

Annual General Meeting of the Institute

The Annual General Meeting of the South African Institute of Mining and Metallurgy was held in Kelvin House, Johannesburg, on Wednesday, 19th August, 1981.

Dr P. R. Jochens (President) was in the chair and declared the meeting open at 4.05 p.m.

This account of the proceedings includes only those matters that are not reported under the heading 'Annual report and accounts' elsewhere in this issue.

Confirmation of the Minutes

The minutes of the last Annual General Meeting, which was held on 27th August, 1980, were confirmed as published in the September issue of the *Journal*.

Welcome

President: I extend a sincere welcome to you all, especially to the following distinguished guests: Mr L. W. P. van den Bosch, President of the Chamber of Mines, and Mrs van den Bosch; Mr J. G. Kirchner, Government Mining Engineer, and Mrs Kirchner; Dr William Bleloch; Dr L. Alberts, President of the National Institute for Metallurgy, and Mrs Alberts; Dr C. F. Habis, President of the CSIR, and Mrs Habis; Dr P. J. Hugo, Chief Director of the Minerals Bureau, and Mrs Hugo; Mr D. N. Stuart, General Manager of the Chamber of Mines, and Mrs Stuart; the Presidents and representatives of other Institutes and their wives; and Honorary Life Fellows of our Institute and their wives.

Brigadier Stokes Memorial Award

President: Last year the Institute introduced the Brigadier Stokes Memorial Award to commemorate the outstanding contribution made by Brigadier R. S. G. Stokes, an Honorary Life Fellow and Past President of this Institute. Council decided that the Brigadier Stokes Award would consist of a platinum medal and cash award, and would be made for the highest achievement and contribution by an individual in the field of mining and metallurgy in South Africa. The first recipient of this award was Mr Harry Oppenheimer, in 1980. All corporate members may submit nominations for this award, and I am happy to report that, once again, we have a most distinguished recipient, namely, Dr William Bleloch.

Dr Bleloch received his schooling at St. Andrew's College, Grahamstown, and then attended the University of the Witwatersrand, where he was awarded a B.Sc. Honours degree in 1927 and an M.Sc. degree in 1928. In 1931, he was awarded a Ph.D. degree by the University of London. His first post back in South Africa was as Chief Chemist to Union Steel Corporation.

During the Second World War, he enlisted in the South African Engineering Corps and was soon instructed to report on the feasibility of establishing chemical warfare plants in South Africa. He designed and operated a pilot plant, and was subsequently responsible for the design,

construction, and commissioning of full-scale plants. Towards the end of the war, Lieutenant-Colonel Bleloch was responsible for converting the Klipfontein factory to the production of D.D.T. A paper based on this work, which was presented to this Institute in 1947, was awarded the Gold Medal.

A subsequent paper by Dr Bleloch to the South African Institute of Engineers on the large-scale production of ethylene is worthy of note, since it has been said that this paper entitled him to be regarded as a pioneer in South Africa of the large-scale production of synthetic organic chemicals.

As early as 1934, Dr Bleloch had proposed a scheme for the recovery of vanadium and pig iron from vanadiferous magnetite, and in 1948 he conducted large-scale tests overseas on the magnetite of the Bushveld Complex. He demonstrated that vanadium could be recovered, and that pig iron suitable for steelmaking could be produced. Details of this visionary concept are provided in a paper published by the Institute in 1949. In addition, he acted as Technical Adviser to Rand Mines Limited during the development of a process to produce chromium steel from Bushveld ore, and during the construction and initial operation of the commercial plant.

He presented a paper to the Institute in 1950 entitled 'Theoretical considerations in the operation of iron blast furnaces with cold oxygen carbon dioxide blast'. He was again awarded the Institute's Gold Medal. His interest in the use of modified blast-furnace technology continued, as shown by another paper published in the *Journal* (1971): 'Theory of cold blast iron production with stackgas of low nitrogen content'. This paper has been quoted as a possible solution to the problem of inadequate local reserves of coking coal. Certainly, the idea also has merit in connection with ferro-alloys of lower melting points. In fact, I wonder whether the recent work on the application of plasma technology in the tuyères of blast furnaces is not an extension of the same concept.

Dr Bleloch was elected a President of this Institute for the year 1956-1957. His brilliant Presidential Address, 'Metals and megawatts in South-eastern Africa' was widely acclaimed for its clear and accurate exposition of the exciting prospects for the electrometallurgical industries in that area, provided the necessary cooperation between the countries could be obtained.

Dr Bleloch has often stressed the importance of exploiting our ores, which, at that time, were lying fallow or were being exported at much lower profit than if they had been worked into metal before exportation. In the course of one of his addresses, he said: 'It is not really in the research laboratory that these problems are solved. It is in the minds of men that they are solved by the ability of mankind to think'.

In the course of his extremely active career, Dr Bleloch

has given us ample evidence of his own ability to think, and of the fertility of his very active mind. In 1975, the University of the Witwatersrand conferred upon him the degree of Doctor of Science and Engineering *honoris causa*. On that occasion, the citation included the following comment: 'William Bleloch can truly be called the father of our electrochemical and electrometallurgical industries, the importance of which to our economy and the welfare of our people can scarcely be overstated'.



The President, Dr Peter Jochens presents the Brigadier (Stokes Memorial Award to Dr William Bleloch (right)

Dr Bleloch, in making this award to you, the Council of the South African Institute of Mining and Metallurgy recognizes your vital contribution to the development of the South African metallurgical industry.

Dr Bleloch: I thank you sincerely for the honour you have today conferred upon me in the Brigadier Stokes Award, and I ask you to accept my sincere thanks for so great an honour – indeed not only for myself, but for the many who worked with me during the years. They gave of their best through the hard times and in the days of success, and in my own mind they certainly share in the honour that you have conferred upon me today.

My earliest memory of Brigadier Stokes is that of a strong man in our Presidential chair some 44 years ago, and I am indeed proud to hold this premier award in memory of him.

I thank you, Mr President, for your generous words in introducing me to this distinguished gathering but, you know, looking back on the rough days, I do not think that all of my confrères would accept without cavil your

generous words about me. But I myself am indeed happy to accept those words, and I will always treasure them.

If you will bear with me for two or three minutes, I would like to make a brief comment on the present situation in the electrometallurgical industry. Our reserves of manganese, vanadium, chromium, and iron offer great potential wealth in the making of alloy steels, but the making of these steels is likely to be dependent for, say, the next fifty years on our coal-produced electric power. Although our metal reserves rank high in the world, our coal is in very sharp contrast, ranking something less than 1½ per cent of the world's reserves, which are rated at 10 terra-tons (or 10 million million tons), 80 per cent of which is in the U.S.A. and the U.S.S.R. To provide an adequate working life for the existing and presently planned E.S.C. power stations and the three Sasols, the committed reserves of our coal are probably about 30 thousand million tons. This allows for a realistic extraction below 60 per cent as advocated by Prof Bill van Rensburg of Texas. Moreover, the coal reserves for these plants must be single blocks well situated in relation to the national grid and water supplies, and the mining area must be as compact as possible since transport adds heavily to the cost of coal. Stripmining, including adequate restoration of the surface, is at present useful only for coal to depths of less than 30 metres, and a ratio of overburden to coal of 4 to 1. Outside the committed reserves, clean coal may gradually become a rare commodity, and, the deeper the coal, the harder the partings and the lower the headroom, which may add both to the difficulties and to the cost.

The 40 or 44 million tons per year of coal to go out of Richards Bay may bring in some 600 million rand per year in foreign exchange, which will, of course, be a great help to us. But I think it should be borne in mind that the 40 million tons per year of coal to be exported from Richards Bay could generate 75 thousand million kilowatt-hours per year, which is equal to the total output of all the E.S.C. generating stations in 1979.

That power could make over 20 million tons per year of alloy steels from our reserves of reducing coal and metal oxide ores. This has a potential foreign-exchange value that is possibly six or seven times that generated by the export of the 40 million tons of coal through Richards Bay.

Here, to my mind, lies a great challenge and a great opportunity for our future engineers. I would ask them, in measuring up to that challenge, to look to the inspiring tenacity and courage of Brigadier Stokes whose memory we honour today.

Mr President, I thank you again for this award, making this, indeed, the most momentous occasion in my lifetime of engineering endeavour.

Presentation of Silver Medals

President: The high standard of the papers published in the *Journal* during the past year led Council to award several silver medals.

The first go to Professor F. F. Roxborough and Messrs P. King and E. J. Pedroncelli for their paper 'Tests on the cutting performance of a continuous miner'. This paper describes tests on the cutting of South African



Prof Peter King, Junior Vice-President for the 1981-1982. Session congratulates silver medallists Peter King (centre) and Ermanno Pedroncelli (right)

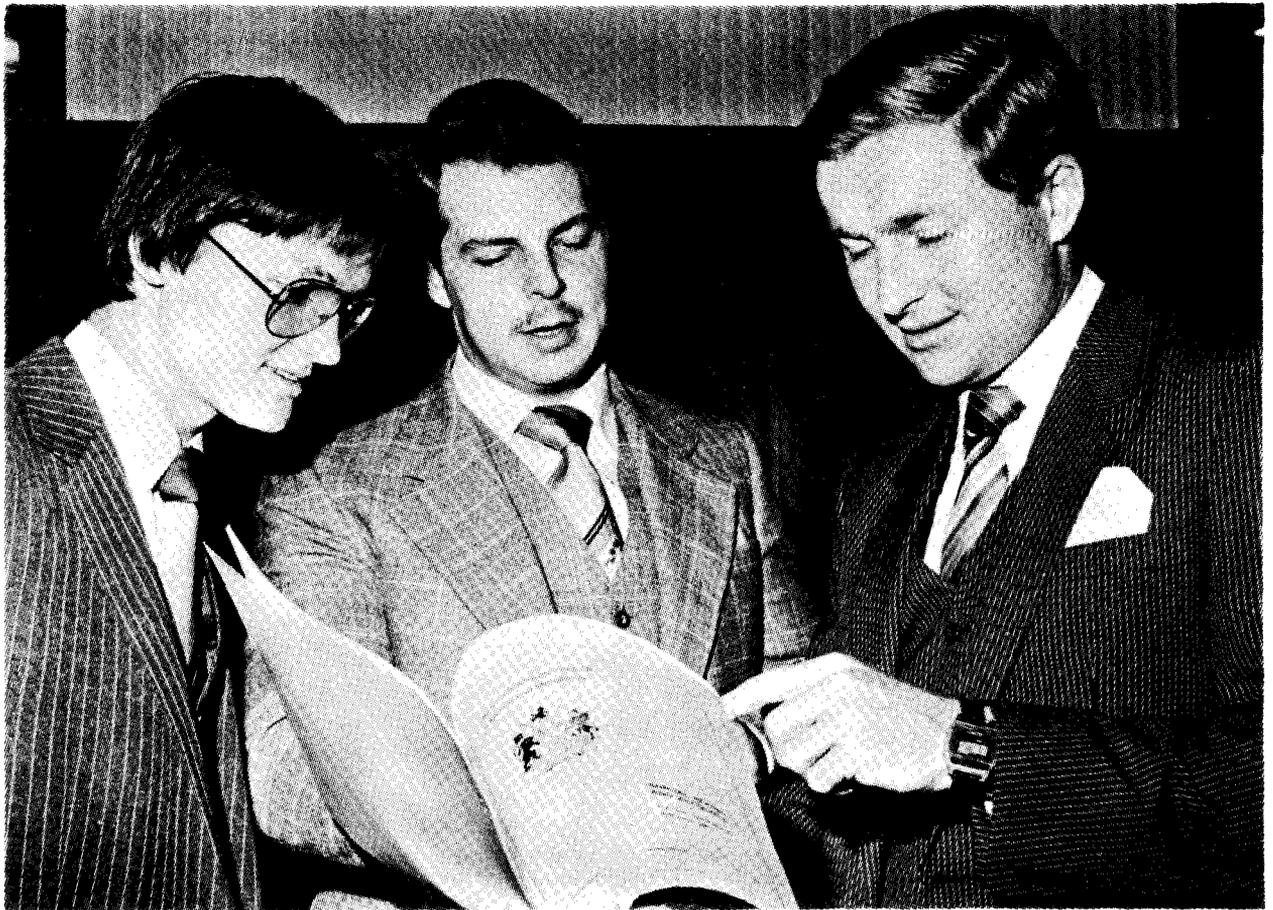
coals, which are harder than coals elsewhere. The paper shows that it is possible to modify the design and optimize the utilization of these miners if one has an understanding of how the pick shape and spacing and the depth of cut influence the pick forces and cutting energies.

A silver medal is presented to Mr R. Heunis for his paper on 'The development of rock-burst control strategies for South African gold mines'. He cannot be with us, but Professor Leiding will receive the prize on his behalf. The paper describes practical rock-burst control strategies based on the increased understanding of rock bursts and rock falls that has resulted from the mining industry's research efforts. Possible directions for future research on the topic of rock bursts in the context of increased productivity and safety are also identified.

Silver medals (won last year) are now handed to the authors of the paper on 'Developments in the application of carbon-in-pulp to the recovery of gold from South African ores': namely, Dr P. A. Laxen and Messrs G. S. M. Becker and R. Rubin. (Mr Becker's medal is being sent to him in Australia.) This paper describes past and current developments in the use of activated carbon for the recovery of gold, and provides detailed laboratory and pilot-plant information on several applications of the carbon-in-pulp process. Work on this topic is continuing in cooperation with the gold-mining industry, and considerable transfer of technology has already taken place.



Dr Peter Laxen (left) and R. 'Mick' Rubin received silver medals, awarded in 1980, for their paper on the development of activated carbon for the recovery of gold



Messrs W. Barret, F. C. Kruger and N. A. Alexander (right) were awarded prizes by the Institute for their papers written in part-fulfilment of the B.Sc. (Eng.) degree.

Annual Report and Accounts

President: I should like to highlight those facets of the Institute's activities that clearly indicate the purpose of the Institute and the achievements attained.

The *Journal* maintained its high standard of technical excellence, and the past year saw the consolidation of the modifications that had been introduced in the previous two years, namely, the change in the cover, the publication of more papers per annum, and the spotlight articles, which briefly report on recent mining and metallurgical events. It is also pleasing to note that the advertising in the *Journal* has increased considerably, which is helping to partly offset the rapid increases in printing costs.

The organization of colloquia on mining and metallurgical topics continues to be rewarded by excellent attendances. The colloquia on minefires and project management in the metallurgical industry were organized to coincide with the electro-mining exhibition. The Institute collaborated with the Institution of Metallurgists, South African region, in arranging a colloquium at Kelvin House on the subject of wear and abrasion in industry. Another joint colloquium has been planned, and we sincerely hope that this interaction with the Institution of Metallurgists will increase. The colloquium on the influence of the fluctuating gold price on the potential mining of low-grade areas could not have been timed more appropriately.

Another successful activity that has become a perma-

nent feature of the Institute is the organization of high-calibre vacation schools on topics of interest to the local mining and metallurgical industry. The mining subject this year was 'Increased underground extraction of coal', which generated extraordinary support. In fact, three consecutive schools were held, with a total of 225 delegates, and yet another will be held in November this year. I have been told that it is already over-subscribed. Two vacation schools on metallurgical topics were organized: one on uranium-ore processing, and one on the heat treatment of steel. The latter, interestingly enough, was organized by the Materials Engineering Specialist Division of the Institute, which is based in Pretoria.

This Division was formed last year and has proved to be very active.

Naturally, during the year the activities associated with the organization of the 12th Congress of the Council of Mining and Metallurgical Institutions showed a marked increase, and we and our co-organizers, the Geological Society of South Africa, with the collaboration of the South African Institute of Measurement and Control, have made very considerable progress. The itineraries of the pre- and post-congress tours have been finalized, and about 100 papers have been selected for presentation.

The rationalization of the objectives and activities of the Training, Career Guidance and Education Committee continued during the past year, and a coordinated effort was developed.

The positive effects of the Phoenix Programme on enrolment in the departments of mining and metallurgy at universities are becoming noticeable.

The recently established activity involving the production of a series of monographs made considerable progress during the year. The second editions of the first two monographs have appeared, and in the final stages of preparation are three more monographs that should evoke the same response as the first two. These are 'The Principles of Flotation', 'Rock Mechanics', and 'Increased Underground Extraction of Coal'.

Finally, I should like to draw your attention to the remarkable efforts of Miss Arlene Kaljee, who at short notice took over the responsibilities of the Secretary of this Institute. She and her competent assistants made the transition work exceptionally smoothly.

A particular note of thanks is expressed to Mr Eric Boden, the Manager of A.S. & T.S., and his staff. I am sure that you will join me in wishing him a happy and well-deserved retirement.

I now call on Professor Krige, our Honorary Treasurer, to give a brief review of the financial status of the Institute.

Professor Krige: The costs of producing the *Journal* increased alarmingly – by some 50 per cent during the year, owing mainly to higher unit printing costs and an increase in the number of pages of text and advertisements per issue. This increase was partly offset by higher revenues from advertising and outside sales, but still left a shortfall of nearly R30 000, compared with R17 000 last year. However, advertising revenue is still improving, and the net journal cost of R30 000 represents less than half of the total paid in subscriptions by members and company affiliates (R70 000).

The monograph series showed a net deficit for the year of R14 500, but this is due almost entirely to the cost of printing of the second editions of monographs 1 and 2 towards the end of June 1981. No sales of these reprints were therefore possible before the end of the financial year.

The vacation schools and colloquia held during the year were exceptionally successful and showed a total surplus of some R77 000. Activities in this field will be considerably curtailed in the 1981/82 year owing to the Institute's involvement with the Mining Congress in 1982. The net surplus is, therefore, likely to be a relatively small figure. Also, with continued inflation and the printing of further monograph volumes, it seems inevitable that there will be a net overall deficit for the 1981/82 year.

Subscriptions were not increased this year but, in the circumstances expected for next year, an increase seems unavoidable. I have to sound a warning at this stage so that you will be prepared for it in a year's time.

The Education, Brigadier Stokes, and MacArthur Forrest Memorial Funds all stand at satisfactory levels.

A special word of thanks is due to Mr Trueman, our accountant, and to Arlene Kaljee, our secretary, and her staff. I now formally second the motion for the adoption of the Annual Report and Accounts. Agreed.

Office Bearers and Members of Council for 1981/82

President: I have pleasure in announcing that, in

accordance with clause 3.3 of the Constitution, the retiring Council has elected the following Office Bearers for the ensuing year:

President: Mr G. Y. Nisbet. Vice Presidents: Professors A. N. Brown and R. P. King. Honorary Treasurer: Professor D. J. Krige.

Immediate Past President: Dr P. R. Jochens.

In terms of the election of the ordinary members of Council, there is a letter from the scrutineers saying, 'We have to report that we have inspected the nomination papers for members of Council for the 1981/82 session, and have found that the Ballot papers sent to corporate members of the Institute were in order. There was a return of 518 papers, representing a ballot of 39,7%. As a result of our scrutiny, we find that the following members have been elected: Messrs B. C. Alberts, J. D. Austin, P. T. Fewell, C. E. Fivas, J. J. Geldenhuys, P. N. Harris, H. E. James, and C. G. Knobbs, Drs B. K. Loveday and J. Lurie, Messrs D. G. Malan, J. C. Mostert, and G. C. Thompson, and Dr. H. Wagner. In terms of Clause 328 of the Constitution, Mr W. C. Mather, Chairman of the Witbank/Middelburg Branch, and Mr B. Rohrmann, Chairman of the Orange Free State/Klerksdorp Branch, will serve on Council, while Professor G. T. van Rooyen will represent the recently formed Materials Engineering Specialist Division based in Pretoria.

The following Past Presidents have signified their willingness to serve on Council for the ensuing year: Dr M. G. Atmore, Mr H. Britten, Professor D. D. Howat, Dr J. P. Hugo, Mr D. G. Maxwell, Professor R. P. Plewman, Dr R. E. Robinson, Dr M. D. G. Salomon, Mr P. W. J. van Rensburg, Mr D. A. Viljoen, and Mr P. A. Von Weilligh.

Induction of President

President: It is my pleasure to introduce George Young Nisbet to you as the incoming President.

George grew up at New Modderfontein, where his father was an engineer, and this background no doubt accounts for his continuing interest in the mining industry and his enjoyment from his close association with it. He matriculated at Pretoria Boys High School and then registered at the University of the Witwatersrand for the B.Sc. Eng. degree in mining.

Although his studies were interrupted for a period of six years during the Second World War, when he saw service in North Africa and Italy, he graduated in 1948 and was awarded the Chamber of Mines Gold Medal. Then followed an almost classical development of his technical and management skills through a variety of posts, including Shift Boss, Mine Overseer, Underground Manager, and Assistant Mine Manager, until 1968, when he was appointed Divisional Mining Engineer at the Anglo American Corporation. In 1970 he moved to Western Holdings Limited as Mine Manager, and shortly after that became General Manager of Consolidated Diamond Mines Limited.

Of particular interest to me as a Metallurgical Engineer, is that, while he was Deputy Managing Director Gold Division, from 1975 to 1980, his responsibilities included being executive in charge of the project team involved in the planning and commissioning of the Joint

Metallurgical Scheme, which was the first major scheme for the treatment of mine tailings for the recovery of gold, uranium, and pyrite.

During the year, George joined the Johannesburg Consolidated Investment Company Limited as Executive Director and Managing Director Gold and Uranium Division. He is a member of the executive committee and of the Gold Producers' Committee of the Chamber of Mines. His value to these organizations can perhaps be best summed up by what a colleague has said of him: 'George pays a great deal of attention to detail, but doesn't fail to see the broad picture. He has immense patience and is forgiving up to a point. He is very human and, although he is hard to get to know, when you do you find him very warm'.

Several years ago, when the formation of a gold-mine museum was suggested, the interested parties recognized that such a multi-faceted project would require a special man who could lead the project to a successful conclusion to the credit of the industry. Many of you will have had the opportunity to judge for yourselves the extraordinary living monument that has been created on the Crown Mines Property. In 1979 George was appointed Chairman of the Gold Mine Museum. In addition to his very busy schedule, he will now have the responsibility, and I should like to think of it as a pleasure, of guiding the affairs of our Institute during the coming year.

His wife, Cherry, will have to apply all her resources to ensure that she and George, who is a self-taught naturalist, have the opportunity to, at least occasionally, go tramping in the bush or across the veld for relaxation.

The year 1981 will no doubt stand out in both George's and Cherry's minds for another good reason. Both their children, Jennifer and Robert, were married during this year.

There is no doubt that the Institute is fortunate in having a man of George's proven calibre for its 85th President. It is also particularly fitting that he should be President of this Institute during the year that South Africa is to host the 1982 Congress of the Council of Mining and Metallurgical Institutions.

Professor King: It is the custom of this Institute to elect two Vice-Presidents to assist the President during his year of office. I have been honoured today by my election as Junior Vice-President, and I take this opportunity to express, on behalf of our Senior Vice-President, Professor Brown, and myself, my sincere appreciation for this expression of your confidence. It is a particular pleasure and honour to offer our warm congratulations to our newly elected President, Mr Nisbet. We anticipate a momentous and fruitful year under his guidance and his leadership, and we offer him our commitment of service and support during the forthcoming year.

President Elect: It is a privilege to carry out my first official duty, which is to congratulate the retiring President, Dr Jochens, on his term of office. During the year, Dr Jochens displayed a deep and sincere interest in the well-being of the Institute, which enabled him to carry out his duties most effectively. He guided the Council through all its meetings with tact and feeling, and the example he set to me and the other office bearers was of the highest order. It would be most difficult to achieve

similar standards, but he has certainly left me and the other office bearers with clear objectives. There is no doubt that one of his main objectives was, and is for that matter, that the Institute should provide a forum that caters and appeals to all members of the two professions. This has been most difficult within the rapidly changing environment in which we operate, which results in changes of emphasis in many specialist sections. On behalf of the office bearers, the Council and members, I extend to Dr Jochens our appreciation of his guidance and the contribution he made during his term of office. I am, indeed fortunate that he will be available to assist and guide me during my term of office.

Presidential Address

Mr Nisbet delivered his Presidential Address, entitled 'The role of mining in South Africa' [given in full on pp. 273 to 279 of this issue of the *Journal*].

Vote of Thanks

Mr Von Wielligh: It is indeed a great pleasure, and an honour, to propose a vote of thanks to Mr Nisbet, the newly-elected President of the South African Institute of Mining and Metallurgy, for upholding the tradition in delivering an interesting and informative address.

The Outgoing President gave us a resumé of Mr Nisbet's career and background. His experience and expertise, together with his technical achievements, make him eminently suitable to speak with real authority on the subject matter that he chose for his address.

Mr Nisbet and I have known each other for a number of years, and in that time I have developed a high regard for his integrity, his pragmatic approach to problems, his qualities of leadership, his soundness of judgment, and, above all, his ability to identify the nub of the problem and then motivate the necessary resources to find a solution.

We are indeed fortunate to have a man of Mr Nisbet's calibre to lead us during a year of particular importance, since we will be hosting an international mining and metallurgical congress. This, needless to say, will, very materially, add to the already onerous duties of the office bearers and, in particular, the President. I wish him well in shouldering this responsibility.

We listened with keen attention to Mr Nisbet's outline of the role of mining in South Africa. On a topic of this nature, to an audience such as this, there may be a feeling that the obvious is being said. But it was abundantly clear in the presentation that Mr Nisbet chose the topic because, as he said, he has a personal interest in it.

What Mr Nisbet said and the statistics he produced deserve the fullest publicity within and outside the borders of South Africa. He succeeded in highlighting, with aptly chosen examples and prognostications, the vital role of the minerals industry in providing South Africa with a sound economy that is the envy of the world.

Every citizen of this country, irrespective of race, colour, or creed, should be aware of the contribution of the minerals industry towards the development of the country, its well-being, and the prosperity of all its inhabitants.

He dealt, very adequately, under four clear headings, with aspects that needed to be emphasized. The examples given of the national benefits emanating from the multiplier effect were particularly impressive. But there are a few aspects that I would like to comment on.

First, I wish to issue a warning that we must not become euphoric on the potential given us by the vastness of our mineral resources. We —and when I say 'we', I mean the State and private enterprise — must exploit and utilize the benefits in the least wasteful manner. A mineral resource, no matter how vast, has a finite life when exploitation commences. We should therefore make provision, by means of the right kind of research, for a possible substitute. The substitute must provide for the function of the mineral either as a basic ingredient in the manufacturing industry, or as a generator of employment opportunities.

Secondly, to the average South African the potential of other minerals is overshadowed by the magnitude of the gold- and coal-mining industries. It is indeed true that the scale of operations of the platinum, diamond, and certain base-metal producers are not publicized for a variety of accepted reasons to the same extent as coal- and gold-mining. However, the potential of these industries is enormous, with particular reference to the future of our country.

Thirdly, in his reference to the assistance given to educational institutions, Mr Nisbet mentioned that about 760 students are attending universities under the sponsorship of the mining industry. It is therefore somewhat disheartening that the industry is, and has been for many years, faced with a critical shortage of mining and metallurgical engineers. We have been, and will be for the foreseeable future, reliant on immigrants to assist in providing us with our basic requirements of engineers and technicians in the professions referred to. It is, however, of significance that there are currently a number of Black undergraduates in the professions served by our Institute.

The question arises as to why South Africans prefer professions other than those required for the development and the mainstay of the industry upon which the economy of the country depends. I can only ask questions for which I have no answers. Is the industry at fault for not adequately publicizing the career opportunities afforded by mining? Have we managed to overcome the apathy among South Africans towards mining as a career? Are the hazards associated with

mining over-emphasized, particularly during stress situations as a result of major accidents? I can only make an appeal to the news media to assist us. Are academic curricula such that the graduate has little flexibility in his choice of employment? This is perhaps a demotivating factor — and, if so, is it practical to consider remedial measures?

In short, what prevents the industry from attracting adequate numbers suitable for training to become a part of this huge industry? To use the terminology of modern-day youth, do we need to put some glamour in these professions? Perhaps they should seek the advice of practising mining and metallurgical engineers, from whom I am sure they will receive the necessary assurances appertaining to job satisfaction and career opportunities.

Lastly, further to Mr Nisbet's exposition of the multiplier effect of the benefits from the industry, it may be worth noting that a major proportion of the Black labour force is obtained from neighbouring countries. The benefits that accrue to those countries can be quantified directly by the foreign exchange earned by their citizens, and, indirectly, by the obligation of the worker to spend the major proportion of his earnings at home. This provides additional benefits, in accordance with Mr Nisbet's multiplier theory.

On the brighter side, the South African mining industry has, over the years, managed to establish itself in a sometimes unfriendly world as a supplier that is trustworthy, and can be relied upon to honour its contractual obligations.

This Institute has contributed to the best of its ability, which can be claimed, in all modesty, to be not immaterial towards the establishment of this valuable image. Mr Nisbet's contribution this evening is an excellent start to what, I am convinced, will over the next twelve months prove to be yet another outstanding addition to the achievements of those who preceded him.

Appointment of Auditors and Honorary Legal Advisers

President Elect: I propose that Messrs Alex, Aiken and Carter be appointed auditors, and that Messrs Van Hulsteyn, Duthie and Saner be appointed legal advisers to the Institute for the coming year.

Conclusion

The meeting ended at 5.30 p.m.