AAPG Special Paper 280 "Laramide Basement Deformation in the Rocky Mountain Foreland of the Western United States"

edited by **Christopher J. Schmidt, Ronald B. Chase, and Eric A. Erslev**, published by the Geological Society of America, Inc., 3300 Penrose Place, P.O. Box 9140, Boulder, Colorado 80301, ISBN 0-8137-2280-2, 365 pages.

Review by **Christopher G. Kendall**

This text includes two separate plates; a "Simplified Geologic Map of the North Owl Creek Fault" and the "Wyoming Transect". This latter is in fact broken down into three sheets which together form a cross-section across the Wyoming area including the Bighorn Mountains, the Cast Bighorn Basin, the Wind River Basin, and the Wind River Mountains over into the Green River Basin and the Thrust Belt. This cross-section encompasses basement involved thrust generated folds which were seismically imaged in the subsurface across the Central Rocky Mountain Foreland.

The book consists of 17 papers which represent the results of a symposium held in 1990 in the Rocky Mountain Section of the Geological Society of America in Jackson, Wyoming. This symposium and now this book examines the mechanical behavior of the basement of the Rocky Mountain foreland and the effect of the Laramide Foreland deformation. Papers trace the character of the Rocky Mountain Foreland from south western Montana to south central New Mexico. The papers in this book extensively review the character of the folds in this area, recognizing that major low angle thrust folds are common, but that high angle normal and reverse faults do exist in many of the structures. These appear to be secondary to larger basin bounding thrusts that dip gently with depth. The papers investigate the mechanical behavior of the crystalline Precambrian basement, the linkage between folding of the sedimentary cover and the faulting of the underlying basement. The advent of the use of seismic has a changed the character of geologic studies of this area and the book recognizes this. Before seismic sections were available, geologists emphasized the importance of vertical movement in the area. Now, with seismic data, it has been recognized that horizontal motion along low angle thrusts plays a much more important role. Now the question is whether there is an initial stage of penetrative folding in both cover and basement rocks before thrust faulting broke through the steepened forelimb of the fold or whether thrusting and folding occurred simultaneously. The papers in this volume investigate this problem in some considerable detail.

The book is full of a wealth of geological data and interpretation, is tightly written and beautifully illustrated. Illustrations encompass photographs, maps and numerous cross-sections. The photographs include those of outcrops, aerial views, rocks, and thin sections. The paper by Stone on basement-involved thrust-generated folds as seismically imaged in the subsurface of the Central Rocky Mountain Foreland folds sets the stage for the volume and provides a synthesis for the original evolution of the area and its structural deformation. The other papers in the text deal with more detailed aspects of the folding and thrusting in the Rocky Mountains, but Stone's paper provides the core.

Economic geologists and geophysicists who are interpreting thrust folded geometries in Mountainous areas in both western United States and other parts of the world will find the philosophy developed in this text applies to other regions. It is the wealth of information compiled in this book that is so important. Both professionals and graduate students using this book will do so for years to come. It is put well together and I am glad to have it on my shelves.