Geoscience Canada

Copper: Its Geology and Economics

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Volume 5, Number 3, September 1978

URI: https://id.erudit.org/iderudit/geocan5_3br02

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Publisher(s)

The Geological Association of Canada

ISSN

0315-0941 (print)
1911-4850 (digital)

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Cite this review

Walker, P. N. (1978). Review of [Copper: Its Geology and Economics]. *Geoscience Canada*, *5*(3), 156–156.

Copper: Its Geology and Economics

By Robert Bowen
and Ananda Gunatilaka
Halsted Press Division of John Wiley and Sons, New York 366 p., 1977.
$49 50

Reviewed by P. N. Walker
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Copper mining has been called the second oldest profession and the development of the copper industry closely parallels the development of man's technology Despite the antiquity of the industry, and the proliferation of geological literature, there is a dearth of publications that integrate the geological, technological and economic aspects of the industry to provide an overview The volume attempts this ambitious task, but unfortunately the attempt must be classified as a failure The promise is there, but inadequate preparation and an unbalanced treatment of the subject leave this promise unfulfilled.

The prime emphasis is on the geology of copper deposits, particularly on the theoretical and mechanistic aspects of ore formation with somewhat perfunctory treatment being rendered to the economic aspects of the industry. An introductory chapter covers the geochemistry, consumption, production and geographic distribution of copper and copper deposits. This is followed by a discussion of the relationship between copper deposits and plate tectonics, particularly the relationship between porphyry copper deposits and convergent plate margins. Descriptive chapters constitute 65 per cent of the book with a four-fold division into deposits of plutonic association, hydrothermal vein association, volcanogenic-sedimentary association and stratiform copper deposits Two chapters on the structure of the production and distribution aspects of the industry and on its future conclude the book. Appendices include a list of copper mineral species, geographic copper consumption tables, U S mine production statistics and a somewhat irrelevant discussion of biogeochemical exploration techniques.

The descriptive chapters concentrate on genetic theories and the descriptions of deposits are skimpy and disorganized. Numerous ill founded and even erroneous generalizations and assertions are made, e.g , the twice repeated statement that there are no copper ores in the volcanic rocks of the Canadian Shield. Extensive, but unfortunately not exhaustive check lists of deposits are included with each chapter, but these contain so much erroneous information that they are of dubious value A list of important copper porphyry deposits includes numerous Canadian examples with little or no porphyry affiliations such as Mattagami Lake, Manitouwadge and Consolidated Rambler but omits the Lornex and Gibraltar deposits. Other check lists are similar mines of misinformation, with numerous misspellings of place names, mislocation of deposits (Lake Dufault, Ontario), misclassification of deposits (Thompson, Manitoba a Zn-Cu deposit) and even the classification of the same deposit in two different categories under different names One list of Canadian Cu-Zn volcanogenic deposits contains 14 errors in only 32 entries.

Unfortunately this sloppiness pervades all sections of the book Figures are incorrectly labelled and text references to figures are inaccurate. Many statements are ambiguous or contradictory The tone is set by a figure on page 2 which shows the progressive decrease in copper grades with time, but does not state whether these are average or minimum ore grades

Sections on copper marketing, and pricing mechanisms are brief but adequate The importance of porphyry copper deposits, particularly those in the Western Hemisphere, as the major source of copper on land in the near and mid term future is rightly emphasized. A chapter on the future of the industry provides adequate coverage of the occurrence of copper in manganese nodules and the potential importance of this source.

Overall this volume suffers from apparent hasty preparation, without the checking of facts and editing of text and figures which should be expected in a technical publication particularly one of this price

MS received May 10, 1978

Applied Salt-Rock Mechanics: v.1.: The In-Situ Behavior of Salt Rocks

By C. A. Baar
Elsevier Scientific Publishing Company, 294 p. 1977.
U S $38 95

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The first volume of Applied Salt-Rock Mechanics provides a detailed critique of technical and scientific literature devoted to the geology, physical properties and in-situ mechanical behavior of salt rocks. In his introduction the author claims that erroneous and misleading hypotheses, which he considers cannot be reconciled with observations of the actual in-situ behavior of salt rocks, have led in the past to serious problems in the potash mining industries of Europe and North America This volume is intended to draw attention to what the author believes are the misconceptions of a number of research workers and consultants in the field

In the least controversial section of the volume the author provides a rather abbreviated discussion of the geology of evaporate deposits The reviewer considers there would have been considerable merit in enlarging the sections on texture, stratification and structural geology, particularly in view of the dependence of the mechanical properties of salt rocks on their depositional and deformational history

The bulk of the volume is devoted to chapters on the physical properties of salt rocks and their mechanical behavior under conditions met in conventional underground mining. The author provides a sometimes refreshingly intuitive approach, based on detailed observations of underground deformations, to the mechanical behavior of salt rocks He analyzes and criticises the results of research and consequent hypotheses of most workers in the field The reviewer, while admiring the courage required to forward this no-nonsense practical approach, has reservations concerning an inclination of the author to disregard certain fundamental physical laws,