

address on 'The Rubber Lining of Plant and Equipment' by chastising Mr Thomas for calling the original mackintosh a plastic, when it had actually been rubber. However, upon being questioned, he admitted that the difference between modern synthetic rubbers and plastics was sometimes uncertain and actually unimportant. Rubber could absorb large quantities of energy through deformation, thus performing in a manner quite contrary to that of ceramics, which could withstand sliding wear. The many compounds making up a rubber allowed it to be designed for specific applications, such as resistance to a particular chemical.

Mr V. Statford (UTP Welding) described the variety of processes and materials used in weld surfacing, and stressed that the artisans applying the surfacing should be educated on these and their applications. Wear resistance did not depend only on overlay hardness; for example, a swing-hammer crusher was surfaced with a composite of chromium carbide and austenitic manganese steel to provide a combination of abrasion and impact resistance.

Dr A. Wells (CSIR) introduced glow-discharge-assisted surface heat treatment as the diffusion of elements into or out of a surface. A chamber was filled with the appropriate gas and a potential difference was applied between the work surface and the chamber wall. The evenness of the coating over the whole surface and the importance and applications of nitriding and boriding were discussed.

In the final paper, Dr R. Hutchings (University of Cape Town) discussed ion implantation with particular reference to its effectiveness in wear-protecting precision-

dimension engineering parts, tools, and dies. It was commercially available locally, but its major drawback was the difficulty in reproducibility and quality control.

In the general discussion, Professor Ball replied to a query about the difference between mode and mechanism of wear that the wear mechanism occurred within the surface to produce the observed wear mode on the surface. It was also concluded that knowledge of abrasion mechanisms in polymers was lacking, possibly because polymers had only recently come into extensive use.

In his summing up, Dr M.P. Shaw (CSIR) emphasized that, as users were the most important people, it must be ensured that the research work being carried out reached them. He congratulated the speakers on the quality of their talks and on their contributions to the understanding of the relationship between structure and properties of materials.

### General

In general, the reaction of the delegates to the Colloquium was very favourable. The full spectrum of materials had been covered, and user, manufacturer, and researcher had been brought together. However, it was clear that there was inadequate education on 'alternative' engineering materials at the university and technician level. When added to the fact that there is definitely no panacea to all wear problems, this lack of education leaves the user confused as to how to select from the variety of materials available. This Colloquium had indicated some of the available materials, but a seminar was needed on materials selection from the user's point of view.

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## Corrigenda to article on copper\*

by D.J. Crowe†

I read with considerable interest the recent articles on copper by Mr C.O. Beale as published in the *Journal*. However, in Part II the section dealing with Prieska Copper Mines (Pty) Limited contained several factual errors, details of which are given below.

Page 109 The second sentence of the second paragraph in the section entitled 'Prieska Copper Mines (Pty) Ltd' should read: By 1971 diamond drilling had indicated the presence of about 47Mt of ore ...

Page 110 **Underground Mining.** 'Mining started in 1974' should read *Mining started in 1972 and full-scale operation was achieved in 1974.*

Second paragraph. 'Ore is blasted from holes drilled parallel to the orebody from stripping crosscuts' should read *Ore is blasted from rings of near-vertical fan holes and slipped to*

*the full width of the stripping crosscuts.*

Page 110 **Concentration,** last paragraph. The concentrates are thickened ... and are then transported ... to *Port Elizabeth* (not Saldanha Bay) for export.

Page 110 **Current Situation,** second sentence. 'The Company now judges that ore below the 957 m level' should read *In 1982 the Company concluded that ore below the 957 m level ...*

Page 111 **Current Situation.** To update the article to the present situation, a sentence reading as follows should be added after the concluding sentence: *However, in February 1985 the Company announced that production was expected to continue until around mid-1986, primarily as a result of the significant increase in rand prices for copper and zinc, which had permitted the profitable reclamation of substantial tonnages of lower-grade ore accumulations contained in old stoping areas.*

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