

Comment on paper: The mechanism and rate of reduction of Mamatwan manganese ore fines by carbon

The following comment has been received from Mr A. D. Osche* on the above paper, which was published in the *Journal* in October 1977 (vol. 78, no. 3, pp. 51-62).

As the operators of the Hotazel and Wessels mines in the northern Cape, we feel it would be pertinent to offer comment regarding the opening sentence of the paper. Namely, it is stated that the higher grades of manganese ores such as that from the Hotazel and Wessels mines are being depleted, and it is therefore important for the large reserves of lower-grade ores of the Mamatwan type to be utilized.

While this is true in the ultra-long term, the statement is certainly not of essence at this time and could prove detrimental to this Company. It is a well-known fact that the continuity of a supply of ore is of prime import-

ance to a furnace operator, and such statements as the above should be validated before being put into print.

While the Hotazel deposit is certainly nearing depletion, the Wessels deposit has been exploited for approximately four years, and, as such, the mine has only recently been brought up to full production. Ore reserves at Wessels within the old lease area at present production rates are sufficient for more than fifty years. An extension to this mining lease has just been obtained, and underground and surface work is proceeding with encouraging results.

It could thus be said that, in terms of mine life and continuity of raw-materials supply, the higher grades of manganese ore are freely available and will be so for the foreseeable future.

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Obituary: T. K. Prentice

The Institute records with deep regret the death on 30th January of its senior surviving Past President, Mr Thomas Kennedy Prentice, at the age of 83.

He became a member of the Chemical, Metallurgical and Mining Society in 1914, and became its Treasurer in 1932. He was President in 1936/37 and clearly enjoyed his unique distinction of by-passing the Vice Presidency. He was President of the Associated Scientific and Technical Societies in 1939.

His Presidential Addresses respectively surveyed the gold-mining industry and its metallurgical development on a broad basis, and then in full detail the precious-metal constituents of Witwatersrand ores.

His papers and his technical contributions over the years were distinguished and numerous. Outstanding

was 'The Production of Platinum Concentrates from Transvaal Ores', which earned him the Society's gold medal in 1930. His proof that 'The rate of wear of an individual ball is proportional to d^2 ' led to the indexing of his name in metallurgical textbooks.

The warm personality and never failing humour that accompanied Tom's technical ability gained him a wide circle of friends and colleagues.

In non-Institute affairs he was a man of many parts, but it is perhaps mainly as leader and co-ordinator of the mining industry's technical team in the development and exploitation of South African uranium resources that he will be remembered. His encouragement and friendship to many young metallurgists at the time will be recalled with gratitude.

Book reviews

R. A. Rich, H. D. Holland, and U. Petersen. *Hydrothermal uranium deposits. (Developments in Economic Geology, vol. 6)*. Amsterdam, Elsevier Scientific Publishing Co., 264 pp. with 77 illustrations and diagrams, 30 tables. U.S. \$34,75.

By virtue of the information contained within its pages, this book is invaluable for all geologists engaged in uranium exploration and research. Although the spotlight is on hydrothermal uranium deposits, many observations are applicable to other types of deposits

as well, particularly with regard to ore genesis.

In Part I of the volume, the general characteristics of hydrothermal deposits are discussed.

Chapter 1 deals with the distribution of uranium in different rock types and in natural waters, comprising a very useful reference with regard to geochemical exploration.

In Chapter 2, the geological setting, age distribution, and mineralogy of known hydrothermal uranium deposits are discussed. Of particular value is the sum-

mary on paragenetic studies and wall-rock alteration, for which published data up to now may have been difficult to obtain.

In their review of fluid-inclusion studies (Chapter 3), the authors summarize the most important research in recent years, including the work done on the Massif Central in France and the Erzgebirge region of Central Europe.

Chapter 4, which deals with uranium transport in hydrothermal fluids, is less satisfactory with regard to hydrothermal deposits, but, as the authors themselves point out, limited chemical data are currently available for uranium systems above 100° C. Uranium in the low temperature and pressure range is, however, fully discussed, and has a direct bearing on sedimentary types of deposits. A number of important conclusions on the stability and solubility of uranium minerals are drawn.

In Chapter 5, attention is given to the role of reducing agents, particularly ferrous ions, in the deposition of pitchblende in hydrothermal deposits. A suggestion by previous workers that a decrease in the carbon monoxide content of highly carbonated solutions can cause the precipitation of pitchblende is questioned by the present authors. The effects of other parameters such as temperature, pressure, and pH are also briefly discussed.

The last chapter in Part I is perhaps the most important: it deals with the origin of hydrothermal uranium deposits. The authors recognize four important requisites:

- (1) sources of highly oxidized solutions in the sub-surface,
- (2) sources of leachable uranium,
- (3) reducing agents at the site of pitchblende deposition, and
- (4) a suitable hydrological setting.

These are discussed separately, with the emphasis on favourable geological settings in each. The results are compared with known ore environments, and some guidelines are offered to exploration for potential deposits. The importance of red beds in association with crystalline basement rocks is emphasized.

Part II encompasses descriptions of the most important hydrothermal uranium deposits. Major occurrences in Canada and the U.S.A. are discussed, followed by descriptions of Australian, European, and African mines. For most examples, a description of the general geology and mineralogy is followed by a discussion of paragenesis, zoning, wall-rock alteration, age, and, most important, ore controls. The descriptions are

elucidated with numerous maps, cross-sections, and diagrams, while selected references contribute to the value of this part of the book.

Perhaps the most salient feature of the volume is the short and direct approach of the authors; the reader is never bored by tedious discussions.

Unfortunately, the price in South Africa is not mentioned but, judging by the U.S. price of 34,75 dollars, it may well place the book beyond the reach of the average student, which, considering the academic value of the book, would be regrettable.

J.P.I.R.

M. David. *Geostatistical ore reserve estimation*. Amsterdam, Elsevier Publishing Company, 1977. 364 pp.

This is the first comprehensive English textbook on geostatistics. Over the past fifteen years the use of geostatistical techniques to improve the standard of ore valuation has raised ever-increasing interest in mining circles throughout the world. Publications to date have been mainly in French and have generally consisted of short papers that cover only certain specific aspects of the subject.

The need for a comprehensive and authoritative work on geostatistics in English has therefore been evident for some time, and Professor David's work fills the gap admirably. He has drawn heavily, but appropriately, not only from earlier publications but also from his own experience both as an academician and a practising geostatistician.

The book briefly covers all the essential elementary statistical theory before dealing with the development and applications of geostatistical theory and techniques. The development of the theory is linked to, and kept in perspective by, examples of numerous pertinent problems encountered in ore valuation such as optimum sampling patterns, optimum ore block estimation, and unbiased grade-tonnage curves.

Practical applications of the theory and techniques are demonstrated by a large number of actual cases. Several computer programmes are included to assist the reader in the implementation of geostatistical systems.

The book is highly recommended for mining engineers, mine economists, and geologists involved in investment analysis, ore-reserve estimation, grade control, mine planning, and allied problems. It should remain a standard reference work on geostatistics for many years to come.

D.G.K.

World mineral industry

The Australasian Institute of Mining and Metallurgy is celebrating its sesquicentenary in 1979. A conference will be held in Perth from 13th to 18th August, 1979, as part of the celebrations, the theme being 'Australia's Role in the World Mineral Industry'.

The Australasian Council has asked this (the South African) Institute to participate by suggesting the names of keynote speakers or authors of papers who would like to attend the Conference.

Any member of this Institute who is interested in presenting a paper is asked to contact the Secretary.

The programme provides for the discussion of the following topics:

- Energy requirements for the mining and metallurgical industries
- Water resources for future mining activities
- Mining and the environment
- Marketing of minerals and metals
- Offshore mining (oil, gas, and minerals)
- Exploration geology
- Costing, accounting, and taxation in the mining and metallurgical industries.

Engineering teaching staff

UNESCO has extended its technical assistance to the Venezuelan government in the training of engineers to suit the rapidly developing economy of the country. The Venezuelan universities are at present recruiting, to reinforce their own teaching staffs, high-level experienced professors from industrialized countries.

One- to two-year contracts are now being offered to suitable candidates who have the following qualifications.

- (a) Degree in electrical, mechanical, metallurgical, industrial, structural, or environmental engineering, preferably at doctorate level.
- (b) Teaching experience in engineering at university

level.

- (c) Professional experience in large or medium-size industries, or as a consultant.
- (d) A working knowledge of Spanish, which is essential.

The functions to be performed include classroom teaching, industrial training of students, laboratory and workshops, applied research.

If you are interested, please send a copy of your *curriculum vitae* to Dr Leon Ter-Davtian, International Director UNESCO, Apartado postal 51 664, Caracas 105, Venezuela, with a copy to the Secretariat of WFEO: 19 rue Blanche — 75009 Paris — France.

UNESCO vacancy

Vacancy for a post of expert under the UNDP.

- (1) *Title of post*: Expert in metallurgical engineering.
- (2) *Duty station*: Instituto Universitario Politecnico of Ciudad Guyana (Venezuela).
- (3) *Functions*: To train teaching staff in his speciality through direct teaching at post-graduate level and guidance of applied research work. To assist in the design and layout of laboratories and the selection of equipment. To take part, with his local colleagues, in the teaching at undergraduate level and the supervision of training periods in industry.
- (4) *Qualifications required*:
 - Degree from an institute of higher education in iron and steel metallurgy and liquid/solid processing and foundry work (doctorate desirable).
 - Five years experience in teaching and research in engineering schools (not to be substituted by experience gained in an institute training technicians). The candidate should have personally

conducted applied research and/or served in technical services in industry in his field of specialization.

- Five years of experience as a supervisor of professional engineers in production in steel plants of any size.
 - It is desirable that the candidate be the author of publications in the field of applied research in engineering in his area of specialization.
- (5) *Language*: Spanish mandatory. French and/or English desirable.
 - (6) *Duration of contract*: 12 months from July 1, 1978 (extension possible).
 - (7) *Salary and benefits*: Level P5 of UNESCO.

If you are interested please send a copy of your *curriculum vitae* to Dr Leon Ter Davtian, International Director UNESCO, Apartado postal 51 664, Caracas 105, Venezuela, with a copy to the Secretariat of WFEO: 19 rue Blanche — 75009 Paris — France.

Shell Design Awards

The annual Shell Design Awards, organized by the Design Institute and sponsored by Shell South Africa (Pty) Ltd, focus attention on achievements in South African design. From 1978 the awards are geared to give recognition to design excellence in consumer durable products, and in engineering products and components.

In the 1978 Shell Design Awards, opportunity is given to design students at South African universities and colleges for advanced technical education to participate in a special section of the awards known as the Design Student Awards. These awards are intended to highlight the creative promise and design ingenuity of students of

engineering and industrial design.

There are four categories in the 1978 Shell Design Awards, each of which is subject to special conditions of entry:

- Consumer Products Design Award
- Engineering Products Design Award
- Design Student Award (Consumer Products)
- Design Student Award (Engineering Products).

Entry forms for each category are available from the following and should be returned not later than 11th August, 1978: Shell Design Awards, Design Institute, Private Bag X191, Pretoria 0001.