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BOOK REVIEWS

MINERALS OF NEVADA. By Stephen B. Castor and Gregory C. Ferdock, Nevada Bureau of Mines and Geology, Special publication 31. University of Nevada Press, Reno and Las Vegas; 2004, 512 p., $75.

Billed as the first synoptic catalog of Nevada minerals, this beautifully-produced and well-organized publication ranks as one of the best state mineralogies available. Every mineral species reported from Nevada is listed in alphabetical order. Each mineral entry begins with the chemical formula, followed by a short description of the types of deposits in which the species is found, and then by brief descriptions of the specific occurrences of the mineral, grouped alphabetically by county. The mineral occurrences are usually described in terms of their geology and the form and association in which the mineral has been found. At least one citation is given for each occurrence. More than 100 excellent color photos of minerals are included. A large-scale map showing Nevada's mining districts and most important mineral occurrences is included in a pocket inside the back cover.

The authors were quite thorough in their search for Nevada mineral occurrences. They combed both the scientific and popular mineralogical literature, searched the files of the Nevada Bureau of Mines and Geology Analytical Laboratory, solicited information from mineral collectors and dealers, examined in detail the mineral holdings of the W. M. Keck Museum of the Mackay School of Mines (University of Nevada, Reno) and obtained listings of Nevada specimens from nearly two dozen other museums. Their approach is much more all-inclusive than that employed by H. Earl Pemberton in his 1983 edition of *Minerals of California*. Pemberton was criticized by some for dropping many earlier reports of California mineral occurrences, because he judged them to be unsubstantiated. On the other hand, one entry in *Minerals of Nevada* makes me wonder whether the authors could have been more diligent in checking the information they received. They report the occurrence of clinohedrite from an undetermined locality in Pershing County based upon a listing of mineral specimens in the collection of the Natural History Museum of Los Angeles County. Considering the great rarity of this mineral and the incomplete nature of the locality information, they should have asked for confirmation. It turns out that the name "clinohedrite" had been incorrectly entered in the museum's computer catalog. The species is actually clinoclase, presumably from Majuba Hill, Pershing County. (Another minor criticism related to the authors' references to museum collections involves their use of non-standard acronyms for many museum names, e.g. RMO rather than ROM for the Royal Ontario Museum.)

While the comprehensive listing of mineral occurrences is certainly the most important component of this book, making up roughly two-thirds of its pages, you will also find a number of informative essays written by a variety of authors. These are titled: The Importance of Minerals, Geology and Minerals in Nevada, The Mining and Mineralogical History of Nevada, Nevada Type Localities, Carlin-Type Gold Deposits, Precious-Metal Deposits in Volcanic Rocks, Porphyry and Contact Metasomatic Deposits, Mercury Deposits, Nevada's Industrial minerals, Gemstones of Nevada, Nevada Meteorites, The Goodsprings (Yellow Pine) Mining District, A Personal Nevada Collecting History, Nevada from a Mineral Collector's Standpoint, and Mineral Collectibles from Nevada. The last three of these suggest that the book is slanted toward the mineral collector, but geoscientists, students and even the layman will find much of interest. Unfortunately, as might be expected for such a composite of articles by many different authors, the quality and style of the writing is rather uneven. Some essays are a pleasure to read, while others are flawed by overlong sentences, poor phrasing and unexplained technical jargon.

Minor faults notwithstanding, this is an excellent publication and an essential resource for anyone interested in Nevada minerals.

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URANIUM-SERIES GEOCHEMISTRY by B. Bourdon, G. M. Henderson, C. C. Lundstrom, and S. P. Turner (eds.). Mineralogical Society of America Reviews in Mineralogy and Geochemistry, Vol. 52, 2003, 656 p. $40($30 for MSA members)

This volume was written to support a two-day short course held in the Spring of 2003 in Paris, France just prior to the joint EGS/AGU/EUG meeting. This book represents a ten-year reunion to update the two editions of "Uranium-series Disequilibrium, Applications to Earth, Marine, and Environmental Sciences," edited by M. Ivanovich and R. S. Harmon that were published in 1982 and 1992. It also celebrates the nominal 100 year anniversary of the discovery of the uranium decay series. The goal of the volume is to present an overview of key U-series related research over the last 10 years for the non-specialist. The theme is that technical breakthroughs lead to important new application of U-series techniques. The breakthroughs go beyond the obvious improvements in the analytical measurements and extend to new sampling methods, models, and computational tools.

The volume consists of 16 chapters along with some important preface material. After an introduction on U-series systematics and an update on recent advances in measurement techniques, the remaining chapters deal with processes occurring within the last one million years and organized from high to low temperature. The topics include: mineral-melt partitioning, dating young volcanics, mid-ocean ridge basalts, intraplate volcanism, convergent margins, groundwater, marine and lacustrine carbonates, speleothems, oceans – over short and long timescales, rivers and weathering, estuaries, human evolution, and finally the statistical treatment of U-series data. There is sufficient introductory material in each chapter so that the reader can jump around without getting lost. However, it is easier to follow the plot if the chapters are read in order. For example, knowing about U-series partitioning into garnet sets up the following chapter covering the evolution of mid-ocean ridge basalts. All chapters are good, but for the non-specialist I especially recommend the chapter on human evolution by A. W. G. Pike and P. B. Pettitt-great reading!

This volume is relatively inexpensive, which is a both a strength and a weakness. It will be attractive to students because of the low cost but the smallish print, lack of color figures, lack of an index and glossary, and the high rate of typographic errors will make it less inviting and potentially confusing to the non-specialist.

This book belongs on the bookshelves of all U-series researchers. The updated tables of decay schemes and half-lives along with a rich selection of references will be there when needed for preparing publications and proposals, and the "Pitfalls in Data Presentation" section in K. R. Ludwig's chapter on data treatment should serve as a checklist when working up results. The book is also of value to the non-specialist. The international cast of authors does a thorough job of updating key areas of U-series related research over the last decade and their enthusiasm for the topics comes through in the writing. I recommend this book.

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INTRODUCTION TO THE PHYSICS OF THE EARTH'S INTERIOR. Second Edition, by Jean-Paul Poirier Cambridge University Press, 2000 312 pp. ($80 hardback, $34.95 paper)

The theme of this small book is elementary, covering classical solid state physics applied to some problems of the Earth's interior. The level of coverage is aimed at advanced undergraduate or early graduate students. This book can also be considered as an update of Francis Birch's classic 1952 paper on "Elasticity and the Internal Constitution of the Earth." It should also be required reading for those specialists who attempt to model deep Earth processes.

Subjects covered include thermodynamics of solids, elasticity, lattice vibrations, equations of state, melting, transport properties, and phase changes. There are also sections on shock waves, thermal history, and convection.

Much of mineralogy and geophysics is based on classical physics and this is an excellent introduction. Poirier has a delightful style and this book, although elementary, is rigorous. It fills an important niche. Deep Earth physics requires a thorough background in what is now known as condensed matter physics. Other current books on convection, mantle dynamics and geochemistry do not adequately address the effects of pressure on material properties. Many convection simulations still use the Boussinesq approximation, which is not adequate for pressures inside the Earth's mantle. Many interpretations of tomographic images and geochemical data also depend on assumptions about thermal parameters that do not vary much with depth. Concepts such as narrow plumes, homogeneous mantle and whole mantle convection rely on simple pot-on-the-stove type analogies that ignore the effects of pressure.

This book is a worthy and welcome celebration of the 50th anniversary of Birch's famous paper, and a good stimulus to reread that paper.

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