



# Official closing address of the XV CMMI Congress

by R.F. Botha\*

## Introduction

I want to thank you for inviting me to deliver this, the closing address at the final plenary session of the 15th Congress of the Council of Mining and Metallurgical Institutions. Your Council has an impressive title, and justly so. Consider the expertise, the skill, the capacity, the achievement, that is gathered together here in this room this afternoon.

## Anniversaries

Right at the outset, I would like to mention yet again (for I am sure they will have been mentioned already at this Congress) the many birthdays we are able to celebrate: the *Empire Council of Mining and Metallurgical Institutions* on its 70th birthday; *Mintek* on its 60th; the centenary-in-sight of the *Geological Society of South Africa* next year; and finally the most noble birthday of all, because its the oldest, the *South African Institute of Mining and Metallurgy's* 100th birthday.

This is a considerable achievement. I can't help thinking about what would have gone through the minds of the founders of your organisation if they could then have seen all the achievements of the 100 years that would follow their simple act of founding a modest association.

## The special role of miners

You, the builders of so much of our physical, scientific and technological world, enter areas unknown and unappreciated by the vast majority of the world's millions who enjoy the results of your achievements. I wish I could persuade our educators to include mineralogy and metallurgy as subjects of learning in schools from their first year until they leave.

It is you who make it possible for the rest of us to flourish, with the use of the marvels that you procure for us from the depths and mystique of the earth. You may, like the surgeon, come to regard your specialized world as normal, even mundane or—the ultimate blasphemy—boring. But to us laymen, you enter a world of wonder and mystery. That gate is locked to most of us. You descend into the mysterious depths where we cannot go; or into the metallurgical laboratory where your minds leave ours behind.

Your world is an unknown one to us and, goodness knows, you often do yourselves a disservice by not communicating adequately your impressive achievements to the rest of us. I know it is a lot to ask you to use a language which everyone out there can understand—but do give it some thought and see whether you cannot simplify the terms and concepts commonly used at least among lay people.

Explain your art and your science by comparisons with everyday examples which strike a chord in the experience of ordinary people.

Recently I asked an expert to explain to me the factors which determine when coal is low grade. He then started bombarding me with a whirlpool of data and parameters, ifs and buts, howevers and whereas's, elements and formulae. After a while I interrupted my tutor's flow of words and thoughts. I asked him whether it would be in order to regard low grade coal as rubbish. He agreed, but grudgingly.

'In other words,' I said to him, 'if Sasol, the South African company which manufactures synthetic fuel, converts 40 million tons of low grade coal into petrol, I can say that we are driving our cars on rubbish?' This time he agreed that that would be an effective way to persuade the ignorant of the necessity to maintain tariff protection for Sasol.

\* *The Honourable, the Minister of Mineral and Energy Affairs.*  
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### Lack of recognition

There are monuments to great travellers like Columbus, Marco Polo, Vasco Da Gama and Bartholomew Diaz; there are books written about courageous adventurers like Scott of the Antarctic and Edmund Hillary of Everest. But I am not aware of as many dashing heroes in the mining or metallurgical fields, although I am sure there are many. I do not see many statues of metallurgist or mining engineers. If there are any, it is probably because they have made a lot of money or taken up a dubious career in politics!

The Nobel Prize has six categories: physics, chemistry, physiology or medicine, literature and (since 1969) economics. But what about *mineralogy*—the science which treats of minerals? What about *metallurgy*—the knowledge of metals, the art of working them, the procedures of extracting them from their ores? Of these noble pursuits there is no mention, no prize from Mr Nobel nor his committee. Exponents of these skills have to hope for inclusion in the fields of physics and chemistry if they are to receive this recognition, probably the greatest award the world knows.

There are not many statues to mineralogists, no national holidays, too few streets with their names. I looked in vain for 'Merensky' in the indexes of my history books.

It seems as if we are impressed with achievements which involve travelling great distances across the surfaces of the earth, or scaling great heights or going to the moon. But when it comes to plumbing the depths, the achievements of our pioneers and record breakers rest in relative obscurity.

### Job on mining

Yet I cannot help reverting to that great and ancient descriptive passage of mining which you probably all know, but which nevertheless bears repeating, from the Book of Job in the Old Testament of the Bible:

*There are mines where silver is dug;  
There are places where gold is refined.  
Men dig iron out of the ground  
and melt copper out of the stones.  
Men explore the deepest darkness.  
They search the depths of the earth  
And dig for rocks in the darkness.  
Far from where anyone lives  
or human feet ever travel,  
Men dig the shafts of mines.  
There they work in loneliness,  
Clinging to ropes in the pits.  
The stones of the earth contain sapphires,  
And its dust contains gold.  
No hawk sees the roads to the mines,  
And no vulture ever flies over them.  
No lion or other fierce beast  
Ever travels those lonely roads.  
Men dig the hardest rocks,  
Dig mountains away at their base,  
as they tunnel through the rocks,  
They discover precious stones.  
They dig to the sources of rivers  
And bring to light what is hidden.*

Then, of course, the writer of the Book of Job begins to compare the physical searching for the treasures hidden in the earth to the spiritual searching for wisdom. And who can deny that this search—and the finding of this treasure—lies at the heart of whatever this life is all about? So one could say that your profession and others like it lie at that heart.

### The value of minerals in our everyday lives

And who can deny that the treasures that you win from the earth and render unto all mankind are not the heart of at least 'our material world' as Madonna would call it? For minerals are all around us, within and without us, above and below us, before us and behind us, to the left and to the right of us. We can never escape the presence of, and the need for, the materials with which you are concerned.

Last week, while debating my budget in the Senate, I sketched to our honourable senators our dependence on minerals by taking Mr Normal, Mr Citizen, as he starts his daily life. He may have passed the Stone Age and reached the Metal Age—silver in his hair, gold in his teeth and lead in his feet. Nevertheless, he is still active enough to be woken by an alarm clock made of stainless steel and plastic derived from minerals synthesized from petrochemicals. He switches on the light. The lamp has a bulb made of glass and filaments of tungsten; or he switches on a torch with a zinc-cased battery full of soft black manganese and carbon-graphite electrodes.

He stumbles out of bed and gropes his way towards the shower. The water is heated in a metal geyser—even solar heating will require silicon panels. Energy from the tides, winds or rivers will need metal transmission lines from generators consisting of plastic and steel. The handle of his shower cubicle and the shower rose will be steel or plastic as indeed will be the frame itself. The water will have been stored in concrete and steel dams and have been purified with chlorine. It will have been transported to his house in cement, steel or copper pipes.

Mr Citizen shaves before he leaves his home. The shaving soap will have soda ash; the razor will be of steel or some other metal; the brush will have synthetic fibre and a plastic handle. In the meantime, his wife will be making herself beautiful with cosmetics full of kaolin or talc as a base. The talc which the ladies use is, of course, a mineral long before it becomes a face powder. Being a hypochondriac, she takes several medicines full of kaolin, bentonite, magnetite and calcite, not forgetting the trace elements which the body needs such as iron, copper, magnesium, zinc—all of mineral origin.

Mr Citizen eats cereal for breakfast. The bowl is ceramic from mined clay, the cereal from crops harvested with tractors using a variety of metals, *fertilized* with minerals like phosphate, potash, nitrogen, calcium, sulphur and magnesium and *protected* by pesticides made of arseno-sulphate with kaolin powder as a neutral base. The spoon he uses is steel, iron and chromium. His egg and bacon is sprinkled with sodium chloride, commonly called salt, mined from inland pans in the Karoo. He glances through a newspaper of wood-pulp, and kaolin to give it body. Titanium dioxide processed from ilmenite and rutile is added to achieve whiteness. Talc is used again for the smooth and glossy look of the commercial insert.

Did you ever realize, that it is you who are responsible for the freedom of the press?!

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And so we could go on through the day ... how Mr Citizen leaves his metal and mineral-riddled house, drives to work in his metal and mineral-riddled car from whence he moves out into a metal and mineral-riddled day. No drug addict, however desperate, was ever as hooked on his fix as our Mr Citizen is hooked on your metals and your minerals.

At the end of the day, he returns to his home, the presence of all these metals and minerals still with him. Even when our Mr Citizen retires for the night, he, his children and his warm-hearted cuddly wife can still not manage without mineral derivatives and metallurgical variations.

As Mr and Mrs Citizen get into bed—these days they could even have different surnames and be Mr Citizen and Ms Loyal Subject instead—there could be some natural rituals to perform, which are always with us. Be that as it may, our family pair can either do it in the dark, at some risk, or leave the light on in order to do it properly.

But before you give free rein to your imagination, let me hasten to reassure you that I am referring to that hallowed habit of taking a last sip from the glass of water next to the bed before we close our eyes and fall asleep! Yet again, we have a combination of minerals: a glass made of sand from the Cape Flats filled with chlorine-purified water.

The description just given is a completely incomplete list of the minerals utilized in everyday life. You would know better than I, how to complete that list. Imagine what we would have been able to describe if we had followed the man or his wife in their taxi, bus or car, seen them at work in the factory, laboratory or other workplace where they spend their day.

### The RDP, minerals and mining

It is true that a large part of our community does not enjoy the amenities I have described. But they certainly aspire to have the benefit of at least some of them in future. The current South African Government is committed to do its utmost to make this possible through the Reconstruction and Development Programme (RDP).

A White Paper on the RDP will soon be approved by the Government and the relevant parliamentary structures. The RDP is a vision of the fundamental transformation of our society and nation. Key programmes have been identified to drive the RDP, covering urban renewal, rural development, human resource and capacity development, democratization and institutional reform, economic restructuring and the elimination of poverty. Strict budgetary and fiscal discipline will be required for all programmes and projects which are to be partly or wholly funded from the RDP Fund. A business plan will be required for every project before funds can be released. All programmes and projects will be subject to auditing and performance assessment.

Affordability and fiscal discipline will be amongst the important principles in implementing the RDP. The RDP will seek to integrate growth, development, reconstruction, redistribution and reconciliation into a unified programme. This programme will both meet basic needs and open up previously suppressed economic and human potential in urban and rural area. In turn, this can be expected to lead to an increased output in all sectors of the economy. By upgrading our infrastructure and human resource development, we will also enhance export capacity. Attention will be paid to those economic factors inhibiting growth and investment and placing obstacles in the way of private sector expansion. Success in linking reconstruction, development and growth is essential if we are to achieve the aims of the RDP.

Exports of minerals and mineral-related products account for 65 per cent of South Africa's total foreign exchange earnings. It is therefore clear that the mineral industry in this country will be of fundamental importance in implementing the RDP. Much of our funds required will be generated from our own resources inside the country. But we are also looking forward to new investments from abroad. We hope that we will be able to mobilize substantial funds from foreign sources, but we realize that to do this one needs more than just hope. We must offer attractive opportunities that foreign investors cannot refuse. To some extent we offer them already. We will offer them to an increasing extent in future.

I believe the world wants us to succeed. When you return to your countries, go and say to your governments and institutions: 'South Africa has the will to succeed'. We need a little time, a little understanding—and a lot of money!

But for success we will also have to prospect for the rich ores of reconciliation, drive deep shafts into thick seams of tolerance and learn to process and refine friendship out of the rough rocks of the past.

### Resources and technology

Your theme for this Conference is *Resources and Technology*. Resources are 'the means of providing what is required, something that can be used for support and help, an available supply that can be drawn on when needed'. *Technology*, on the other hand, is the practical cousin of science which is knowledge itself: 'The application of science, especially to industrial or commercial objectives; methods and materials used to achieve such objectives; the knowledge that is available to a civilization used to fashion implements, practise manual arts and skills and extract or collect substances'.

This last phrase tells me that there is a special relationship between technology and those sciences which you practise and apply. Clearly, too, with regard to resources, what could fit the definition of 'providing what is required', better than mineralogy and metallurgy—except perhaps the butcher, the baker and the clothes maker?

### The resources/technology relationship

With resources, we look at what is provided by nature. Technology is the contribution made by man. Gorillas and chimpanzees lick the end of a stick and poke it into an ants' nest, knowing that when they draw it out, there will be ants clinging to it. When they enjoy their delicacy of the day, little do they realize that they are demonstrating the relationship between resources and technology.

The resources are the ants, which have been placed there by nature; the technology is the application of the primitive intelligence of the ape who has devised a way of appropriating the delicious taste of formic acid which ants provide!

Leaving all the fancy and complicated words behind, life is in effect the exchange of energy between ourselves and our environment. Nature developed those who hunted and those who were the prey; those who ate and those who were eaten. Sometimes a species was a *chaser* in relation to certain other species but a *chased* in regard to *yet others*. All had to develop acumen and skills to survive, whether as eater or eaten. These two urges have lived on in *homo sapiens*.

First, our species learnt to make tools—from stone and bone in the beginning, then wood, and later iron. These were the primitive beginnings of technology. It was out of man's ambiguous nature, his desire to befriend and build, but also his desire to dominate and destroy, that technology, mining, mineralogy, metallurgy, developed.

In the latest phase of development, the exploitation of mineral and metals has undergone an amazing transformation. Our realization that we depend on the treasure chest of our minerals to improve the quality of our lives, has led to an increasing number of spectacular advances: TV, telescopes, cameras, the whole communications and computer explosion. We have come closer to the stars. We are beginning to pierce into the unanswered questions of the universe, even of the meaning of life itself, thanks to the kind of treasures which you are willing to lay bare and make available to your less knowledgeable fellows.

To do this, one needs to explore. To explore, one needs courage and an open, searching mind. In the 1930's Einstein was once asked which would occur first, a man on the moon or the splitting of the atom? Einstein said a man would be walking on the moon decades before splitting the atom.

But geniuses can also miscalculate. So when we are faced with questions as to whether there is life on other planets, for instance, I say: beware he who presumes to be certain of these vast questions. We might one day overcome the seemingly impenetrable wall of time and distance. One day we might be obtaining our diamonds, our metals, our minerals from a planet where dinosaurs still rule.

### A look back

So the South African Institute is 100 years old this year. Imagine the difference between mining, minerals and metallurgy now and 100 years ago. Imagine the author of Job being shown the mining marvels of our present age. Imagine the inhabitants of the primitive Ferreira's mining camp in the first years of the Witwatersrand, being told of mine shafts kilometres deep, of vast air-conditioning ducts to conquer the fierce heat of the earth's inner cauldron, the dominant role of gold as a precious metal in the world's financial markets, no matter what its fluctuating fortunes might be.

Imagine George Harrison (not the Beatle) who discovered the vast Witwatersrand gold deposits. He sold his claim for ten pounds sterling. In an affidavit to one of the regional forerunners of my Department, Pretoria's Mines Department, in July 1886, he reported a 'payable gold field'. This simple statement launched one of the world's biggest gold rushes. After collecting his ten pounds, this 'billion-dollar loser', as one book describes him, disappeared without trace, just another prospector who had sold out too cheaply and too soon.

### Conclusion

And yet maybe he lost this treasure only to find another, which the writer of Job describes in terms of metals and minerals, namely, wisdom. I will quote him and then conclude.

*Wisdom is hard to be found among men,  
No one knows its true value.  
It cannot be bought with silver or gold  
It is worth more than a gold vase or finest glass.  
Its value is more than coral, crystal or rubies.  
The finest topaz and the purest gold  
Cannot compare with the value of wisdom.*

May God guide us to learn the skills to mine this treasure. If we do, our descendants will meet together like this in 100 years time even more happy, effective and prosperous than we seek to be today. ♦

Mr Eric Dempster, President of the Institution of Mining and Metallurgy (London), presented a silver salver to The South African Institute of Mining and Metallurgy to commemorate its centenary.