

Developments in Economic Geology

Volume 3:

WORLD MINERAL SUPPLIES

Assessment and Perspective

edited by G.J.S. GOVETT and M.H. GOVETT

1976. xii+460 pages. US \$34.75/Dfl. 90.00.
ISBN 0-444-41366-9

The adequacy of world mineral supplies to meet growing world consumption, while of vital concern to economists and politicians, is ultimately a technical problem requiring a scientific as well as a political evaluation and solution. This book assesses the current world mineral demand and supply, the factors determining mineral availability, the distribution of mineral resources, and the shortcomings of current demand and supply projections.

CONTENTS: Introduction. Part I. An Assessment of World Mineral Supplies. 1. Defining and measuring world mineral supplies. 2. Price, technology and ore reserves. 3. The abundance and availability of mineral resources. 4. Geographic concentration of world mineral supplies, production, and consumption. 5. Recent trends in energy consumption and supply. Part II. A Perspective on World Mineral Supplies. Problems of future demand and supply. 6. World economic development and future mineral consumption. 7. Future world energy demand and supply. 8. Marine mineral resources. 9. Conservation of minerals and of the environment. Developments in mineral exploration and exploitation. 10. Mineral exploration and technical cooperation in the developing countries. 11. The development of geochemical exploration methods and techniques. 12. Future trends in geophysical mineral exploration. 13. Development of deep mining techniques. 14. Mineral extraction and processing technology in future. Appendix. UNDP-assisted projects in geology and mineral resources. Subject index.

Volume 4:

SEMICONDUCTING ORE MINERALS

by R.T. SHUEY

1975 xii+416 pages. US \$21.25/Dfl. 55.00
ISBN 0-444-41357-X

The subject is treated more comprehensively than hitherto. It is the aim of the author to give an understanding of the electronic band structure, the properties of charge carriers, and the electrically active defects naturally present in a number of minerals. Geophysicists, geochemists and extractive metallurgists will find this volume to be a most useful reference source.

Volume 2:

CONCEPTUAL MODELS IN EXPLORATION GEOCHEMISTRY

The Canadian Cordillera and Canadian Shield

compiled and edited by P.M.D. BRADSHAW

Reprinted from the Journal of Geochemical Exploration, Vol. 4, No.1

Association of Exploration Geochemists Special Publication No. 3

1975 xii+224 pages US \$14.95/Dfl. 39.00
ISBN 0-444-41314-6

This book is the first comprehensive survey of the established principles of exploration geochemistry in the Canadian Cordillera and the Canadian Shield, and provides a valuable guide to exploration geochemists working in these two environments. The principles of the uses of exploration geochemistry have been synthesized into a series of comprehensive conceptual models based on field data from the literature and 38 new case histories presented in this volume. A summary of the observed length and strength of geochemical dispersion about some 41 known mineral deposits is also given.

Volume 1:

GEOCHEMICAL EXPLORATION 1974

Proceedings of the Fifth International
Geochemical Exploration Symposium, held in
Vancouver, Canada, April 1-4, 1974, Sponsored
and organized by the Association of Exploration
Geochemists

edited by I.L. ELLIOTT and W.K. FLETCHER

1975 xii+720 pages US \$57.50/Dfl. 150.00
ISBN 0-444-41280-8

This volume comprises more than forty papers presented at the Symposium. It includes the opening address "Environmental Problems and the Exploration Geochemist" which is followed by general session papers describing case histories and the uses of exploration geochemistry in several countries. This is succeeded by five sections with well-defined themes - Statistical Techniques (7 papers), Primary Dispersion (10 papers), Exploration in Lateritic and Tropical Terrains (10 papers), Exploration in Glaciated Terrain (6 papers), and Analytical Geochemistry (5 papers).

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TEKTITES AND THEIR ORIGIN

by JOHN A. O'KEEFE

DEVELOPMENTS IN PETROLOGY, 4

1976. xii + 244 pages
Price: US \$36.50/Dfl. 95.00
ISBN 0-444-41346-4

The lunar missions, the discovery of the microtektites, the studies of Muong Nong glass, and the application of ideas from glass technology have forced a complete revision of the hypotheses concerning the origin of tektites (which are glass pebbles that have fallen from the sky). It has long been disputed whether they were ejected from the moon or from meteorite-impact craters on the Earth. New data, in the form of hundreds of papers, has been appearing so quickly that most of the available information has neither been digested nor summarized in any previous book.

This volume summarizes more than 600 papers on distribution, structure and composition of tektites. It is directed toward a wide range of readers, including specialists in meteorites, lunar science, mineralogy, glass science, geology and petrology, and to planetary astronomers, lapidaries, mineral collectors, and those interested in the puzzles and paradoxes of science.

CONTENTS: 1. Definition and Historical Introduction. 2. Tektite Distribution, the Strewn Fields and their Geologic Relations. 3. The Shapes of Tektites. 4. The Internal Structure of Tektites: Petrography. 5. Physical Properties of Tektite Glass. 6. The Chemical Composition of Tektites. 7. Isotopes, Fission Tracks and Cosmic Ray Tracks. 8. The Terrestrial Origin of Tektites: Arguments in Favor. 9. The Terrestrial Origin: Arguments Against. 10. Conclusions. List of References.

VOLCANISM IN AUSTRALASIA

A collection of papers in honour of the late G.A.M. Taylor, G.C.

edited by R.W. JOHNSON

1976. xvi + 406 pages
Price: US \$23.25/Dfl. 60.00
ISBN 0-444-41462-2

In the last few years, a considerable amount of new geological and seismological work has been accomplished on the volcanoes of the Australasian region - especially those in the island-arc regions to the north and east of Australia.

This comprehensive volume is the first-ever compilation of research papers by investigators actively involved in this field. The book is being published shortly after a time (1974-75) when some volcanoes in the region have been especially active, descriptions of important eruptions thus becoming available very soon after the events. Both the scope and treatment are wide, and all the specialist branches of volcanology are represented: volcanology sensu stricto, i.e. observations of eruptions; geology of old volcanoes and volcanic products; petrology, geochemistry, and mineralogy of volcanic rocks; volcanic histories compiled from unpublished or generally inaccessible documents; volcanic land forms; tectonics of island-arc volcanic chains; tephrochronology; geochemistry of volcanic emanations; seismic refraction studies of volcanic areas; seismic surveillance of volcanoes; volcanic seismology; volcanism and mineralisation; gravity studies of volcanoes.

The twenty-eight papers are arranged geographically starting with Australia and moving clockwise through Indonesia, Papua New Guinea, the Solomon Islands and Tonga, to New Zealand.

Extensively illustrated by black-and-white and colour photographs, maps, chemical variation diagrams, eruption diagrams and tabulations of chemical and seismological data, the book will interest all those concerned with the subjects listed above, and particularly volcanologists and petrologists.

RECENT CRUSTAL MOVEMENTS

edited by N. PAVONI and R. GREEN

Reprinted from the journal Tectonophysics, Vol. 29 (1-4)

DEVELOPMENTS IN GEOTECTONICS, 9

1976. xiv + 554 pages
Price: US \$36.50/Dfl. 95.00
ISBN 0-444-41420-7

This volume contains fifty-five papers presented at the Fifth International Symposium on Recent Crustal Movements, held in Zurich, Switzerland, from 26 to 31 August 1974. The papers are grouped according to their topics under the following headings: geodetic investigations, geological-geomorphological investigations, geophysical investigations, in-situ stress measurements/crustal stresses, seismotectonics/active faults, and plate tectonics/continental drift.

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New books in DEVELOPMENTS IN PETROLEUM SCIENCE

Volume 5:

Oil Shale

edited by TEH FU YEN and
GEORGE V. CHILINGARIAN

1976 xii+292 pages
Price: US \$34.75/Dfl. 90.00
ISBN 0-444-41408-8

Oil shale is an important source of fossil fuels. In the tri-state area of Colorado, Utah and Wyoming alone, there are reserves equivalent to about two trillion barrels of oil locked in place. From an economic standpoint, oil shale is the most promising of the three supplemental energy sources (i.e. tar sands, coal and oil shale). With an all-out effort, the United States, for example, could develop a shale oil industry producing from 1,000,000 - 1,500,000 bbl/day by 1985. In the past three decades no comprehensive treatise has been available on this topic, especially dealing with the basic science and technology of this tremendously important field.

The contributors of various chapters in this book are internationally known authorities in their fields of specialty. This volume can be used as a textbook in courses on fuel science and energy technology, as well as a reference for the personnel of industrial and governmental laboratories and agencies and the management.

CONTENTS: 1. Introduction to Oil Shales (T.F. Yen and G.V. Chilingarian). 2. Geological Setting of Oil-Shale Deposits and World Prospects (D.C. Duncan). 3. The Origin and Formation of Oil Shale (R.F. Cane). 4. Origin and Characteristics of Green River Oil Shale (W.E. Robinson). 5. Mineralogy of Oil Shale (W.C. Shanks, W.E. Seyfried, W.C. Meyer and Th.J. O'Neil). 6. Chemical Separation and Characterization of Kerogen from Oil Shale (J.D. Saxby). 7. Structural Aspects of Organic Components in Oil Shales (T.F. Yen). 8. Biological Fossil Hydrocarbons in Shales (E.J. Gallegos). 9. Retorting Technology of Oil Shale (G.U. Dinneen). 10. Evaluation of Oil Shales Using Geophysical Well-Logging Techniques (W.H. Fertl). 11. Environmental Analysis of an Oil-Shale Industry in the Upper Colorado Region (D.W. Hendricks and J.C. Ward). 12. Survey of Oil-Shale Research in the Last Three Decades (C.H. Prien). Index.

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Volume 4:

Geomorphology of Oil and Gas Fields in Sandstone Bodies

by C.E.B. CONYBEARE

1976 x+342 pages
Price: US \$26.95/Dfl. 70.00
ISBN 0-444-41398-7

During the past fifteen years there has been a number of significant publications relating to petroleum exploration and the search for elusive stratigraphic traps in sandstone bodies. This information has been distributed in a variety of publications.

This book collates and summarizes many published case histories of oil and gas fields producing from sandstone bodies, and classifies these bodies according to their depositional environments. In particular, it discusses the geographic setting, sedimentary processes, and stratigraphic features of sandstone bodies, classifying them and describing a number of examples of oil and gas fields producing from sandstone bodies. It serves as a reference for petroleum geologists, geophysicists and geographers.

CONTENTS: Introduction. 1. River Channels. 2. Distributary and Delta-Fringe Sand. 3. Barrier and Other Offshore Bars. 4. Regressive Marine Shoreline Sand. 5. Transgressive Marine Shoreline Deposits. 6. Submarine Valleys. 7. Tidal Current Sand Bodies. 8. Alluvial Fans and Sheets. 9. Eolian Sand. References. Subject Index.

Volume 2:

Abnormal Formation Pressures

Implications to Exploration, Drilling, and
Production of Oil and Gas Resources

by WALTER H. FERTL

with a contribution by GEORGE
V. CHILINGARIAN and HERMAN H. RIEKE III

1976 xviii+238 pages
Price: US \$30.95/Dfl. 80.00
ISBN 0-444-41328-6

CONTENTS: 1. Abnormal Formation Pressure Environments. 2. Compaction of Argillaceous Sediments (G.V. Chilingarian and H.H. Rieke III). 3. Geophysical Methods Detect and Evaluate Abnormal Formation Pressures. 4. Drilling Data Detect and Evaluate Abnormal Formation Pressures. 5. Geophysical Well-Logging Techniques Detect and Evaluate Abnormal Formation Pressures. 6. Drilling and Completion Concepts in Overpressured Formations. 7. Reservoir Engineering Concepts in Abnormal Formation Pressure Environments. 8. Appraisal of Hydrocarbon Distribution and Related Economic Factors in Normal and Abnormal Formation Pressure Environments. 9. Global Occurrence and Evaluation of Abnormal Formation Pressures. Appendix. References. Index. Subject Index.

DEVELOPMENTS IN SOLID EARTH GEOPHYSICS

Volume 8:
**INTRODUCTION TO
DIGITAL FILTERING IN
GEOPHYSICS**
by OTA KULHÁNEK

1976. xii+168 pages
Price: US \$23.25/Dfl. 60.00
ISBN 0-444-41331-6

An attempt is made here to present available information pertinent to filtering techniques employed in geophysics in a systematic and tutorial form. Emphasis is put on an understandable presentation of principles for the benefit of researchers in geophysics who have little or no experience with digital processing methods. With the help of this book, they will be able to design for themselves appropriate filters to discriminate between signals and noise. Also provided is the background necessary to follow the recent rapid development of more sophisticated filtering techniques. Applications are covered by references dealing with seismological problems and other geophysical branches, such as gravity, geomagnetism etc.

CONTENTS: 1. Fundamental Relations. Definitions. Relationships between input and output signals. Relationships between input and output statistical characteristics. Signal distortion due to the transmission through a filter. Analog-digital conversion. z-transform. Input-output relationships for digital systems. Stability of digital systems. 2. Design Principles of Digital Filters. Nonrecursive filtering. Pole-zero technique. Approximation of analog systems. Phase-distortionless filters. Effects of quantization in digital filters. 3. Low-, High- and Band-Pass Filters. Low-pass filters. High-pass filters. Band-pass filters. 4. Correlation and Optimum Filters. Correlation filters. Matched filters. Wiener optimum filters. Polarization filters. 5. Deconvolution Filters. Exact deconvolution. Truncated approximate deconvolution. Least-squares approximate deconvolution. Trace decomposition. 6. Multi-Dimensional Filters. SS technique. Basic requirements for array patterns. DS and WDS techniques. Improvement of the signal/noise

ratio due to DS and WDS techniques. Velocity filtering. References. Subject Index.

Volume 9:
**EARTHQUAKE
PREDICTION**

by TSUNEJI RIKITAKE

1975. xvi+352 pages
Price: US \$36.50/Dfl. 95.00
ISBN 0-444-41373-1

During the past two years, successful forecasts of earthquake magnitudes have been made in China, the United States and Japan. Earthquake prediction, long a dream of seismologists as well as of the public, has now become a matter of actuality although much work still needs to be done in order to accomplish a prediction of higher accuracy.

CONTENTS: 1. Introductory Remarks. 2. Foretelling Earthquakes - Various Legends. 3. Birth of Prediction-Oriented Earthquake Science. 4. Earthquake Prediction Programs. 5. Land Deformation as Detected by Geodetic Surveys. 6. Land Deformation Relative to Sea Level. 7. Continuous Observation of Crustal Movement. 8. Seismic Activity. 9. Change in Seismic Wave Velocities. 10. Geomagnetic and Geoelectric Effects. 11. Active Faults and Folding. 12. Other Elements for Earthquake Prediction. 13. Laboratory Experiments. 14. Dilatancy Models. 15. Theory of Earthquake Prediction. 16. Earthquake Modification and Control. 17. What to do with an Earthquake Warning? References. Index.

Volume 7:
**SPECTRAL ANALYSIS IN
GEOPHYSICS**
by MARKUS BÄTH
1974. xvi+563 pages.
Price: US \$46.25/Dfl. 120.00
ISBN 0-444-41222-0.

Volume 6:
PHYSICAL VOLCANOLOGY
edited by L. CIVETTA,
P. GASPARIINI, G. LUONGO and
A. RAPOLLA
1974. xvi+333 pages
Price: US \$34.75/Dfl. 90.00
ISBN 0-444-41141-0

Volume 5:
**THE PHYSICAL
PRINCIPLES OF ROCK
MAGNETISM**
by F.D. STACEY and
S.K. BANERJEE
1974. ix+195 pages
Price: US \$24.95/Dfl. 65.00

Volume 4:
**MATHEMATICAL ASPECTS
OF SEISMOLOGY**
by M. BÄTH
1968 xii+415 pages
Price: US \$42.50/Dfl. 110.00

Volume 3:
**METHODS IN
PALAEOMAGNETISM**
edited by D.W. COLLINSON,
K.M. CREER and S.K. RUNCORN
1967. Out of print.

Volume 2:
**ELECTROMAGNETISM AND
THE EARTH'S INTERIOR**
by T. RIKITAKE
1966. xi+308 pages
Price: US \$40.50/Dfl. 105.00

Volume 1:
**THE EARTH'S CRUST
AND MANTLE**
by F.A. VENING MEINESZ
1964. x+124 pages
Price: US \$19.25/Dfl. 50.00

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