

'We are equipped as never before, And the question arises: What shall we do with our strength?' 1953 Sir Robert Robinson, Nobel Laureate

The papers in this issue are from the 5th conference on Platinum: 'A Catalyst for Change'.

The platinum industry has suffered a sequence of unfortunate events causing much concern about its future. These setbacks run fairly deep. The most serious is the crippling increase in electric power cost which, because of the heavy demand of the electric smelting furnace, has caused the cost of processing to move into the danger range relative to the prices obtained for the products. The gloom has been deepened by the carbon emissions tax announced in the latest budget.

No wonder that, in the selected papers, attention has been given to highly sophisticated computer evaluations to optimize the cost structures of what has to be one of the most challenging mining enterprises in the world.

But recent technical advances point to promising 'vistas'. I am using this one word to signify a landscape of new technical and community collaboration.

On a personal note the most gratifying paper in this issue is: 'A practical approach to plant-scale flotation optimization' by A. Harris, L. Venkatesan, and M. Greyling.

This paper dispels at long last the myth that the flotation process is an art, never to be controlled by scientific and engineering principles. As a slide-rule trained chemical engineer, I was rapidly converted to using computers to solve differential equations when, as the newly appointed director of the then National Institute for Metallurgy, I established a research group under Professor Woodburn, head of the Department of Chemical Engineering at Natal University. He elected to attempt a mathematical analysis of the froth flotation process. It was Woodburn who first focused on the froth phase as the key to successful modelling. This proved to be more difficult than anticipated. He has been proved to be correct but, as a measure of the challenges, it has taken half a century and the participation of all the chemical engineering groups in South Africa and many mineral research laboratories to prove the point.

The implications of this milestone paper go way beyond nostalgic memories. It is a key step in the processing of notoriously variable platinum ores, so that one might expect improvements in recovery and costs, particularly when combined with the other paper on flotation: 'Hybrid Energy Flotation™ – on the optimization of fine and coarse particle kinetics in a single row' (D. Govender, D. Lelinski, and F. Traczyk.)

These two contributions provide a quantitative basis of how to modify the design of flotation plants to suit other components in the processing sequence. This is invaluable in the optimization exercises that abound in this issue.

Another paper on ore dressing is also of great significance: 'Pre-concentration of UG2 platinum ore: economic benefits' (DRA Mineral Projects). It describes the simple and controllable dense medium separation (DMS) process for concentrating the chromite and closely associated

platinum and base metals from the ores of the UG2 reef. DMS responds favourably to the highly effective high pressure roll crushing (HPRC) technology. Flotation and DMS could be supplementary processes to deliver a concentrate to the next step in the recovery chain, which has previously been the electric smelting furnace. The DMS process becomes much more interesting if the electric smelting operations are replaced by the hydrometallurgical Kell process, which has been very convincingly described in a previous issue of the Journal. It certainly obviates the need to separate the bulk of the chromite from the sulphide minerals and bypasses the high electrical power cost of furnace operation.

The combination of the Kell process suggests to me a new and exciting vista of process circuits. This is based on the premise that the chromite is unaffected by the hydrometallurgical processes but the base metals and the platinum group elements can be recovered from solutions at high extractions. The Kell process operates just as effectively with Merensky and other reef flotation concentrates. Combinations of rougher, cleaner, and scavenger flotation cells coupled with the DMS separators can be designed to be applicable to the full range of mineralization in all sections of the Bushveld Complex with reasonable mining options and grades. There is a good probability of other improvements forthcoming – improved drilling and blasting protocols, underground mechanization, as well as optimization strategies to cater for market and ore variations that are described in this issue. From other sources there is a steady stream of developments in recovery from the typical hydrometallurgical solutions, with improved water recovery and zero waste or toxicity to the environment.

My overall impression on the techno-economic aspect is a vista of continuing expansion of mining operations along the full perimeter of the Bushveld Complex.

There are two other papers that I think the conference committee consider being compulsory reading, since they relate to the mutual dependence of shareholders and mine employees. These associations were the cause of the upheavals at Marikana, and brought about doubts as to the contribution of the platinum industry providing the hoped-for employment opportunities.

The first paper is: 'Navigating above-the-ground risk in the platinum sector' by A. Lane. A most comprehensive paper, but for this Journal Comment I must summarize the main conclusion, which is to give primary attention to the ambitions of the lower paid mine workers. These, I believe, would be the ability to participate, proudly and fully, in the enjoyment of being members of an integrated community working at the mine. It means having an income to participate in a first class education for their families. The income aspect is not unrecognized, and the magnificent work of the Anglo American companies in establishing an entrepreneurial fund to provide for sustainability in the community is not as well known as it should be. But for lower skilled family members, small-lot agriculture of a carefully selected advanced nature is also an option, with great potential for production of food, materials, and bio-energy and biofuels. The latter local market runs into hundreds of billions of rands. This demands a major commitment from government and its research facilities. But if these can contribute to the infrastructure of the mining clusters, I begin to see some hope to achieving meaningful levels of employment in the platinum mining industry.

The second paper relevant to this topic is: 'A perspective on the supply and utilization of mining

Written by RE Robinson
Friday, 01 March 2013 00:00

graduates in the South African context' by Dr C. Musingwini, Professor J.A. Cruise, and Professor H.R. Phillips. This paper is of wider applicability, representing some astounding efforts in increasing the production of mining engineers and technical professionals. In summary, my conclusion to extending this effort is to focus on the school and technical education by a close interaction between the mine professional community and the teachers and scholars (and of course the parents and potential employers) in computer-oriented schools. Not mentioned in this issue, but announced at the conference, is the new platinum mine, 'Wesizwe'. The main players are the Bafokeng nation and, fascinatingly, Chinese investors. Work has already started, but I have no details regarding the processing methods nor the size and number of employees.

Perhaps it could be the perfect Vista opportunity to exploit all the latest thinking around mining cluster communities, and with full national support to catalyse similar models across the country – a win-win situation for all concerned. To end in a more fanciful but somewhat irrelevant mood – it would be wonderful as a first step if South African and Chinese shareholders could sponsor a 'WESIZWE WIZARDS' international team in the soccer leagues!