

# Orange Free State Branch

Minutes of a General Meeting held at the Welkom Mine Canteen on Wednesday, 21st November, 1973, at 4.00 p.m.

## *Present*

Mr E. T. Wilson (Chairman) in the Chair, 15 Fellows and Members, 12 Associates, Graduates, and Students, and 11 Visitors (Total 38).

## *Minutes of the Previous Meeting*

The Minutes of the June General Meeting had not yet appeared in the Journal. Their adoption was deferred to the next General Meeting.

## *General Business*

Members were reminded about the proposed visit to the Atomic Energy Board on the 13th February, 1974.

## *Antarctic Expedition*

The Chairman introduced Dr Kruger and called on him to deliver his talk and slides entitled 'Antarctic Expedition'.

The presentation of this talk and slides was excellent, and was received with applause from all present.

A note of thanks to Dr Kruger was proposed by Mr A. N. Shand.

## *Closure*

After thanking all present for their attendance, the Chairman declared the meeting closed at 5.30 p.m.

Minutes of the Committee Meeting held in the Board Room at Western Holdings Limited at 5.00 p.m. on Wednesday, 6th March, 1974.

## *Present*

E. T. Wilson (Chairman), W. B. Evans, A. N. Shand, R. G. Williams, G. J. C. Young.

## *Apologies*

E. J. Dunstan, transferred; C. J. Isaac, transferred; C. Mostert, unable to attend; D. A. Smith, on leave.

## *Minutes of the Previous Committee Meeting*

The Minutes of the two previous Committee Meetings held on the 26th June, 1973, and 11th October, 1973, which had been distributed to Committee Members, were taken as read. Their adoption was moved by Mr Shand.

## *Additional Committee Members*

It was reported that two elected

Committee Members, Messrs C. J. Isaac and E. J. Dunstan, had been transferred from the Welkom area and would therefore be unable to serve on the Committee. A letter of resignation from Mr Dunstan was noted.

It was agreed that the Committee co-opt two replacements to fill the vacancies. After further discussion by Committee Members, it was decided that Messrs H. M. W. Eschenburg and H. G. Mosenthal be approached in this regard.

## *Future General Meetings*

The response by members to the planned visit to the Atomic Research Board at Pelindaba was surprisingly poor, and consequently the trip had been cancelled.

Owing to the fuel restrictions, no further visits would be arranged, for the remainder of the year at least.

It was agreed that General Meetings should be arranged along the following lines:

3rd April, 1974—Film Show, 'Ordeal at Mufulira', Western Holdings Canteen at 4.00 p.m.

Early June, 1974—Talk on the Reichert Cone by Mr P. D. de Bruyn, Metallurgical Manager, Vaal Reefs Exploration

(Mr Shand undertook to approach Mr de Bruyn in this regard)

To be followed by two short films: 'Diamond—King of Gems'

'The Highveld Process'

(If the talk on the Reichert Cone could not be arranged, a film on the treatment of refractory copper ore would be substituted.)

St Helena Recreation Club at 4.00 p.m.

Early August, 1974 or late October, 1974—Annual General Meeting.

It was considered preferable to hold this Meeting in early August before the departure of delegates to the 10th Commonwealth Mining and Metallurgical Congress in Canada.

## *Appointment of Honorary Secretary*

As Mr A. J. G. Paschalides had resigned as Honorary Secretary of the Branch, the position was offered

to Mr R. R. Perkin. Mr Perkin accepted this appointment.

## *Date of Future Committee Meetings*

The Meeting was of the opinion that additional business could be dealt with by the Committee when it met at times that General Meetings were convened. Therefore, no date was set for a future Committee Meeting.

## *General*

The Chairman expressed the view that the time was again opportune for a membership drive within the locality served by the Branch. The Secretary was requested to circulate all Mine Managers with a list of existing members on their mines, and to appeal for new members.

The meeting closed at 5.40 p.m.

Minutes of the General Meeting held in the Western Holdings Canteen, Welkom, on Wednesday, 3rd April, 1974, at 4 p.m.

The proceedings commenced with the showing of the film entitled 'Ordeal at Mufulira', which vividly portrays the efforts made and final achievement in saving the mine and restoring it. The film was well received by all present.

The business part of the Meeting followed.

Mr E. T. Wilson was in the Chair.

Also present were: 20 Fellows and Members; 20 Graduates, Associates, and Students; and 43 Visitors.

The Chairman welcomed those present and commented favourably on the excellent attendance.

## *Minutes of the Previous General Meeting*

The Minutes of the General Meeting held on the 21st November, 1973, were read, and their adoption was unanimously carried.

*Matters Arising from These Minutes*  
There were no matters arising from these Minutes.

## *General Business*

No matters were raised under this heading.

## *Closure*

The Chairman thanked those present for their attendance and declared the Meeting closed at about 5.40 p.m.

Refreshments were then served.

## PAPERS OF INTEREST

The following papers may be of interest to members.

DC current transformers with particular reference to HVDC trans-

mission schemes, by M. Hadingham.

*Trans. S. Afr. Inst. Elec. Engrs*, April 1974.

The design and construction of the Hendrik Verwoerd hydro-electric

power station, by B. W. Graber, H. Sattler, and E. S. Smook.

Mechanical engineering at the University of Lourenco Marques, by E. A. Bunt.

*S. Afr. Mech. Engr*, April 1974.

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## Book review

### Symposium on Environmental Engineering in Coal Mining

The 20 papers presented at the symposium cover some 14 subjects related to environmental engineering in coal mines, such as dust, heat, gas emissions, ventilation, noise, and lighting.

The standard is very high, and the proceedings can be regarded as an excellent treatise on the present state of environmental engineering

in coal mining. Some of the papers illustrate successful practical applications of research in improvements in environmental conditions. The balance between technical and practical papers is good, whilst the economic cost of improved environmental conditions is always considered. Unfortunately, there are some printing errors.

Although this symposium applied particularly to British and European

coal mines, the proceedings in principle apply to coal mines elsewhere in the world, and it is unfortunate that use is made of abbreviations that are known to the delegates but are not familiar to overseas mining engineers.

With particular reference to South Africa, the proceedings will be a most useful reference as the incidence of longwall mining increases.

B.T.H.

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## Competition for students

Each year the Institute offers a prize (or prizes should the entries warrant it) of up to R100 for the best paper or dissertation on a topic appropriate to the interests of the Institute. The competition is open

to all Student Members of the Institute.

A Student Member who is in full-time study at a university may submit the dissertation or thesis he has to write in part fulfilment of his

university degree, provided that it is presented in a manner and on a topic suitable for publication in the journal.

Entries for 1974 should reach the Institute by 31st December, 1974.

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## A.S. & T.S. Trust

The A.S. & T.S. Trust has been formed with the specific object of establishing a worthwhile source of funds which can be used to further the progress of science and technology in South Africa. The concept is that this progress can best be achieved by judiciously promoting the activities of the scientific and technical societies who are associated with the A.S. & T.S. A pamphlet, setting out in greater detail the background and the objects of the Trust, was sent out to all members with the last issue of the A.S. & T.S. annual proceedings. It will be recalled that a major objective was

the provision of more suitable facilities and services for member societies, particularly in the other large centres. This would require large sums of money and it is believed that these can be raised by appealing for donations and legacies from members and for subscriptions from the public. The Trust has decided upon an initial target of R1-million.

Your Council fully supports the objects of the Trust and has contributed an initial R1000 on behalf of members of the South African Institute of Mining and Metallurgy. Your Council further believes that

individual members should be given the opportunity of contributing personally to this Trust and it has been pointed out that, if each and every member of the A.S. & T.S. subscribed R6 per year for five years, then within that time nearly half of the target would have been subscribed by members. They feel confident that the public would then follow the members and contribute equally generously.

You are invited to add an appropriate amount to your cheque when remitting your annual subscription to the Institute, for us to forward to the Trust on your behalf.

## Nim reports

The following reports are available free of charge from the National Institute for Metallurgy, Private Bag 7, Auckland Park, 2006.

### Report No. 1573

*A pilot-plant investigation of a flotation model.*

Batch tests on a simple flotation cell were used to evaluate model parameters. The model was then used to predict pilot-plant performance (for flotation cells of the same size). Data from a continuously operated rougher bank were also used to predict cleaner performance, via the model.

The density, flowrate, and pH of the plant feed were automatically controlled, and a process-control computer was used for data logging and for control. Sampling of the plant stream was done automatically by the use of carefully designed sample cutters.

The report compares data from the pilot plant and the predictions that can be made with a flotation model, and the reliability of the experimental observations is discussed. Flowrate and grade of the concentrate streams in the plant were found particularly useful in the estimation of parameters for the flotation model, and model predictions and experimental data compared well when the plant configuration had no recycle from the cleaner and recleaner stages to the rougher.

Details of the design and operation of the plant, of the data collected, and of the parameters predicted are given as appendixes.

### Report No. 1597

*The role of sulphur in the flotation of sulphide minerals.*

A Partridge and Smith micro-flotation cell was constructed and was found to be markedly superior in reproducibility to the Fuerstenau cell and the Hallimond tube.

The Partridge and Smith cell and the Fuerstenau cell were used in tests on the natural floatability of allotropes of sulphur, bulk xanthate compounds, and some sulphide minerals. The sulphide minerals were cleaned of oxidation products, and

were reacted with acids, with solutions of metal salts, and with xanthate solutions. The amounts of free sulphur and xanthate-reaction product formed on the surface were determined and related to the floatability of the relevant samples.

Although it appears that free sulphur can act as a collector in some instances, this is strongly dependent on the particular mineral surface. Sulphur is not the sole or main cause of the phenomenon of natural floatability of sulphide minerals. Detectable amounts of free sulphur are not formed when the surfaces of oxidized sulphide minerals react with xanthates, and free sulphur does not appear to contribute significantly to the floatability in sulphide-mineral flotation systems. The collecting entity in such systems is the xanthate reaction product on the surface.

### Report No. 1599

*The analysis of silicate rocks and metallurgical slags by X-ray-fluorescence spectrometry.*

The technique described for the analysis of silicate rocks and metallurgical slags involves fusion of the sample with a flux consisting of lithium tetraborate, sodium tetraborate, and lithium fluoride. The sample is cast into a glass disc and analysed by X-ray fluorescence, synthetic standards being used as reference discs and inter-element effects being overcome by the use of influence factors for the correction of peak and background intensities. The precision and accuracy of the results compare favourably with those obtained by wet-chemical methods, and the cost per sample analysed is very much lower than that for chemical methods of analysis.

### Report No. 1607

*The analysis of ion-exchange resins by X-ray-fluorescence spectrometry.*

A pressed-pellet technique, with boric acid as the binding agent, has been employed for the determination of trace amounts of volatile (arsenic, selenium, tellurium, and antimony) and non-volatile (iron, nickel, cop-

per, zinc, silver, lead, and bismuth) impurity elements adsorbed on ion-exchange resin in the presence of platinum-group metals and gold. Background and line-overlap corrections were applied, and scattered radiation was used to compensate for matrix variations, the intensity data being evaluated on an on-line desktop computer by comparison with synthetic calibration standards. The accuracy of the method has been assessed by spiking tests and by comparison with atomic-absorption analysis. Precision tests have been carried out, and limits of detection are given for all the elements studied.

### Report No. 1617

*An electronic differential precision thermometer.*

The electronic thermometer makes use of a miniature thermistor-composite bead, which, together with two 0,1 per cent high-stability resistors, gives an output that is linear to within 0,15 per cent with respect to temperatures from  $-5$  to  $+45^{\circ}\text{C}$ . The bead is smaller than a match-head and is located at the tip of a thin, flexible stem coated with chemical-resistant material. The stem is 12 cm in length and can be inserted into confined areas.

The instrument has a read-out of  $100\text{ mV}/^{\circ}\text{C}$  and a temperature coefficient of less than  $0,001^{\circ}\text{C}$  for each  $^{\circ}\text{C}$  change in ambient temperature. It is capable of indicating temperature differences with respect to a stable, continuously adjustable back-off reference with an accuracy better than  $0,001^{\circ}\text{C} \pm 1$  per cent of the span selected. If required, the percentage error can be eliminated by allowance for the error extrapolated from the linearity curve.

Instead of the back-off reference, a second probe can be used with the same accuracy in the determination of temperature differences between two measuring areas.

The instrument has a direct, accurately scaled read-out, as well as output sockets for a recorder or digital voltmeter. It is robust and can be used for general laboratory work as well as in intricate precision applications.