

Geomorphology and Landforms: Illustrations from the Himachal Himalaya

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Within the geological outreach literature, John McPhee's collection *Annals of the Former World* represents a gold standard. Its brisk story-telling of geologists and their explorations has excited the imaginations of the public and many budding geoscientists alike. The human stories of geological practice are evocative and detailed, although associated stories of Earth's evolution are impressionistic only. A recent book - *Geology and Landforms: Illustrations from the Himachal Himalaya* - offers Earth's stories with captivating simplicity by building from a broad base of accessible observations: carefully arranged series of field photographs. Accompanying concise text and diagrammatic explanations offer guidance and background information. The direct access to well-curated data allows the reader, novice and professional alike, to enjoy discovery. Therefore this book is fantastic for sharing the wonder of Earth's natural processes with friends and introductory students. It is not out of place as a textbook, but may be even better suited to the coffee table; and how many books can claim both?

The casual reader may initially skip over a brief, figure-rich introduction to Himalayan tectonics and

regional geology and go directly to the beating heart of the book: six chapters of photographs highlighting the geomorphology of the Himachal Himalaya. [Himachal Pradesh (i.e., Himachal State) has long been the most accessible portion of the Indian Himalaya, a half-day's train-ride north of Delhi]. Chapters are organized according to subject matter: Glaciers, Rivers, Lakes, etc. Each chapter begins with a brief overview of relevant information, starting with universal overviews of the topic at hand (e.g., types of glaciers worldwide, modes of structural control of landscape, etc) and finishing with a description of local details (e.g., names and settings of lakes within the Himachal region). These overviews communicate well to a public audience, but do not shy away from reporting recent advances. Indeed, at one point the authors present a compelling argument for a river capture along the Beas River that I have not seen reported elsewhere in the literature. Then, it is on to the photographs, which span 42 years (1962-2004) coincident with the authors' extensive work in the region. The photographs are spectacular, and presented with due respect: there are between 10 and 30 photographs per chapter, one photograph per page. Each photograph has only a one or two line caption; simple explanations of all jargon in the captions can

be found in a glossary. The series of photographs are meticulously ordered, beginning with active examples of the geomorphic system (e.g., merging glaciers, snout glaciers, terminal moraines) and moving gradually to increasingly relict signatures of such systems (e.g., from U-shaped valleys filled with active glaciers to cirques and remnant U-shaped valleys, glacial striations, and the last remnants of a lateral moraine in a landscape otherwise dominated by more recent river erosion). This approach gently leads the novice reader from the vision of a lay-person to the insight of the geoscientist.

The organization of the book, though clever, is somewhat beside the point, i.e., the geomorphology itself. As with an exceptional production of a Mozart opera, the cognoscenti may rave afterwards about the staging concepts, but the bulk of the enjoyment comes from the original dramatic music. Here, the majesty of Himalayan geomorphology provides the core value. Highlights include the sheer walls of the Sutlej River gorge, the dramatic elevation differences separating recent lake beds and river terraces from the active stream, beautifully exposed km-scale folds controlling the geometry of entire mountains, etc.

Some photographs offer dramatic comment on the interactions of humans and the rugged environment: a landslide that smothered a village, scarps from a historic earthquake, a pair of photographs highlighting the differing fates of towns built on fill vs. strath terraces. This social commentary is consistent with the spirit of responsibility inherent in the best traditions of the Geological Survey of India, which the three authors have represented for the bulk of their careers.

Quotations from Tennyson, Shelley, Wordsworth, Coleridge, Browning, and the Vedas introduce different chapters throughout the book, highlighting that for the authors, this book is an expression of romance. Ahluwalia is an established leader in both science and science outreach; Kumbkarni is both a Quaternary geologist and an award-winning photographer; Bhargava is nothing less than the most accomplished living Himalayan geologist in India. Their combined talents and their dedicated intent to communicate the wonders of Himalayan geomorphology have produced a masterpiece of geological outreach literature.