

# Book news

## 1. Book reviews

● *A concise history of mining*, by Cedric E. Gregory. London, Pergamon, 1980.

Reviewer: M. G. Atmore

I have read this volume with great interest and pleasure. The pleasure derives from the remarkable amount of information that the author has been able to assemble, and the competence and style with which this has been done. In order to achieve this, he has split the subject into five parts, the first of which addresses historical development, and mining methods and systems.

In Part II, the major part, particular mining operations are briefly described under sub-headings of the Eight Ages of Man, ranging from Old and New Stone-Age, through Copper, Bronze, Iron, Coal, Petroleum, and Uranium Ages. There is a drawback in this method of presentation until it is realized that these are strictly chronological periods, and that the majority of the text is concerned with metals and minerals other than those used to describe the periods. The geographical coverage is outstanding, and I was particularly impressed by the treatment of the Central and South American continent.

Part III is devoted to specific and ancillary aspects of activities, but especially the successful extraction of minerals. Among the many topics are mine drainage, underground haulage, hoisting, rock-breaking, ventilation, and illumination.

Part IV is particularly interesting and deals with mining legends, customs, and traditions, including such topics as the Legend of St. Barbara, religious and mythical traditions, traditional drinking vessels, the minting of coins, the Little People, and many others.

Part V is not, in my opinion, of the same standard as the earlier parts. Within the limitations of space imposed, it was not possible to treat, other than superficially, topics such as the importance of mineral production to a nation, financial aspects of mineral development, and other economic topics. In any case, this part is not historical but more a 'present state of the nation' address.

The production is good, and the illustrations well chosen and clear, but I am not attracted to the over-free use of underlining in the text. In the copy made available to me, there are two printing defects, which should have been avoided.

As I mentioned earlier, I have thoroughly enjoyed this book, and strongly recommend it to anyone interested in a broad outline of the history of mining.

● *Metal statistics*. 68th edition, 1981. Frankfurt am Main, Metallgesellschaft AG.

Reviewer: Ian Robinson

The 68th edition of *Metal statistics*, which is published annually, contains the following.

- (i) A review of the world consumption, production, and prices of the major non-ferrous base metals (aluminium, lead, copper, nickel, zinc, and tin) during 1980 and the first half of 1981.
- (ii) Tables of the annual world production by country

of a wide range of non-ferrous base metals and also silver; there are also tables for the consumption of some of these metals.

- (iii) Tables of the annual world production of non-ferrous base metals over the period 1900 to 1980.
- (iv) Detailed statistics by countries (consumption, production, imports, exports) of the major non-ferrous base metals.
- (v) Tables of the prices of metals, giving monthly and annual prices, on the important world metal markets. The monthly prices are listed over the period 1976 to June 1981, and the annual prices are listed from 1946.
- (vi) Graphs of annual prices of the major metals from 1850.

The following is a summary of the main points in the review of world metal markets in 1980 and the first half of 1981.

World consumption of the principal non-ferrous metals in 1980 totalled 37,2 Mt, a 4 per cent decline with respect to 1979. The factors that caused this decline in consumption and that derived, at least partly, from the sharp increase in world oil prices included a decline in car production in the Western World, a decline in the purchasing power of Developing Countries, the prolonged crisis in the US economy, and the petering-out of the boom in the Japanese economy.

The world consumption of aluminium fell by 4 per cent compared with 1979 to 15,3 Mt. This decline suggests that the consumption of aluminium, which has enjoyed a growth rate well above that of the older base metals, is beginning to slow down. The fall in aluminium consumption will have repercussions on the large-scale expansion plans that existed, and has led to decisions to reduce the actual or planned capacity in Japan and Australia. High energy costs will lead to a transfer of smelter capacity from Japan and Europe to countries such as South Africa, where energy is cheaper.

The lead market saw a 5,3 per cent fall in consumption to 5,3 Mt. Despite the facts that production closely matched consumption and that changes in stock levels were slight, there were violent fluctuations in lead prices on the London Metal Exchange: the LME spot price fell from a peak of £588 per ton in March 1980 to £273 per ton in January 1981. The consumption of lead will continue to depend primarily on variations in motor-vehicle rates and the number of vehicles registered in the world.

The world recession affected the two main areas of copper consumption—the construction and automotive industries—resulting in a 3 per cent fall in consumption to 9,55 Mt. Despite little change in the level of stocks held by producers and commodity exchanges during the period under review, copper prices exhibited a volatility similar to that of lead prices, suggesting that interest not directly related to the base-metals industry intervened in the market. The LME spot price reached a peak of £1375 per ton at the beginning of February 1980 and fell by about 45 per cent to a low point of £754 in January

1981. Major new smelter and refinery capacity was under construction in Brazil, Mexico, Canada, and the Philippines, so that a long period of adequate supplies on the copper market is expected.

Following the pattern of the other base metals, zinc also experienced a decline in consumption, falling by 3,3 per cent to 6,1 Mt. However, unlike the London quotations for lead and copper, zinc prices showed a consistent upward trend, peaking at £559 per ton in August 1981; the producer price was raised in a number of steps from \$780 per ton in February 1980 to \$1000 on 1st September, 1981. The future trend of zinc consumption will be substantially influenced by the introduction of two competing processes for the galvanization of steel parts like vehicle-body sheets, etc. Both the new processes are based on the use of zinc-aluminium alloys instead of pure zinc. The use of these two new alloys could open up new markets to galvanization such as to outweigh the decline in consumption that would otherwise occur.

The major application of nickel is in stainless steel, and the crisis in the world steel industry, which was particularly severe in Europe, exacerbated the effects of the recession and caused a sharper fall in nickel consumption than that experienced by the other base metals. The world nickel consumption in 1980 decreased by 6,4 per cent to 0,73 Mt, and production rose at the same time by 13 per cent to 0,76 Mt. The rise in production resulted in an oversupply and forced producers to grant discounts on their published list prices, making it impossible to determine representative prices for the different forms of nickel.

Tin consumption followed the general trend of base-metals consumption, registering a fall of 4 per cent to 0,22 Mt. The consumption in 1980, in fact, fell below the consumption in 1940, when the world was at war. However, despite the decline in consumption, prices rose to record levels on the LME, reaching £8455 per ton in March 1980, the highest tin price ever achieved on the Exchange. At the end of August 1981, the price rose again to £8351 per ton, almost equalling the March 1980 peak.

● *Mineral processing technology* by B. A. Wills. London, Pergamon Press, 2nd ed., 1982.

Reviewer: D. A. Viljoen

Although the book, which is subtitled 'An introduction into the practical aspects of ore treatment and mineral recovery', is intended for students of mineral processing, the author has included much of value for practising engineers.

The accent is directed towards the common physical ore-processing techniques utilized in today's mining industry. Also included are valuable chapters on metallurgical accounting and control, and particle-size analysis.

Starting with ore handling, the book embraces all the important mineral-processing techniques in considerable detail, and deals finally with tailing disposal. Chapter headings include Comminution, Crushers, Grinding mills, Industrial screening, Classification, Gravity concentration, Heavy-media separation, Froth flotation, Magnetic and high-tension separation, Ore sorting, and Dewatering.

Appendices cover the application, properties, and occurrence of metallic ore minerals as well as common non-metallic ores.

The value of this book to engineers and students is its practical insight into the underlying principles influencing the function and control of various processes.

● *Platinum-group elements: mineralogy, geology, recovery*, by Louis J. Cabri (Editor). Canadian Institute of Mining and Metallurgy, C.I.M. Special Volume 23.

Reviewer: R. A. Snodgrass

Whenever literature on the platinum-group elements (PGE) is encountered, reference is invariably made to the cloak of secrecy that has traditionally surrounded work in this field. It is pleasing to note that in recent years publications on these elements are more forthcoming – as also indicated by the comprehensive lists containing very recent references at the end of each chapter.

This book consolidates data published mainly in the 1970s on the chemistry, geochemistry, and mineralogy of the PGE. Although reference is made to recovery in the title, this subject is restricted to mineralogical factors influencing the beneficiation of different types of PGE mineralization.

Chapters on inorganic chemistry and phase relations cover those aspects thought to be useful to the mineralogy and geochemistry of the PGE. A single chapter is devoted to a wealth of trace-element geochemical data, which will contribute towards a better understanding of PGE distribution in the source rocks of ultramafic and mafic magmas.

Two chapters on sample preparation and analytical techniques emphasize the complexities involved in obtaining reliable analyses down to the parts-per-billion range without detailing any specific analytical procedures. However, many appropriate references are listed.

Approximately half of the publication is related to the mineralogy of the PGE, where a wealth of information has been collected. New minerals are characterized, and a critical look is taken at powder-diffraction card data.

An extensive list of analyses, mainly done by electron microprobe, on platinum-group minerals from various localities is presented, and leads up to the definition of a systematic approach for recording unnamed minerals. If applied generally, this system should eliminate the inconsistencies in past recording.

In the chapter on geology, all the major and many minor PGE deposits are examined with a view to establishing a systematic and comprehensive classification. Finally, the last chapter deals with geochemical and mineralogical factors that could affect recovery processes.

This work will undoubtedly be of interest to people in the field of PGE and, it is hoped, will encourage and assist future research.

● *Mines and mineral deposits of Thailand* by Paul F. Scholla Associates.

Reviewer: P. G. du Plessis

The purpose of this publication is, according to the authors, to highlight the mineral potential of Thailand

and to arouse foreign interest in the local mining industry.

The report indicates that Thailand occupies a very modest place in the mining world, only about nine industrial minerals being produced in limited amounts. Tin, tungsten, tantalite, and fluorite are among the foremost products, each yielding a small percentage of world production. Considerable potash exploitation seems to be indicated for the future.

Detailed descriptions are given of all the numerous mineral occurrences in the country, however small they may be. Production statistics are included, and the distribution of all known deposits is shown on maps.

The compendium is orderly and neatly produced, and succeeds in reviewing the Thai mineral industry against the background of world demand.

● *Principles of mechanical metallurgy* by Iain le May. London, Edward Arnold, 1981.

Reviewer: J.P. Hugo

In the preface to this textbook the author states his objectives as follows: 'An attempt has been made . . . to develop a text which provides a broad and reasonably complete survey of the principles involved in mechanical metallurgy: it should be useful to senior undergraduates in mechanical engineering and metallurgy, graduate students embarking on detailed study of specific topics in the subject area, and practising engineers. Wherever possible, topics in the areas of fracture, fatigue and creep, in particular, have been related to the needs of the designer, not by providing material data as such - these being available in handbooks and reference material - but rather by emphasizing principles as they relate to design and service applications'.

Seldom has an author described not only his objectives but also his achievements more exactly. The text is concise but not overly terse, logically expounded, in general adequately illustrated, and eminently readable.

Further pros are a well-referred and -indexed text and a valuable appendix of sample problems. The cons are that a few of the diagrams have been reduced in size to the point where a magnifying glass is almost necessary, while the quality of reproduction of several of the photomicrographs will barely satisfy the professional eye.

Overall, in the opinion of the reviewer, the book is a valuable addition to the modern technical literature in the increasingly important field of mechanical metallurgy.

It is shown that multi machine faces are more prone to delay than single faces, and their advance per web is lower, and the need for co-ordinated work at face-ends and along the face is emphasized.

● *Principles of blast furnace ironmaking: theory and practice*, deur Anil K. Biswas. Cootha Publishing House, 1981.

Oorsigter: R.J. Dippenaar

Met die skrywe van die boek stel Biswas homself ten doel om sistematies daardie tegnieke te analiseer wat gebruik kan word om hoogoondproduksie te optimeer.

Ten einde produksietegnieke ten volle te kan evalueer is dit nodig om die wetenskaplike beginsels wat hoog-

oondbedryf ten grondslag lê, na behore te verstaan. Biswas slaag daarin om hierdie aspekte kortliks maar baie insiggewend oor te dra. Hy skenk aandag aan die baie belangrike aspekte van hittebalanse en die lugdinamika in die oond. Hy analiseer verder die invloed wat grondstofeienskappe op hoogoondbedryf het en evalueer tegnieke om daardie eienskappe te bepaal wat van wesenlike belang is. Hy gee ook 'n omvattende bespreking van die chemiese reaksies wat in die verskillende dele van die hoogoond plaasvind en bring dit in verband met slakgedrag en swaelverwydering.

Die skrywer skenk heelwat aandag aan 'n bepaling en evaluering van oond-gedrag ten einde die kooksverbruik te optimeer. Hy analiseer tegnieke om hoogoondproduktiwiteit te verhoog aan die hand van die interne struktuur van die hoogoond en hy maak na my mening 'n belangrike bydrae in die verband. Oondkonstruksie en die invloed daarvan op oondbedryf word ook geanaliseer en Biswas sluit die boek af met 'n bespreking van tipiese bedryfsprobleme en die tegnieke om dit te oorkom.

Biswas lewer 'n omvattende en baie nuttige oorsig en analise van moderne hoogoondtegnologie. Ek vind dit jammer dat hy nie ruimte kon afstaan aan 'n kort evaluering van die baie nuttige wiskundige modellerings-tegnieke van die hoogoondproses nie, maar in 'n boek wat reeds meer as vyfhonderd bladsye beslaan, is dit miskien te veel gevra. Die handboek behoort byval te vind by sowel student as produksie-ingenieur. Daar was 'n groot behoefte aan 'n handboek wat 'n sistematiese en doelgerigte analise en evaluering van moderne hoogoondtegnologie kon gee en Biswas het daarin geslaag om in 'n groot mate die leemte te vul.

## 2. New books

● *Cobalt resources and cobalt metallurgy*. Brussels (12 Boulevard de Berlaimont, 1000 Brussels), C.I.M.N.F., 1982. U.S. \$30 or 1200 BF.

This is the first part of the proceedings of the International Conference on Cobalt Metallurgy and Uses, which was held in Brussels in November 1981.

● *Proceedings 'Metallic Corrosion'*. 3 vols. Approx. 2300 pp. DM 250. (DECHEMA, Postfach 970146, D-6000 Frankfurt am Main).

At the 8th International Congress on Metallic Corrosion, which was held in Mainz from 6th to 11th September, 1981, the papers included in the three volumes of the Congress proceedings formed the basis for the discussion of the prevailing corrosion problems in all areas of applied and basic research and their solution in everyday life and industry. The papers comprise discussion papers, poster papers, and plenary lectures.

Volume I contains papers dealing with basic and applied research on corrosion processes, testing, and prevention.

Volume II contains papers dealing with corrosion protection techniques, solutions to problems in specific industrial fields, economics, education, information, and research and development programmes.

Volume III contains plenary lectures on various topics.

● *Quarrying and rockbreaking. The operation and maintenance of mobile processing plants* by David Lester. London, Intermediate Technology Publications Ltd, 1982. 117 pp. £7.50.

This book is an attempt to bring together some of the many considerations and maintenance problems of a fairly high-output rock-processing plant producing aggregate, and should help owners of such plant and their operators to gain the best returns from the capital and labour invested. Various types of plants and their operation are described. Recommended maintenance schedules and lists of spare parts are included.

For the owner or manager of a small mobile rock-crushing plant this book is essential reading.

● *IMM index to mining and metallurgy 1894—1949*. London, Institution of Mining and Metallurgy, 1982. £400 for the complete set, which consists of 216 fiche.

The Institution of Mining and Metallurgy was founded in 1892 and, by 1894, the library had been established. Shortly after that date, the detailed indexing of articles from periodicals, reports, conference proceedings, and monographs was begun. As such indexing of the literature at that period was rare, *IMM Index* is a unique and valuable publication. It covers the entire field of mining and minerals engineering, including economics, geology, mining, concentration, metallurgy, assaying and analysis, and plant; it deals with all minerals, metallic and non-metallic (with the one exception of coal), and the scope is world wide. It contains more than 85 000 entries, each reference giving the authorship, title, and bibliographic details of the individual entry, and is published on negative diazo microfiche at 26× reduction. It is available in 23 sets arranged under the three main categories of Commodities, Technology and Operations, and Countries.

### 3. Mintek reports

The following reports are available free of charge from the Council for Mineral Technology, Private Bag X3015, Randburg 2125, South Africa.

#### Report M6

*A comparative study of the effects of changes in liner patterns and mill speeds on rod-mill parameters.*

A study was made of the performance of three rod mills at different mines, two of the mills being 9 ft by 12 ft and one being 8 ft by 12 ft. Tests on the smaller mill showed that doubling of the number of lifter bars permitted much larger tonnages of ore to be milled with a decreased consumption of electric power and of liner metal. The use of wave blocks but no lifter bars produced a smooth inner surface in the mill, which resulted in a drastic reduction in tonnage milled with markedly increased consumption of liner metal and of electric power.

Tests on the other two mills indicated that a slower speed (19 r/min as against 21 r/min) resulted in a lower tonnage milled and a higher consumption of liner metal and electric power, but with a greatly increased proportion of material smaller than 43 μm in the discharge.

The evidence available suggests that the fitting of

alternating rows of hardened, cast carbon-steel lifter bars and manganese-steel lifter bars would give the whole lining a longer life, particularly if the carbon-steel bars protruded 25 mm further into the mill than did the manganese-steel lifter bars.

#### Report M11

*The application of split conditioning to the flotation of coarse particles.*

This report describes the problems encountered in the recovery of coarse mineral particles in the flotation process, and demonstrates the use of a technique of split conditioning for the recovery of such particles.

There are a number of reasons why coarse particles will not float, i.e., poor agitation, not enough collector, too few air bubbles, or air bubbles that are too small. This problem can be overcome by an increase in frother, collector, impeller speed, or the rate of aeration, but these generally result in the production of lower-grade concentrates. Split conditioning has been shown to result in an improved recovery of coarse material without this drawback.

Work on an auriferous pyrite and platiniferous sulphides is described, and it is shown that stronger collectors could be used for the recovery of coarse minerals.

#### Report M15

*The separation and determination of trace elements in chromic oxide.*

This report describes the separation of chromium, by volatilization as chromyl chloride, from trace elements in 2 g of chromic oxide. After separation, the trace elements can be determined by atomic-absorption spectrophotometry or optical emission spectrometry with an inductively coupled plasma source, in the following concentrations: Fe(III) ≥ 0,25 μg/g, Cu(II) and Co(II) ≥ 0,5 μg/g, Bi(III) ≥ 4 μg/g, Pb(II) ≥ 2,5 μg/g, and Al(III) ≥ 5 μg/g.

Details of the laboratory method are given in an appendix.

#### Report M16

*The preparation and certification of ten uranium reference materials.*

This report describes the procedures involved in the preparation, analysis, and certification of ten 'UREM' uranium-bearing materials for use as international reference materials. Recommended values for total U<sub>3</sub>O<sub>8</sub> are assigned to all of the ten materials.

Twenty-two laboratories from seven countries contributed a total of approximately 300 analytical results for each material. The analytical methods used were X-ray-fluorescence spectrometry, colorimetry, fluorimetry, neutron-activation analysis, and emission spectroscopy using an inductively coupled plasma source.

Approximately 300 kg of each reference material was prepared, primarily for use by the South African uranium industry. However, a limited amount of each material is available for overseas laboratories.

#### Report M19

*Beneficiation tests on two samples of bauxite from Natal.*

Tests were done on two samples of bauxite, which

contained 37,3 per cent available alumina (sample Bh14) and 34,6 per cent available alumina (sample Bh39), to show whether they could be beneficiated to at least 40 per cent available alumina and not more than 5 per cent reactive silica.

Various single methods of concentration were tested on sample Bh14, and significant upgrading was obtained by selective crushing, scrubbing and attrition, flotation, and wet high-intensity magnetic separation. These methods were combined in different ways, and the integrated flowsheets that resulted were applied to sample Bh14. All the flowsheets tested produced bauxite of acceptable grades, the most favourable result being a recovery of 72 per cent of the available alumina in the form of a concentrate assaying 43,4 per cent available alumina and 1,3 per cent reactive silica.

Sample Bh39 was tested only by the integrated flowsheets developed for the first sample. The best result obtained was a recovery of 43,5 per cent of the available alumina in the form of a high-grade concentrate containing 45,2 per cent available alumina and 0,4 per cent reactive silica. It is considered that considerably increased recoveries could be achieved if further test-work were done.

It is concluded that the two samples tested can be concentrated to grades suitable for the Bayer process, but that additional testwork is required if maximum recoveries are to be achieved.

#### Report M24

*Atomic-absorption programmes for the Hewlett Packard H.P. 97S programmable calculator.*

This report outlines the limitations of the atomic-absorption (AA) programmes supplied with the Hewlett Packard H.P. 97S programmable calculator, and proposes ways in which these limitations can be overcome. Three new programmes, for AA on-line analysis, off-line analysis, and an automatic system, are described.

#### Report M29

*Interactions between sulphide minerals and metal ions in the activation, deactivation, and depression of mixed-sulphide ores.*

This report describes an investigation into the association between metal-salt species and sulphide-mineral surfaces.

The conditions under which association occurs were established, and the rates and extent of reaction were measured for copper and lead salts and for pyrite, sphalerite, galena, chalcocopyrite, bornite, covellite, chalcocite, and pyrrhotite. A survey of the literature on work in this area is included.

The results suggest that some form of association is a common occurrence, and can take place in two forms. In some instances (galena, sphalerite, and pyrrhotite), the interaction is of the same type as the well-established mechanism of the activation of sphalerite by copper, i.e., exchange of an activating cation for a metal ion of the mineral lattice; in others, solid metal-hydroxy species are adsorbed at the mineral surface. The association of hydroxy species is found to be reasonably specific, in that they differ in their mode of occurrence and extent at different surfaces.

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## Analytical chemistry

Edinburgh is the site of the SAC 83 International Conference and Exhibition on Analytical Chemistry, organized triennially by the Analytical Division of the Royal Society of Chemistry (RSC) and in earlier days by the Society for Analytical Chemistry — hence the name SAC.

As in past SAC conferences, the scientific programme will be organized around plenary, invited, and contributed papers and posters covering the whole field of Analytical Chemistry. In addition, there will be one day symposia on particular analytical themes organized by RSC Groups and other associated bodies. The programme will include a series of workshops, where research workers can demonstrate new apparatus and techniques, as well as informal evening discussion meetings.

SAC 83 is to be held from 17th to 23rd July, 1983.

A new and exciting feature of SAC 83 will be a group of one-day update courses, convened by international

authorities on the following topical subjects:

Flow injection analysis	Prof. J. Ruzicka
Narrow column HPLC	Prof. J. Knox
Microcomputers in analytical chemistry	Prof. D. Betteridge
New techniques in fluorescence	Prof. J.N. Miller
Inductively-coupled plasma emission spectroscopy	Dr. L. Ebdon

Plenary and invited lectures by acknowledged international authorities will highlight new developments and set the scene in various branches of analytical chemistry. Contributed papers are invited for lecture and poster sessions on any aspect of analytical chemistry. Abstracts of contributed papers will be required in November 1982.

Direct any enquiries to The Secretary, Analytical Division, Royal Society of Chemistry, Burlington House, London, W1V 0BN, U.K.

## Less common metals

Arising from The Metals Society's Mission to China in 1979 and return visits to the U.K. by Chinese metallurgists, The Metals Society, London, and the Chinese Society of Metals, Beijing, have great pleasure in announcing an English-language conference to be held in Hangzhou from 8th to 10th November, 1982.

China's reserves of the rare earths are estimated to be four times greater than the total throughout the rest of the world. The Chinese, therefore, have the potential to become major suppliers of these important materials, which have widespread applications with many more uses expected in the near future. At present they are used, for example, as catalysts in petroleum cracking, as getters in steel production, and in super-alloys and magnetic materials, as well as constituents in nuclear-reactor control rods, abrasives in glass polishing, in ceramic glazes and lighter flints, and for various uses in the television industry in laser crystals and electronic components.

As a result, it is expected that this conference will attract industrialists, prominent academic and industrial metallurgists and technologists, commodity traders, and marketing specialists from leading organizations throughout China and the West interested in developing this rapidly growing area of metal usage.

The objectives of the conference are as follows.

- (i) To provide an appraisal of recent developments in the production and application of some less common metals, such as the rare earths, the platinum-group, and refractory metals.

Invited papers will be presented by internationally recognized authorities on the role of these materials as primary bases and as alloying additions to more conventional bases, to produce materials resistant to high temperatures, corrosion, and wear. Other specific topics to be discussed in relation to materials development will be superconductivity, superplasticity, memory alloys, energy generation, and storage and catalysis.

An important series of papers will also be provided by the Chinese Society of Metals, dealing with the production and use by the Chinese metals industry of some less common metals found in China, and a paper reviewing China's resources in this field has been requested.

- (ii) To create an opportunity for developing contacts with Chinese metallurgists and to give organizations from other countries an opportunity to learn at first hand of China's intentions and capability in the production of less common metals.

Equally it will be an opportunity for Chinese specialists in this field to meet their potential customers and suppliers and to discuss the availability of Western technology with those best equipped to provide it.

For further details contact K.L. Wakelam — Marketing Director, The Metals Society, 1 Carlton House Terrace, London SW1Y 5DB. Tel. 01-839 4071, telex: 8814813.

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## Ferro-alloys

The Third International Ferro-alloys Congress INFACON 83 is to be held in Tokyo from 8th to 11th May, 1983. The official languages of the Congress are English, French, and Japanese.

Presentations and panel discussions are planned on a wide range of ferro-alloy topics. Speakers and panelists will represent ferro-alloy manufacturers in Europe, the United States of America, the Republic of South Africa, Australia, Japan, and other parts of the world. Some of the topics to be dealt with are as follows:

- Evolution of the ferro-alloy industry in Europe in the last years facing the energy crisis, future trends
- Ferro-alloys in a global context — an economic view of the future
- Evaluation of chromium ore for solid-state reduction (SRC)
- The production of medium-carbon ferromanganese by shaking-ladle process
- The process of decreasing the electric consumption for production of high-carbon ferromanganese and silicon manganese

- High-efficiency ferrosilicon smelting technology with heat recovery
- Influence of raw materials on the production of 75 per cent ferrosilicon
- Smelting of manganese ferro-alloy using carbon composite cold pellet
- Dephosphorization of ferromanganese alloy with fluxes
- Potential submerged-arc furnace optimization at Middelburg Steel and Alloys Ltd
- The potential of plasma-arc technology for the production of ferro-alloys
- The potential of neutron sources for in-plant and on-line determination
- Two decades of manganese alloy smelting in Tasmania, Australia
- Are large ferro-alloys furnaces more economic than small ones?

Further details are obtainable from the Japan Ferro-alloy Association, Tokyo Club Building, 3-2-6 Kasumigaseki, Chiyoda-ku, Tokyo, Japan (telephone: (03) 580-0841-5, telex: J23736 Kyletyo).

## Energy in mining

The editors of *World Mining* and *World Coal* have announced plans to reschedule the First International Energy in Mining Symposium. The Symposium will now be held at the St. Francis Hotel in San Francisco, California from 6th to 9th October, 1982.

Energy has very much become the watchword of the mining industry. Energy costs are soaring — no one needs to be told that. What is the industry doing to counter these increasingly crippling costs? The answer is, a great deal. Around the world in underground mines, open-pit mines, smelters, concentrators, and throughout the whole spectrum of mining installations, engineers are devising innovative techniques to reduce energy consumption, to use energy more efficiently, to use alternative, cheaper energy sources, and to recycle energy.

*World Mining* and *World Coal* editors have seen many

examples of better energy usage in mining operations all over the world. The use of trolley-assisted truck haulage, new ventilation ideas, underground milling and flotation, hydraulic mining and transportation techniques, and cogeneration are just some of the many new areas that are being examined and the new techniques employed. Having seen and reported on some of these new ideas, the editors feel that the time is right to bring experts in this field from all over the world and to promote a useful exchange of ideas.

The programme will include sessions on open-pit mining, underground mining, processing, metallurgy, and energy management.

Further details are available from Albert Kaba, Symposium Administrator, *World Mining/World Coal*, 500 Howard Street, San Francisco, California 94105, U.S.A. (telephone: (415) 397-1881, telex: 278273).

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## Pumps

The British Pump Manufacturers' Association, with assistance from BHRA Fluid Engineering, will hold its eighth technical conference, 'Pumps — the Heart of the Matter', from 29th to 31st March, 1983. The meeting will be held at Churchill College, Cambridge, England. Offers of papers on a variety of topics are invited.

Rising energy and labour costs have resulted in pump users demanding an overall improvement in the operating efficiency of pumps and pumping stations. Particular emphasis has been placed on reliability and reduced power consumption, and therefore the conference will cover these important subjects.

The growing concern over the environment and living conditions in the Third World has led to a number of ambitious schemes for new and improved water and sewage systems. These countries continue to offer new and demanding markets, and the organizers would particularly welcome papers on any aspect of pump engineering in the Third World. Other subject areas to be covered include operational problems including installation and commissioning, specification testing and modification; health and safety; and system design.

Authors might like to give consideration to the effects and ramifications of:

1. Energy Conservation — Improvements to operating efficiency and the contribution that speed

control and electronic control systems can make to reductions in energy usage.

2. Meeting the Demands of the Third World — products incorporating the appropriate level of technology to satisfy the requirements of Third World countries and the need to provide training and education in their use and maintenance.
3. Materials Technology — the role that material selection and development can have in broadening the range of applications, the containment of manufacturing costs, the improvement of operating reliability, and the reduction of maintenance costs.

This does not in any way preclude papers covering other aspects such as

- Operational problems including installation and commissioning
- Environmental aspects, and health and safety
- Specification, testing, and modification
- System design.

Prospective authors should submit titles and synopses to the BPMA in English as soon as possible. Manuscripts will be required by 24th September, 1982.

Further details are available from BPMA, 37 Castle Street, Guildford GU1 3UQ, Surrey; telephone 0483-37997.

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# THE SOUTH AFRICAN INSTITUTE OF MINING AND METALLURGY

## Information on Membership

The Institute was founded in 1894 as the Chemical and Metallurgical Society of South Africa. In 1904 it was reconstituted as the Chemical, Metallurgical and Mining Society of South Africa, and in 1956 it became the South African Institute of Mining and Metallurgy.

The objects of the Institute are to advance the science and practice of mining and metallurgy, to afford opportunities for the interchange and recording of knowledge about mining and metallurgy, and to ensure high standards of professional conduct and competence.

Membership benefits include monthly issues of the *Journal* of the Institute; meetings and discussion groups; colloquia and symposia at which papers are read; excursions to mining and industrial concerns; vacation schools usually presented by overseas 'course leaders'; annual monograph publications; and the use of club facilities at Kelvin House. Technical journals received on an exchange basis are available to members at the Johannesburg Public Library. The current membership of the Institute is 2146.

The Institute consists of corporate and non-corporate members, all of whom are entitled to attend and speak at meetings of the Institute, but only corporate members are able to vote. The grades of Honorary Life Fellow, Fellow, and Member constitute corporate membership.

Membership applications are accepted from suitably qualified persons, and the requirements for entrance to the various grades of membership are summarized below.

**Honorary Life Fellows** shall be persons whom the Institute specially desires to honour in consideration of services rendered to the Institute, science, or industry. The election is by ballot and requires the unanimous vote of the Council members present.

**Honorary Fellows** shall be persons of distinction in public service, science, or the arts; they are elected for the current year, and enjoy all the privileges and rights of members, except those of holding office and voting.

**Fellows** shall be not less than 30 years of age, and shall be university graduates in pure or applied science or shall produce evidence to the satisfaction of Council that they have successfully completed a co-ordinated course of study in pure or applied science of at least four years' duration at an approved university or institution deemed by Council to be of equivalent status. Fellows shall have been

employed in senior technical positions in important mining or metallurgical undertakings, or in government, educational, or research organizations concerned with those industries, for at least five years or they shall have practised as mining or metallurgical consultants for at least five years. They shall be practising their profession at the time of application. Council shall be satisfied that the training and technical experience of any candidate practising as a consultant justify such professional status.

Entrance fee R10,00, Annual subscription R35,00.

Letters of designation: F.S.A.I.M.M.

**Members** shall be not less than 25 years of age and shall be university graduates in pure or applied science, or shall have successfully completed co-ordinated courses of study in pure or applied science of at least four years' duration, or an honours degree at an approved university or institution of equivalent status. They shall have been engaged in work of an approved technical character in the mining or metallurgical industries, or in government, educational, or research organizations connected with those industries, of which not less than two years shall have been in positions of responsibility. A candidate shall be practising his profession at the time of his application.

Entrance fee R10,00, Annual subscription R30,00.

Letters of designation: M.S.A.I.M.M.

**Associate Members** shall be not less than 30 years of age, and shall have been engaged in a position of responsibility in, or associated with, the mining or metallurgical industries or allied professions for not less than ten years, of which five years shall have been in a senior technical position in major mining or metallurgical undertakings, or in government, educational, or research organizations concerned with those industries.

Entrance fee, R10,00, Annual subscription R30,00.

**Associates** shall be not less than 25 years of age, and shall have been engaged in positions of responsibility in, or associated with, the mining or metallurgical industries for periods of not less than three years. If, however, the candidate for admission to the higher grade of Associate is at the time of his application already a Student, he need satisfy the Council only that he is, at the time of his application, engaged in a position of responsibility in or associated with the mining or metal-

lurgical industries. In all cases the applicants shall satisfy the Council that they are fit and proper persons to become Associates.

Entrance fee R10,00, Annual subscription R30,00.

**Graduate Members** shall be not less than 21 years of age and shall be university graduates in pure or applied science, or have completed co-ordinated courses of study in pure or applied science of at least four years' duration, or an honours degree at an approved university or institution of equivalent status, and shall be engaged in approved mining or metallurgical undertakings or in government, educational, or research organizations concerned with those industries. They shall not remain Graduate Members after attaining the age of 30 years without the permission of Council, or after obtaining the requisite qualification for transfer.

Entrance fee R2,50, Annual subscription R20,00.

**Student Members** shall be persons not less than 18 years of age who are being educated or trained in a manner approved by Council to occupy a technical position in or associated with the mining or metallurgical industries and who, furthermore, shall not have attained the qualification required for a higher grade of membership. They may remain Student Members until they have obtained the necessary qualifications for transfer to a higher grade of membership, but not after the end of the Institute's financial year in which they attain the age of 28 years. They shall then transfer to a higher grade to retain membership of the Institute. The Council may relax the provisions of this clause in such cases as it considers appropriate.

Entrance fee nil, Annual subscription R5,00. (Payable on application.)

**Company Affiliates** shall be companies involved in, or associated with, the mining and metallurgical industries.

Entrance fee nil, Annual subscription R250,00. (Payable on 1st July each year.)

**Other.** The Council has the power to elect to the grade of Fellow or Member candidates who may not fulfil all the requirements for entrance to these grades but whose status, professional achievements, and practical experience in mining or metallurgy justify such election.

**Applications.** Requests for membership application forms should be addressed to the Secretaries, South African Institute of Mining and Metallurgy, P.O. Box 61019, Marshalltown, 2107.