

Book news

1. Reviews

● *Underground support systems*, by the National Coal Board, London, 1980. 84 pp. £1.95.

(Reviewer: H. Wagner)

This training manual is divided into nine chapters dealing with rigid hand-set supports, yielding hand-set supports, chocks and packs, powered supports, control of powered supports, face end support, roadway support, strata reinforcement, and the law relating to underground support.

Although the manual is primarily designed to cover support problems encountered in British coal mines, the chapters on powered support, control of powered support, face end support, and strata reinforcement should be particularly useful for South African coal mines that either employ mechanized longwall mining systems ahead or intend to introduce this method of mining in the not-so-distant future. The only chapter missing is one on roofbolt support.

The outstanding features of the training manual are the clear and concise text and the numerous illustrations, many of which are in colour.

The training manual, which is excellent value for money, can be ordered from HQ Purchasing and Stores Department, National Coal Board, Hobart House, Grosvenor Place, London, SW1X 7AE, England.

● *Mining geostatistics*, by A. G. Journel and Ch. J. Huijbregts. 600 pp. Academic Press London ISBN 012.391050.1. Price \$74

(Reviewer: D. G. Krige)

This work is the most comprehensive and authoritative textbook on geostatistics published to date. The authors have linked the theoretical and applied sides of the subject throughout in a way that ensures that the book will be used extensively as a reference work both in academic and mining circles for many years to come.

The authors have drawn on their vast experience, both theoretical and applied, gained during some ten years of work at the Centre de Geostatistique, Fontainebleau, under the direction of G. Matheron, as well as from the associated practical consulting work done for mining companies. The book covers all the essential aspects of geostatistics in a methodical and clear manner. These cover all basic geostatistical concepts, the structuring of spatial variability, local estimation via kriging, conditionally unbiased estimates of ore reserves under selective mining conditions and at all the stages of exploration and exploitation of the ore-body, practical simulations of the *in situ* variability within an ore-body for purposes of mine planning, and a somewhat brief coverage of the more recent developments in non-linear geostatistics. Throughout the authors stress the essential link-up between geostatistics and other associated disciplines, such as geology and mining engineering, which also have an impact on the problems requiring solution.

This book is highly recommended as a reference work for all geostatisticians, geologists, mining engineers, and others who are required to interpret and take important

decisions on two- or three-dimensional data that, as is usually the case, exhibit both structured and random characteristics.

2. New journals

● The *International Journal of Coal Geology* is committed to treating the basic and applied aspects of the geology and petrology of coal in a scholarly manner. Its scope encompasses the genesis of coal and coal seams, including studies of modern coal-forming processes and environments; the metamorphosis of coal materials in coal seams and dispersed in other rock types; the geology of coal measures including the stratigraphic, structural, geomorphic, paleogeographic, paleoecologic, hydrogeologic, palynologic, paleozoologic and paleobotanic facets of the subject; the petrology and petrography of coal and coal seams including coal mineralogy, geochemistry, and the chemical and physical constitution of coal.

The journal aims to stimulate the development of the science of coal geology in all parts of the world and to facilitate the dissemination of information on coals from all continents to all those who can benefit from such information. The types of contributions to be published are papers describing original research results, proceedings of symposia, surveys, reviews, book reviews, overviews of recent literature, letters to the editor.

The Journal which, is published quarterly, is available from Elsevier Scientific Publishing Company, P.O. Box 211, 1000 AE Amsterdam, The Netherlands, at U.S. \$82.50/Dfl. 161.00 including postage.

● *Physicochemical hydrodynamics*, a new journal published quarterly by Pergamon Press, New York. Annual subscription US\$72, two year rate US\$136.80.

The prime aim of this journal is to foster the growth and recognition of the subject as a coherent and structured interdisciplinary science, by providing a vehicle for communication between researchers who approach it from any of the neighbouring sciences. A second aim is to promote understanding and the transfer of useful knowledge between scientists concerned with physicochemical hydrodynamics at a fundamental level and those whose interests are in its manifestations in engineering and the natural environment.

3. New books

● *The uranium people*, by Leona Marshall Libby. New York, Crane Russack, 1980. 341 pp. + 321 pl.

The story of the early years of atomic energy and the development of nuclear weapons, is told by the youngest and only woman member of the group that built the first nuclear reactor. Leona Marshall Libby recounts the story of the Manhattan project, telling not only what is scientifically interesting but also much that is of human interest about her former colleagues. These include such central characters as Nobel Laureate, Enrico Fermi, Edward Teller, Leo Szilard, Herbert Anderson, Robert Oppenheimer, and many other talented individuals who played such an important role in scientific history. The

author describes their characteristic approaches to the problems of physics and chemistry, their ethnic and scientific backgrounds, and their personal lifestyles. She discusses how they wrestled with, or reconciled, the inevitable questions of conscience, or were involved in the military and political aspects of the uranium-plutonium project.

● *Mechanical properties at high rates of strain*, edited by Harding, London, Institute of Physics 1979.

Second Conference on the Mechanical Properties of Materials at High Rates of Strain, Oxford, March 1979. Relevant to physics, materials and testing technologies, and mechanical engineering.

● *A guide to associations, industrial councils, trade unions and co-operatives in the Republic of South Africa*, 1979, compiled by C. I. de Kock. Pretoria, Bureau of Market Research. *Research Report* no. 79, 1980. R52. (Available from the Bureau, P.O. Box 392, Pretoria 0001.)

There is a growing realization among business men today that meaningful decision-making is dependent on statistical facts, and their researchers are invariably under pressure to produce such information quickly and cheaply. In most organizations, the need for references to existing, secondary sources of information is urgent and wide-ranging. This guide indicates the type of research information that is available from over 1 000 trade, industrial, and professional associations, 600 farmers' associations, 100 industrial councils, 160 trade unions, and 500 agricultural and retail co-operatives.

It is the third guide to be published by the Bureau to sources of secondary information. The first, *A guide to statistical sources in the Republic of South Africa*, covers statistics available from official and other sources, and the second, *A guide to directories, year books and buyers' guides in the Republic of South Africa*, contains information on a variety of subjects.

● *The importance of the geosciences for the supply of mineral raw materials*, edited by F. Bender. Stuttgart, Schweizerbart'sche Verlagsbuchhandlung, 1977. 136 pp. DM 48.

Proceedings of the First International Symposium on Natural Resources, Hannover, 25th to 26th October, 1976.

● *The mineral resources potential of the Earth*, edited by F. Bender. Stuttgart, E. Schweizerbart'sche Verlagsbuchhandlung, 1980. 156 pp. DM 54.

Proceedings of the Second International Symposium on Natural Resources, Hannover, 18th to 20th April, 1979.

● *Diamond cutting. A correct guide to diamond processing*, by Basil Watermeyer. Cape Town, Purnell & Sons, 1980.

Up to now the diamond cutting business has been a closed shop. As diamond cutters who are adept at fancy cuts are few and far between, and tend to keep their skills to themselves, there is a lack of literature on the subject. This book incorporates notes the author has been compiling during his 33 years as a diamond cutter, and should serve as an invaluable guide to diamond-cutters, jewellers, and the man in the street. The Barion cut, which was perfected by the author, is explained fully

for the first time. Incorporating both vertical faceting and horizontal steps, it can be adapted to any angular stone. The cut combines the intricate craftsmanship of the emerald cut with the brilliance of the round cut.

● *International tectonic lexicon*, edited by J. G. Dennis, H. Murawski, and K. Weber. Stuttgart, E Schweizerbart'sche Verlagsbuchhandlung, 1979. 153 pp. DM 48.

This volume brings together a first selection of important tectonic terms, explains their meaning, and suggests equivalents in the six languages of the International Geological Congress: English, French, German, Italian, Russian, and Spanish. It is in two parts: Part I, Fundamental Tectonic Terms, includes terms that are considered to be important in geological documentation; Part II, Terminology of Cleavage and Schistosity, is designed to be a prototype for similar compilations in other specialized areas.

● *Molybdenum resources guidebook*. Dana Point (U.S.A.), Minobras, 1980. U.S. \$89.00

This compendium gives locations and descriptions of mines, deposits, and occurrences in the U.S.A. and Canada. Also included are descriptions, geology, mineralogy, and ore controls for deposits elsewhere in the world. Copies are obtainable from Minobras, P.O. Box 262, Dana Point, California 92629, U.S.A.

4. Canadian reviews

The following reviews of the activity and developments during 1978 in respect of the chief minerals produced or consumed in Canada are now available. Prepared by members of the Mineral Policy Sector staff, they are for sale at \$1.00 per copy.

Antimony, by J. J. Hogan. 6pp.

Bismuth, by J. J. Hogan. 5pp.

Cement, by D. H. Stonehouse.

Clays and clay products, by G. O. Vagt. 10pp.

Columbium (niobium) and tantalum, by A. J. Webb. 4pp.

Fluorspar, by G. H. K. Pearse. 6pp.

Mercury, by J. J. Hogan. 5pp.

Nepheline syenite and feldspar, by G. H. K. Pearse. 5pp.

Silica, by G. H. K. Pearse. 6pp.

Silver, by J. J. Hogan. 26pp.

Talc, soapstone and pyrophyllite, by G. H. K. Pearse 5pp.

Zirconium, by M. A. Boucher. 8pp.

Requests for copies should be addressed to Canadian Government Publishing Centre, Supply and Services Canada, Hull, Quebec, Canada KIA 0S9, accompanied by postal money order payable to the Receiver General for Canada.

5. NIM reports

The following reports are available free of charge from the National Institute for Metallurgy, Private Bag X3015, Randburg, 2125 South Africa.

● Report 2034

A rapid method for the determination of uranium in ores and carbonaceous materials by X-ray-fluorescence spectrometry.

The determination of uranium by a non-fusion method in a wide range of uranium-bearing materials, e.g., ores, coals, and resins, is described. Matrix effects are corrected

for by dilution and fine grinding of the sample with coarse river sand and application of a technique for background correction. The linear calibration range is up to 1000 p.p.m. of U_3O_8 .

It was found that the suitable dilution of resins with river sand and fine grinding makes it possible for up to 6 per cent U_3O_8 to be determined. Ten samples can be analysed in two-and-a-half hours. The precision and accuracy are 5 and 2 per cent at U_3O_8 concentrations of 500 and 2000 p.p.m. respectively.

The laboratory method, a listing of the computer programme required for the calibration and calculation of the U_3O_8 concentrations, and instructions for the calculation of the error in the determination are given in the appendices.

● Report 2039

The determination of free acid in the presence of hydrolysable cations.

The investigation of seven methods for the determination by titration procedures of free acid in the presence of hydrolysable cations is reported. The methods are directed primarily at the determination of the concentration of free acid in solutions resulting from the leaching of gold and uranium ores with sulphuric acid.

An examination was made of the effects of the individual cations Fe(II), Fe(III), Al(III), and Mn(II) at concentrations of about 2 g/l and 10 g/l on solutions containing sulphuric acid at concentrations of about 0,6 g/l, 1 g/l, and 3 g/l. The pH values of the solutions were plotted against the corresponding volumes of titrant for five of the methods that involved titration with an alkali. This procedure was also used for a solution containing a mixture of the above cations and Ca(II) at concentrations similar to those of uranium-plant leach liquors, for two production-plant uranium leach liquors and for liquors derived from the leaching of copper-zinc ores.

Of the methods examined, that based on the formation of complexes between the cations and potassium oxalate had the fewest defects. The other methods (based on the formation of complexes with fluoride, the enhancement of hydrogen ion activity by concentrated lithium chloride, the removal of salts of hydrolysable cations by their precipitation with acetone, and the reduction of Fe(III) by potassium iodide) failed either in the presence of individual hydrolysable cations or in the presence of mixtures of these cations.

Relative standard deviations (in six determinations) for the solution containing a mixture of cations and 6,5 g of sulphuric acid per litre ranged from 0,0066 to 0,023.

Solutions containing Fe(II) yielded low and erratic results owing to their oxidation by air and the accompanying abstraction of hydrogen ions. This has important implications with respect to the sampling and storage of such solutions.

● Report 2042

The preparation and analysis of minerals for use as reference material. Progress report no. 4.

This report covers the progress made in the collection of reference samples, and describes the completion of the five interlaboratory analytical programmes (those on ferrochromium slags, fluorspar, 'mixed' NIMROC samples, rare earths, and ferromanganese slags). A comprehensive tabulation of the samples that have been evaluated, and a list of the samples that have not been evaluated are included.

● Report 2051

The supergene alteration of sulphide ores. III. The influence of the chemistry of sphalerite on its floatability.

Multiple linear regression models are used in the identification of the two major factors affecting the floatability of sphalerite: the primary character of the ore-body, and supergene alteration. Incipient supergene alteration enhances floatability, whereas advanced alteration has pronounced degradational effects.

The implied negative effect of an increase in the manganese and iron content of the sphalerite is considered to be important, since it partly cancels the positive influence of grade.

● Report 2053

A study of the measurement by electrothermal atomization and atomic absorption spectrophotometry, of hydride-forming elements.

This report describes an investigation of the measurement, by atomic-absorption spectrophotometry and electrothermal atomization, of arsenic, antimony, bismuth, selenium, and tellurium. Instrumental parameters and other factors that could affect the precision and sensitivity of the method, e.g., the acid medium, were examined and optimized.

Although the precision and sensitivity were satisfactory for all the elements except selenium, considerable interference was encountered from many of the associated elements likely to be present in typical sample materials. This interference could not be compensated for by the method of standard additions because the resulting calibrations were non-linear. Some form of separation of the hydride-forming elements will therefore have to be considered before they can be determined successfully in complex materials by electrothermal atomization.