

The method of calculation for amortization costs is surely a matter of company policy. In the case of the Anglo American Corporation "in-house" raise-boring operations, we can justify amortizing the boring equipment in a different manner from that used by outside contractors.

Maintenance Costs

Machine maintenance, head maintenance, consumables, etc., are all included in the figures given in Table IV in our paper. In fact, Mr Guise-Brown's assumption that our costs are "basically cutter and labour charges only" is not correct. Apart from depreciation (or amortization) costs and profit margin, our costing of raise-boring operations is comparable with contract raise-boring operations.

Flat Head versus Christmas-tree Head

In his comments under this heading, Mr Guise-Brown has apparently confused our definition of these heads. Sketches of the different reaming heads were given in the paper and the terms were used accordingly in the discussions. The modern trend in reaming head design for button cutters is towards flat heads for the reasons stated. However, it has also been our experience that disc reamers with flat profiles vibrate excessively—so much so that, in the light of current ex-

perience, it has been a severe setback to disc-cutter manufacturers.

Costs Associated with Holes No. 1 and No. 2

When challenging the costs reported for holes 1 and 2 given in our paper, Mr Guise-Brown should remember that these holes were drilled prior to the advent of "double Cat" seals and in very tough Free State quartzites. Boring in these conditions necessitated the use of more than one set of cutters in each hole, resulting in excessively high costs. There is no doubt that these costs are accurate, and a fixed contract price would have "burnt the fingers" of any contracting company at that point of time.

Cutter Experimentation

We appreciate Mr Guise-Brown's comments on the value of our paper; however, he should note that, despite the fact that a new crew was trained from scratch and detailed observations and measurements were taken throughout the programme, our machine utilization compares favourably with the much more experienced operations of Goldfields Cementation. Furthermore, as was noted in our paper, experimentation with new cutter designs and new products is carried out as often as is considered warranted—in the light of reducing operating costs.

Reaming and Pilot Rates of Drilling

Mr Guise-Brown suggests that his company's experience is at variance with ours in regard to reaming and pilot rates of drilling. We fail to detect the variance. However, we would say that only on odd occasions has the reaming cycle been held up by cleaning operations at the bottom of the hole. By far the most common reason for slow reaming rates is the nature of the rock being bored.

It may be of interest to mention here that in recent months the Anglo American raise-boring team completed a 1,22 m dia. hole through Ventersdorp lava in the Orange Free State. Although we hesitate to say that this lava is as tough as the lavas encountered in the West Wits. area, we successfully completed the hole with acceptable cutter costs. We feel that the application of high loads per cutter may have attributed to the success; however, we appreciate the nature of the problem when larger diameters and lengths of hole are required in such geological conditions.

In conclusion, we should like to thank Mr Guise-Brown for his contribution to our paper. We have welcomed this opportunity of exchanging ideas with another operator of raise-borers who has to contend with similar hard rock conditions and at the same time continue to strive for reduced unit costs.

COLLOQUIUM AND GENERAL MEETING

Developments in gold recovery processes

A General Meeting and Metallurgical Colloquium on the above topic were held on Wednesday, 14th March, 1973, at Kelvin House, Johannesburg.

Dr J. P. Hugo (President) was in the Chair.

The colloquium was attended by 170 delegates, and was opened by the President at 9.15 a.m.

OBITUARIES

The President: It is my sad duty to announce the death of the follow-

ing:

D. R. Campbell, J. Daniel, J. M. Pike, and T. Pryor, Life Fellows; W. Drake and M. P. Pearce, Fellows; J. G. van der Nest, Member, and G. T. Rimmer, Associate.

As a mark of respect to the memory of the deceased and in sympathy with the bereaved, I would ask you all to rise and observe a few moments silence.

MEMBERSHIP

The President: I have much pleas-

ure in announcing that the under-mentioned candidates, whose names have been published in accordance with By-Law 5.2.2, have been elected by Council to membership of the Institute in the following grades:

Fellow: C. C. la Grange, N. Orsmond, K. Reim, S. S. Selmer-Olsen.

Member: A. F. Goetzsche, J. R. Caddy.

Associate: J. W. Broschk, R. H. McArthur, D. F. Cleary, P. J. Heyneke, R. H. B. Miles, F. G.

Pascoe, D. Rapoport.

Graduate: E. E. Fricke, P. A. Noble, K. R. Suttill, A. J. van den Berg, G. Venter, K. P. Schleicher, H. C. van Zyl.

Student: J. F. Baasden, K. J. Luxford.

Company Affiliates: Blackwood Hodge (S.A.) (Pty) Ltd, Hewitt-Robins-Denver (Pty) Ltd, Palabora Mining Co Ltd, The Messina (Tvl) Development Co. Ltd, The Griqualand Exploration & Finance Co Ltd, Vergenoeg Mining Co (Pty) Ltd.

COLLOQUIUM

The following papers were presented:

'The Significance of the Mineralogical and Surface Characteristics of Gold Grains in the Recovery Process', by G. M. Koen and C. E. Feather.

'Some Factors Influencing Gold Recovery by Gravity Concentration', by M. D. Bath, A. J. Duncan, and E. R. Rudolph.

'Computer Analysis, Modelling and Optimization of Gold-recovery Plants of the Anglo-American Group', by M. I. Brittan and E. J. J. van Vuuren.

'Gold Plant Test Work and Computer Modelling at Western Deep Levels', by M. I. Brittan and D. S. MacLeod.

Lively discussion took place under the guidance of the following panels:
Morning Session:

Chairman—Dr R. E. Robinson, N.I.M.; Dr S. A. Hiemstra, N.I.M.; Mr A. J. Mokken, Union Corporation Ltd; Mr H. Britten, Head Wrightson & Co S.A. Ltd; Mr G. S. James, Anglo-American Research Laboratories; Dr G. M. Koen, Anglo-American Research Laboratories; Mr E. R. Rudolph, Anglo-American Research Laboratories.

Afternoon Session:

Chairman—Mr H. P. Carlisle, J.C.I.; Mr D. Watt, Rand Mines Ltd; Mr H. E. Cross, Goldfields of S.A. Ltd; Dr D. I. Legge, Anglo-

Transvaal; Dr M. Brittan, Anglo-American Research Laboratories; Mr W. Ruhmer, Anglo-American Research Laboratories; Mr D. S. MacLeod, Anglo-American Research Laboratories.

The following written contributions were presented at the Colloquium and submitted for publication in the Institute's *Journal*.

'The size distribution and morphology of gold particles in Witwatersrand reefs and their crushed products', by D. K. Hallbauer and N. C. Joughin.

'The adsorption of gold from cyanide solutions onto constituents of the reef and its role in reducing the efficiency of the gold-recovery process', by M. R. Urban, J. Urban, and P. J. D. Lloyd.

Other contributions that will be published in the *Journal* include those made by H. P. Carlisle, A. H. Mokken, S. K. de Kok, J. Levin and W. D. Ortlepp.

The meeting closed at 4.30 p.m.

Notices

TRANSPORTATION AND THE ENVIRONMENT

The 5th Quinquennial Convention of the S.A. Institution of Civil Engineers will take place at the Carlton Centre, Johannesburg, from 20th to 24th August, 1973. The theme of the Convention has been entitled "Transportation and the Environment", and this is strongly reflected by the headings in the programme.

Enquiries should be directed to: The Secretary, 5th Quinquennial Convention, South African Institution of Civil Engineers, P.O. Box 61019, Marshalltown, Transvaal.

ENVIRONMENTAL ENGINEERING

A conference on environmental engineering problems in industrialized and developing countries is to be held at the United Engineering Centre, New York, on 19th and 20th September, 1973.

The conference is being organized by the World Federation of Engineering Organizations (WFEO) and will follow WFEO's Fourth

General Assembly.

Applications for programme details and registration forms should be made to Mrs Ann Cook, WFEO Conference Manager, Savoy Place, London, WC2R OBL.

RABCEWICZ—COLLOQUIY

The Austrian Society for Geomechanics is to honour Professor Ladislaus V. Rabcewicz, on the occasion of his 80th birthday, with a meeting in Salzburg Congress Hall on 11th and 12th October, 1973. The themes of the four half-day sessions will be as follows.

- (1) Residual stresses in the earth's crust and their effects on rock structures.
- (2) Surface and underground rock-blasting techniques.
- (3) Shafts—their construction and stability analysis.
- (4) Specifications for rock-construction projects, with special reference to stability and rock classification.

Details are obtainable from Die Österreichische Gesellschaft für Geomechanik, A-5020 Salzburg, Austria, Franz-Josef Strasse 3.

PYROMETALLURGICAL EVENTS IN 1974

Düsseldorf is to be the venue for the following three events:

International Iron and Steel Congress (27th to 30th May), THERM-PROCESS '74 (28th May to 1st June), and GIFA '74 (8th to 14th June).

THERMPROCESS '74 will be the first international exhibition of industrial furnaces and production processes entailing the application of heat. GIFA '74 is the fourth international foundry fair.

O.F.S. Branch Welkom

THE MARCH GENERAL MEETING OF THE BRANCH WAS HELD IN THE ST. HELENA CLUB AT 8.00 P.M. ON TUESDAY, 6TH MARCH, 1973

Mr C. J. Isaac was in the Chair.

There were also present:

Six Fellows: Messrs M. G. Cullen, D. Rankin, D. A. Smith, R. B. Sutherland, S. L. S. Swart and E. T. Wilson.