

## Book review

*Proceedings of the Symposium on Mining Methods.* London, Institution of Mining and Metallurgy, 1974. 160 pp.

The Symposium was held from 30th October to 1st November, 1974, and the papers include an interesting range of subjects in coal-mining operations, covering the improvements achieved to date, current practice, and required development for the future.

*Constraints in Planning* includes comment on geology, design, policy, law, markets, and their part in planning, the objective being to optimize safety, efficiency, and profit.

*High Speed Tunnelling* considers the requirements of tunnelling for NCB mines. The authors are directors in the NCB's R & D Division, who have designed a machine for coal headings that is described in the paper. The requirements of high speed tunnelling over the next ten years are considered.

*Rapid Drivages with Continuous Miners* includes comment on ancillary equipment, materials handling, ventilation, manning, supervision, and control systems, and the importance of maintenance is highlighted.

The third paper on this subject, *Drivages with Dosco Roadheaders*, describes the modifications made to the machine to improve its performance, its future development, and application.

Falls of ground and their prevention are considered in *The Prop Free Front and Its Development*. The effects of the introduction of powered support on accidents is discussed. A similar paper, *Support on the Face*, briefly

reviews a history of face supports and suggested areas for improvement.

Two further papers on support are *New Techniques in Roadway Support*, which covers the importance of design, strength of strata, and characteristics of support systems, and a paper on *Mechanical Packing Systems* dealing with the development, application, and experiences with various packing machines.

Longwall operations are considered in two papers: *Longwall Machinery Development and Current Practice with Special Reference to Scotland* reviews the development of power loading up to the present continuous mining operations, and the paper on *Longwall Equipment Development* looks to possible future developments in coal face equipment.

The text of the discussions arising from these papers is included, as are the opening and closing addresses.

Salamon, M.D.G., and Oravec, K. I. *Rock Mechanics in Coal Mining*. 119 pp.

This book has a fund of information and practical application for coal-mining officials and mining engineers.

The subject is covered in chapters on Fundamentals and Basic Concepts, Design of Bord and Pillar Workings, Pillar Extraction, Longwalling, Support in Workings, and Surface Subsidence. These aspects are clearly explained, and practical examples are given.

This handy-sized, well-produced book provides the industry with an excellent manual for both the operating production official and the mining engineer for planning and design.

D. E. M.

## NIM reports

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

### Report no. 1822

*Stability constants and linear free-energy relations for the platinum-group metals.* (22nd Oct., 1976).

The formation constants of Pd(II) and Pt(II) with eight ligands each are reported, together with stability constants for Ir(III) and Rh(III) SCN<sup>-</sup>. All the determinations of stability constants were based on the use of appropriate metal electrodes. It is shown that a linear free-energy relation exists for the free energy of formation of the Pd(II) and corresponding Pt(II) complexes with a wide variety of ligands. Similar, but less well established, relations were observed for Au(III) and Pt(IV) stability constants plotted against the corresponding Pd(II) constants. The formation constants of Pd(III) were plotted against the corresponding Ag(I) formation constants, and it is shown that the expected break-up

into hard and soft ligands occurs as for the d<sup>10</sup> metal ions. Owing to the difficulty of determining stability constants for Rh(III) and Ir(III), sufficient evidence for the existence of linear free-energy relations for these ions was not obtained.

### Report no. 1852

*A revised method for the dissolution of platiniferous materials by the sealed-tube technique.* (18th Oct., 1976).

Revised procedures are given for the dissolution of platiniferous materials ranging from lead-cupellation prills to matte-leach residues and individual noble metals. The procedures are based on pressure dissolution with different acid media and heating to temperatures of between 200 and 270 °C.

### Report no. 1828

*γ-picoline adducts of the nickel, copper, and zinc chelates of 2-thenoyltrifluoroacetone.* (26th Nov., 1976)

The extraction of metals by the formation of organic

soluble complexes improves dramatically in the presence of certain neutral ligands. Where these synergistic adducts occur as crystals, the phenomenon can be investigated by crystallographic methods.

This report deals with the synthesis, crystallization, and synoptic crystallographic examination of the  $\gamma$ -picoline adducts of the nickel, copper, and zinc chelates of 2-thenoyltrifluoroacetone.

#### Report no. 1847

*A pilot-plant investigation of a kinetic model for flotation.* (19th Nov., 1976)

The flotation behaviour of phoscorite from the Phosphate Development Corporation was measured in a pilot plant, the flotation cells in the plant being varied in configuration so as to operate with or without circulating loads. The ore was floated in a batch cell so that the

parameters for a kinetic model could be estimated, and these parameters were then used in a flotation-plant simulator, which is based on the kinetic model, in the prediction of the performance of a pilot flotation plant operating on phoscorite. The simulator predictions compare well with the measured performance of the ore in the pilot plant, but the comparison shows that the kinetic model is not completely adequate for the prediction of performance in continuous flotation plants. The model is weakest in its ability to model the behaviour of the froth phase. The flotation behaviour of the ore could be adequately described when it was assumed that the apatite and gangue each consist of floatable and unfloatable components.

The effect of particle size on the specific flotation rate constant of apatite was found to have a maximum at 85  $\mu\text{m}$  and to fall to zero at 400  $\mu\text{m}$ ; that for the gangue had a maximum at 50  $\mu\text{m}$  and was zero at 350  $\mu\text{m}$ .

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Rooiberg Minerals Development Co. Limited.

Rustenburg Platinum Mines Limited (Union Section).

Rustenburg Platinum Mines Limited (Rustenburg Section).

St. Helena Gold Mines Limited.

Shaft Sinkers (Pty) Limited.

S.A. Land Exploration Co. Limited.

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The Griqualand Exploration and Finance Co. Limited.

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