Searle, M. P. *Geology and Tectonics of the Karakoram Mountains*. Chichester (John Wiley and Sons Ltd.), 1991. xviii + 358 pp., 1 coloured geol. map (1:250000). Price (boxed) £175.00.

This is an impressive book. It summarises past and recent knowledge of the geology of the Karakoram mountain range and reviews and interprets its development in relation to tectonic problems and models. One of the most valuable parts of this box-set is the coloured geological map on a scale of 1:250,000. This map and book are the culmination of five years of mapping and subsequent laboratory work by Searle and his colleagues. He has integrated well the recent results with those of earlier geologists, in particular those of the Italian expedition led by Professor Ardito Desio.

The first three chapters provide the regional geological setting by detailing the geophysical and palaeogeographical constraints on the India-Asia collision, as well the tectonics of Central Asia and the Himalaya. The main section of the book consists of separate chapters on Kohistan, the Western Karakoram (Chitral-Yasin), the Hunza region, the Northern Karakoram (Shaksgam, Shimshal, Gasherbrum Group, K2 gneiss), the Karakoram batholith (Baltoro, Biafo, Hushe), the Karakoram Metamorphic Complex, and the Eastern Karakoram (Siachen-Nubra-Ladakh). A useful compilation is made throughout of the isotopic data that provide constraints on the timing of events. Two chapters deal with Quaternary and Present glaciations, and geomorphology, climate and neotectonics. Finally, there is a valuable synthesis and interesting discussion of the orogenic processes responsible for the development of the Karakoram. This includes pre-collisional crustal evolution such as the Kohistan-Karakoram collision, the India-Asia collision, and post-collisional crustal problems such as isograds, *P–T–t* paths, closing temperatures and cooling paths, uplift-erosion-exhumation, magmatic evolution, crustal shortening and thickening, crustal underthrusting and subduction and indentation-extrusion tectonics. The book is very attractively produced by Wiley. It is well illustrated with many photographs of rocks and geological scenery, and maps and sections, very many of which have been specially drawn. And Searle writes well.

The reason why this book is important for the Science is because it would be impossible to summarise all the inter-related geology and discuss all the relevant tectonic, magmatic, geochemical, metamorphic and neotectonic problems in a single paper. We need more books like this which bring together for the reader in one palatable form the geology and development of whole orogenic belts whether they be Phanerozoic, Proterozoic or Archaean. We should be grateful to Mike Searle for slogging up the glaciers of the Karakoram in the first place, and then for sitting down to produce such an excellent and interesting synthesis for us. But it is a pity it is so expensive.

B. F. WINDLEY

Powell, D. *Interpretation of Geological Structure through Maps*. London (Longman), 1992. x + 176 pp. Price £13.99.

This is the latest in a positive glut of books on Map Interpretation – considering the paucity up to about five years ago. Since Moseley's (1979) book with its very personal selection of exercises based on real maps, there have been Butler and Bell's [M.M. 53657] laudible attempt to broaden the whole scope of map interpretation, Lisle's (1988) admirable small book on basic techniques and recently Maltman's (1990) excellent text based on real map examples. In addition, among the old school of 'straight strike-line problem map' books, that by Bolton (1989) is a greater improvement. Each of these offers a different approach to teaching map interpretation. Derek Powell's book is rooted in the strike-line (structure-contour) school, based on problem-maps, but in its depth, variety and execution it sets new high standards.

The first two chapters, which introduce the reader to the nature of geological boundaries, are accompanied to great effect by superb 3-D diagrams which are the hall-mark of this book. The (presumed self-teaching) reader is then taken chapter by chapter through planar surfaces, outcrop shape, linear structures, drill-hole data, isopachytes, faults (very listric), folds (including minor structure analysis) ending with eight general map exercises. The book really ends with another of its innovative features—a detailed analysis of the solutions to the thirty-odd exercises that are developed within the text. The text is accompanied throughout by maps so beautifully drawn that you are persuaded they are real and the level of instruction and cross-referencing is exemplary.

A few—perhaps minor—quibbles. In a book that puts a proper emphasis on unconformities, it is surprising that no mention or analysis is made of facies changes which inevitably accompany the process; similarly, there is no analysis of the

common (and difficult) problem of interpretation of 'buried-landscape' unconformities. The construction of accurate cross-sections is given due attention but I did not think adequate instruction is included to enable a student to draw quickly a true down-plunge profile, with or without topographic correction. The most basic information to be derived from maps of the type presented in this book is the stratigraphic order and the strike and dip of formations (when these are unknown); these are often asked for, but I would like it to have been made clear when a key is *not* showing the order and more emphasis given to the derivation of (and answers to) the strike and dip.

This leads me on to indulge (as Reviewers may) in a very personal consideration of the philosophy behind this approach to the teaching of geological maps. Whilst there is undoubtedly merit in introducing students to this difficult subject with the use of problem maps, with their often unstated stratigraphic order, their regular and mostly straight strike-lines, I do doubt the wisdom of pursuing this approach too far. Real maps (with certain dishonourable exceptions) have strike and dip information and (except in complex areas) give the stratigraphic order, so the student should learn to use this information as soon as possible, either on real or problem maps; strike-lines will still need to be drawn for accurate analysis. On real maps from which I have tried to construct student exercises, I find in contrast to many exercises in this book (and others) that while there is seldom ambiguity about the direction of strike, fold-limbs are highly irregular in both strike and dip and hinges typically non-cylindroidal. The result is a dome and basin strike-line pattern rather of the type that the author here rejects as being too complex (in exercises where the student has to decide between that and a straight line solution). I would also disagree in general with the author's advice that (in the absence of strike/dip information) it is possible to distinguish between curvature of outcrop due to topography from that due to fold hinges or that folds are unlikely to coincide with topographic features.

However, if you are looking for an excellent book which will teach you (or your students) to interpret geological maps from very real-looking problem maps with a considerable (and in my view, proper) emphasis on structure-contours, then this is for you. Its design as a self-teaching manual will be an additional asset to instructors and its level is about right for most first-year University courses in the U.K.

J. TREAGUS