

Corrigendum

Messrs B. R. Broekman and D. W. Penman have notified some errors in the Addendum that was attached to their paper, 'The Prieska experience: Flotation developments in copper-zinc separation', which was published in the August issue of this *Journal* (vol. 91, no. 8, pp. 264-265).

The corrected Addendum is published in full below.

Addendum: The Experience Curve

Experience-curve effects^{A1,A2} exist in numerous industries, and this led to the definition of the experience effect in the following generalized equation^{A3}:

$$C_t = C_{t-1} (V_t / V_{t-1})^{-\lambda},$$

where

- V_t = the experience, cumulative production, to date
- V_{t-1} = the experience, cumulative production, at an earlier specified date
- C_t = the present cost of a unit, adjusted for inflation
- C_{t-1} = the previous cost of a unit at the earlier specified date, adjusted for inflation
- λ = lambda, an exponent characteristic of the experience rate.

In simple terms^{A4}, the ratio of experience at one point in time to another, earlier point, V_t/V_{t-1} , leads to a cost reduc-

tion in the ratio C_t/C_{t-1} depending on the value of the exponent, λ . For a given exponent, λ , the relative cost reduction is the same when the cumulative production is doubled from 100 000 to 200 000 units, as when going from 1000 to 2000 units.

Fig. A1 depicts the experience curve that applied at the Prieska concentrator. It indicates the experience curves for the Prieska concentrator, as well as the actual annual working costs, as cumulative production was achieved. All the costs were deflated by use of the South African producer price index. The production period shown represents the period during which both plant units at the concentrator were utilized.

For simplicity, two experience curves are shown for the concentrator in Fig. A1. In the first, with $\lambda = 0,18$, the real working costs were being reduced by 12 per cent with each doubling of the cumulative production. In later years, where λ equalled 0,45, the real working costs were being reduced by 27 per cent with each doubling of the cumulative production.

The true experience curve for the Prieska plant is actually a set of curves, each with a different value for λ . The different values of λ would represent the effect of improved 'experience', be it managerial, technological, methodological, or other. It is important to stress that the slope of the Prieska experience curve shown in Fig. A1 reduces as cumulative production accrues. This implies that, with time and therefore with additional production, the absolute reduction in real costs is continually decreas-

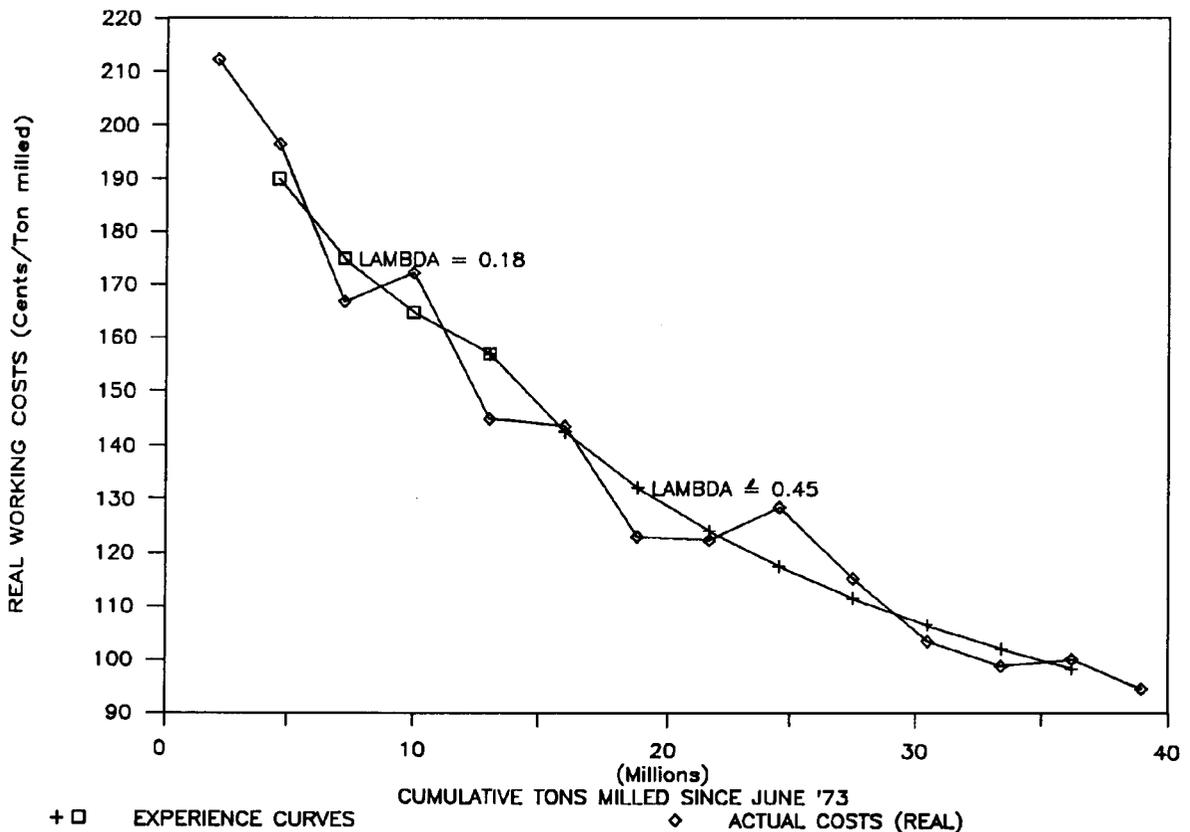


Fig. A1—Experience curves for the Prieska plant (all costs are in 1973/74 real terms)

ing to the point where virtually no real cost reductions are achieved. At that point, the operation has reached maturity, and the only way costs will be reduced significantly is by radical changes in the technological or managerial approach.

References

- A1. THE BOSTON CONSULTING GROUP. *Perspectives on experience*. London, 1972.
- A2. HEDLEY, B. A fundamental approach to strategy development. *Long range planning*. Dec. 1976. pp. 2-11.
- A3. ABELL, D.F., and HAMMOND, J.S. *Strategic market planning*. Englewood Cliffs (USA), Prentice-Hall, 1979. pp. 107-109.
- A4. ROBINSON, C.G. Experience curves as a planning tool. *S. Afr. J. Bus. Mgmt*, vol. 13, no. 3. 1982. pp. 101-112.

Introducing new Council members . . .

Mr K.C. Owen started his mining career as a learner official after matriculating at the Parktown Boys' High School, Johannesburg in 1967.

After completing his National Service, he studied at the University of the Witwatersrand, and was awarded the B.Sc. Mining Engineering degree in 1973. He then joined De Beers Consolidated Mines Ltd and, after a year in the Orange Free State, where he did some mining and shift bossing, he was posted to the Premier Diamond Mine for five years. This included a short spell of duty at Letseng in Lesotho.

As a Section Manager, he took a year off in 1980 to gain his M.Sc. degree at the Royal School of Mines, London. On his return to South Africa, he served at the Consolidated Diamond Mines in Namibia, where he was involved in attempts to extend mining seaward, and in early feasibility studies, which culminated in the recent opening of the Auchas and Elizabeth Bay production facilities. In 1988, having been promoted to Consulting Mining Engineer at De Beers, he settled in Johannesburg.

Mr Owen is married and has three children—two teenage sons and a young daughter. He has taken part in two Comrades' Marathons and the Duzi Canoe Marathon.



Mr B.R. Broekman was educated at Dale College in Kingwilliamstown and the University of the Witwatersrand. He holds the degrees of B.Sc. Eng. (Chemical) and M.B.A. (*cum laude*), both from the University of the Witwatersrand.

He started work as a Plant Metallurgist in 1979 at Hartebeestfontein Gold Mine, and then spent the next seven years working on various Anglovaal Group mines, including a spell at Head Office.

In 1986, he was appointed Assistant Consulting Metallurgist at Anglovaal, and was seconded in the following year to Prieska Copper Mines as Concentrator Manager. He



returned to Anglovaal in 1988, and was promoted to Senior Consulting Metallurgist in January 1991, a position that he still holds.

He is a registered Professional Engineer and a Fellow or Member of several professional bodies.

Mr P.J. Knottenbelt, who was born on 25th August, 1946 in Fort Beaufort in the Cape, was brought up in Zimbabwe. He was one of seven children.

He started his mining career as a Learner Mine Official in Zimbabwe in 1964, and obtained the Diploma in Mining in 1966. Later, in England, he attended the Camborne School of Mines, of which he was appointed an Associate in 1969.

In 1970, he returned to South Africa, where he underwent the graduate training programme of the Anglo American Corporation at Western Deep Levels Gold Mine. Four years later he was transferred to the Free State gold mines, and served in various management positions in planning and production.



He was transferred to the coal mines as Senior Technical Assistant in 1977, and was later seconded to the Amcoal/Trans-Natal satellite campus of the Technikon Witwatersrand.

In 1988, he was seconded again, through the Chamber of Mines of South Africa, to the Technikon Witwatersrand as Departmental Chairman in the Mining Department, a position he still occupies.

Mr Knottenbelt is married, and he and his wife, Lucy, have four children—two boys, both of whom are at the University of the Witwatersrand, and two girls, who are still in junior school.

His hobbies include hiking and table tennis, but he finds little time to pursue these interests.

Mr P.R. Janisch obtained his B.Sc and B.Sc. (Survey) degrees at the Natal University.

From 1964 to 1970, he was a Research Officer in the Chamber of Mines, working in particular on advanced methods of mine surveying.

Mr Janisch joined Gold Fields of South Africa in 1970, and was appointed Group Surveyor in 1971. This was followed by various managerial appointments. He is