

Structural Analysis and Synthesis: A Laboratory Course in Structural Geology

edited by **Stephen M. Rowland** and **Ernest M. Duebendorfer**, published in 1994 by Blackwell Scientific Publications, ISBN 0-86542-366-0, 279 pages, \$36.95.

Review by **Christopher G. Kendall**

This tightly written book is designed for use in the laboratory portion of a course in structural geology. Punched holes for a three ring binder are provided so as problems in the book are required, the appropriate pages can be ripped out and placed in a binder. These exercises are scattered throughout the book some at the end of chapters, while some are placed after a particular structural characteristic has been discussed and described. The book is full of extremely clear block diagrams, maps, stereo nets, and even some photographs of structurally deformed rocks. Some of the diagrams are designed to be copied, cut out, folded, and stuck together to form three-dimensional displays of the structures that the authors wished to illustrate. These cutout block models are particularly elegant. At the back of the book, there are series of maps of the "Bree Creek Quadrangle" designed to go with some of the exercises. Place names on the maps are a whimsical match to those of the places and people in the Tolkein books. This whimsy adds interest to this extremely professional text.

The book is broken into seventeen chapters and some six appendices. Appropriate references attached to the text with recommendations for further reading. Topics covered by the book include attitudes of lines and planes, outcrop patterns and structure contours, interpretation of geologic maps, geologic structure sections, stereographic projection, folds, stereographic analysis of folded rocks, parasitic and superposed folds, faults, kinematic and dynamic analysis of faults, a structural synthesis, geologic models, brittle failure, strain measurement, balanced cross-section construction, deformation mechanisms and microstructures, and introduction to plate tectonics. In each of the chapters the basic objectives of that chapter are provided in the form of a summary which is followed by exercises and descriptions of particular structural styles or methodology. The narrative is subdivided by bold headings and a specific description of a feature or features followed by the problems. These are usually accompanied by pertinent questions and involve some diagrams that have to be annotated or completed.

This text should be useful to earth scientists who have an interest in structural analysis, be they an expert or approaching the subject for the first time. The book is easy to read and guides the reader through the problems which are challenging and progressively increase in difficulty and sophistication. It was designed for geological students who need to gain understanding of the interpretation of geological maps, though other geologists may find the book to be of interest too. It provides an useful overview to structural geology. Though not designed as a reference text, most structural geologists or geophysicists who have not practiced this field of earth science for some time will find the book will aid them to once more rediscover their geological skills in interpreting structure and structural analysis. Students kept interested by the book and will definitely develop their structural geology skills. Additionally this text may meet the needs of a market for problems for the jaundiced structural geologist, just as there is a market for chess problems and cross-word puzzles. The problems should catch the fancy of those of you who like three dimensional problems. The authors are to be congratulated on producing this volume. It represents many years of synthesis and thought. Its beauty is explanation given by the authors of the various aspects of structural geology provided before each problem. While clearly a volume for the classroom, the exercises of this book extend beyond their original intention and can be used by those of us who need to

broaden our understanding of structural geology and sharpening our understanding of how rocks may deformed and how this deformation can be interpreted.