PROCEEDINGS AT THE FORTY-SECOND ANNUAL
GENERAL MEETING

Held at Kelvin House, corner Marshall and Hollard Streets, Johannesburg

Thursday, 24th January, 1952

A. W. Lineker (President) was in the Chair and declared the meeting opened at 8.5 p.m.

There were present 115 members and visitors and the Secretary.

MINUTES

The minutes of the monthly general meeting held on the 18th December 1951, were taken as read and were confirmed.

WELCOME TO VISITORS

The President welcomed the visitors among whom were Mr T. P. Stratten, representing Mr R. B. Hagart, Vice-President of the Transvaal Chamber of Mines; Mr J. E. Worsdale, Vice-President of the Associated Scientific and Technical Societies of South Africa; Dr H. R. Raikes, Principal of the University of the Witwatersrand; Dr A. W. Rowe, President of the South African Institution of Mechanical Engineers; Mr J. P. Leslie, Immediate Past President of the South African Institution of Civil Engineers; Mr R. W. Kane, President of the Institution of Certificated Engineers, South Africa;

Mr C. J. Irving, President of the Chemical, Metallurgical and Mining Society of South Africa.

Dr A. W. Rowe, replying on behalf of the visitors, expressed sincere thanks for the hospitality shown them by the Institute, and for inviting them to attend the Institute's most important meeting of the year.

To the President he offered their sincere congratulations on the conclusion of a very excellent and successful year of office; they felt he had led the Institute through a most successful year, and had fully earned the period of rest which now lay before him.

On behalf of the guests, he wished the incoming President every success in the year to come.

ELECTION OF HONORARY MEMBER

The President, saying it gave him great pleasure to do so, announced that the Council, at its meeting held on the 7th January 1952, had elected Mr Joseph White an Honorary Member of the Institute. This distinction was reserved for those whom the Institute especially desired to honour for exceptionally important services connected
with electrical science or electrical engineering, or services rendered to the Institute; Mr White had qualified in both categories.

His achievements as an eminent engineer and the important positions he had held were well known and required no emphasis. His services to the Institute were also widely appreciated and it was considered appropriate that his association with the Institute should be briefly presented. Mr White joined the Institute as an Associate Member in 1920, he was elected to the Council in 1922 and his service on the Council had been continuous from that date. He transferred to the grade of Member in 1933 and was elected President in 1935. In 1944, Mr White accepted the office of Honorary Treasurer and had been in charge of the Institute’s finances from then to the present time; the success of his stewardship is evidenced by the Balance Sheet, which would be presented to the meeting.

During the twenty-nine years that Mr White had served on the Council he had been, at one time or another, on every standing committee and those special committees which were appointed from time to time to consider matters of particular concern to the Institute; as a result, his knowledge of such matters as the vexed question of registration of engineers and the evolution of the Constitution and By-Laws was profound and in these, and other matters, the Council had come to count on his never-failing advice and wise guidance.

In South Africa, and particularly in Johannesburg, members had come to take the Associated Scientific and Technical Societies of South Africa somewhat for granted. It was gratifying, therefore, to hear the appreciative comments on this organization passed by most overseas representatives at the Conference of Representatives of the Engineering Institutions of the British Commonwealth when that Conference met here in 1950 and details as to composition and operation were asked for and noted with keen interest. Mr Joseph White was one of the Subscribers to the Memorandum and Articles of Association when The Associated Scientific and Technical Societies was Incorporated in 1940; he is the present Honorary Treasurer and a Past President of that body of which this Institute is a Foundation Society.

Having outlined briefly the service which Mr Joseph White had given to the profession and the Institute, the President considered himself privileged to present the certificate denoting him an Honorary Member as a token of the appreciation felt by the Institute. He also expressed the wish that the Council would, for many years, be able to continue to call on Mr White’s valued advice and assistance.

Joseph White (Past President, Honorary Treasurer) said he sincerely appreciated this high honour. As he had mentioned to the Council a few days ago, he only wished that he could convince himself that it was really well and truly deserved. But, be that as it might, he would like to say that his thirty-two years of membership of the Institute has been a very happy period of his life, and any little service that he had been able to render to the Councils and the Institute had given him a very great deal of pleasure. He had seen the Institute multiply its membership by four since he joined in 1920 and he had also seen the status of the individual member rise progressively until to-day the status of the members was as high as that of any similar organization in the world.

When he first joined the Institute, as a slender, somewhat shy young man, he used to sit at the back of the hall and listen with open-mouthed awe to the eloquence of the senior members, and hoped that some day he might be able to aspire to those giddy heights. He did not claim to have aspired to those heights, but at least he could say that the early pangs of stage fright had left him many, many years ago.

When he gave his first paper to the Institute, with very much trepidation, he had found, to his astonishment, that the replying to the discussion on the paper was a surprisingly easy task because, of course, he was thoroughly familiar with the subject; for that reason, he would urge the Institute’s younger members who are on the threshold of their careers to prepare and present papers to the Institute; and he would always give them the comforting thought that the author always had the last word when he replied to the discussion. He had lots of time in which to prepare those telling and spontaneous remarks which normally one thought of only when it was far too late.
During his long period of service on the Council he had seen many young, enthusiastic electrical engineers rise to become President of the Institute; and he liked to think—he believed he was correct in so doing—that their self-sacrificing service on the Council, and for the benefit of their profession, had been of untold help to them in their individual careers.

Once again, he would like to thank the Institute for the high honour conferred upon him although, as Honorary Treasurer, he deplored the drain on our financial resources because he understood that, in future, he would not be called upon to pay an annual subscription!

MEMBERSHIP

The President announced that in terms of By-Law 5.2.4. the Council had elected the undermentioned candidates to membership of the Institute in the following grades:


Graduates: John Douglas Dawson, Thomas Harvey, Cecil Andrew Petersen, Silliam Bernard Stevenson.

Associates: Cecil Oswald Kornges, Daniel Jacobus Erasmus Rademeyer, Charles Thomas Tims.

Transfer from Associate Member to Member: Eric Walter Mole.

Transfer from Graduate to Associate Member: Frank Harold Bird.

Transfer from Associate to Graduate: Allan Clifford Simpson.

Transfer from Student to Graduate: Martyn Maynard Auret, Max Percival Preston Clarke, Pieter Johannes Jacobus du Preez, Douglas Hazleton Mills, William Gordon Pearce Pemberthy, William Horace South Piers, Donovan Louis Widdicombe Varder, Meyer Mandel Widman.

Transfer from Student to Graduate: Solly Jacob Brenner.

ANNUAL REPORT AND BALANCE SHEET

The President presented the Annual Report, Balance Sheet and Income and Expenditure Account for 1951.*

* The Annual Report, Balance Sheet and Income and Expenditure Account are printed on page 21 of this issue of the Transactions.

He drew attention to the fact that eleven awards had been made to authors of papers presented during 1950 and to contributors to the discussions on those papers and two to Students for papers presented in the same year. With regard to discussions, it was pleasing to record the appreciable increase in the number of discussions contributed to the papers presented during 1950.

This year the Institute had inaugurated the presentation of a prize to the best student in the electrical engineering Advanced Technical Certificate (II) class at the Witwatersrand Technical College; the award was termed the Institute Prize and the recipient must be a Student Member of the Institute.

A new award had been made available to Students and Graduates of the Institute for a paper dealing with the administrative and executive aspects of engineering and a special committee was at present considering the conditions to be fulfilled to gain this award which would be known as the M.J.T. Award, as the donor wished to remain anonymous.

The Council expressed its thanks to the donors of awards namely, the South African Cable Makers' Association, the South African Railways and Harbours Administration, the Electricity Supply Commission and the anonymous donor of the M.J.T. Award.

It was pleasing to report that the papers presented in 1951 gave rise to considerable discussions and it was hoped that this increased interest, evidenced in both 1950 and 1951, would continue.

The 1951 joint meeting with the University of the Witwatersrand was an outstanding event; the meeting was the twenty-first of its kind and so marked the attainment of the majority of these joint meetings with the University. In addition, it was the occasion of the presentation of the First Bernard Price Memorial Lecture. These lectures, designed on similar lines to the Kelvin lectures held by The Institution of Electrical Engineers, London, were to commemorate the work of an outstanding scientist, engineer and South African, the late Dr Bernard Price. The First Memorial Lecture was presented by Dr B. F. J. Schonland and was entitled 'The work of the Bernard Price Institute of Geophysical Research, 1938–1951.' The other speakers
were Principal H. R. Raikes and Dr H. J. van Eck.

The question of registration and control of scientific and technical professions in South Africa again received considerable attention by Council during the year. The discussions, instigated by the Associated Scientific and Technical Societies as the result of a communication from the Secretary for Commerce and Industries, merely confirmed the existence of a considerable divergence of opinion on this subject among the professions concerned.

The Council's considered opinion was that improved status, the professed aim of the protagonists of individual registration, would not be attained by exchanging the disinterested control of the electrical engineering profession by the Institute for a type of bureaucratic trade unionism which would result from such registration. Improved status lay in the enhanced standing and the recognition of the Institute as a representative professional body having no axe to grind.

The total membership now stood at 1,657; the increase in membership for the year was 39. Two disquieting features were the decrease in the number of Students, namely 53, and the net increase in the number of Members of only 2. It is certain that this negligible gain does not correctly reflect the number of Associate Members who during the period under review have attained that standing in the profession which entitles them to transfer to the grade of Member. This state of affairs was probably due to a spirit of laissez faire and, possibly, even to the matter of the increased subscription; in either case, the position reflected no credit on that appreciable number of Associate Members who should seek transfer to the senior grade. Those to whom modesty was the stumbling block are reminded that it was in the interests of the Institute that they should transfer.

The Light Current Section, which was inaugurated in May 1950, had continued its activities during the year and the indications were that it was fulfilling its initial promise in providing for this ever-growing branch of electrical engineering.

The formation of a Local Centre of the Institute operating in Cape Town should be accomplished shortly. The exact territory to be covered had not yet been decided, but

the matter was well under way and it was hoped that this Centre would come into being very soon.

During the year the Institute had been approached by the Government Mining Engineer on matters concerning the Mechanical and Electrical Engineers' Commission, the Winding and Locomotive Engine Drivers' Commission and in connection with proposed amendments to the Mines, Works and Machinery Regulations and also by the Chief Inspector of Factories concerning proposed amendments to the Regulations of the Factories, Machinery and Building Work Act, 1941.

The Institute had also been requested by the Department of Public Education of the Provincial Administration of the Cape of Good Hope to give some assistance in the matter of vocational guidance to young people wishing to engage in work associated with electrical engineering.

The Institute had maintained contact with the other members of the Conference of Representatives of the Engineering Institutions of the British Commonwealth and, through the London Secretariat of this Conference, with similar organizations representing the engineering bodies of the Western European countries and the United States of America.

The Obituary List was a poignant one this year. It included the Senior Vice-President, Mr George Drewett, who was also President-Elect for the year 1952, an Honorary Member, Mr V. Pickles (Past President) and Mr R. H. Gould (Past President).

It was indeed sad that Mr Drewett should have been prevented by such a short space of time from attaining the office of President. When the grievous nature of his illness was learnt, Council decided that he should be inducted as President at this meeting, in absentia, if circumstances so dictated, thus enabling him to realize an ambition which he had considered to be the crowning achievement of many years of hard work in his own personal career and in service to the Institute. But fate had decreed otherwise; he died on the 10th December, a little over six weeks ago.

In closing his brief review, the President expressed the thanks of the Council to Mr Joseph White for the services he had rendered the Institute as Honorary
Treasurer and to Mr H. P. Alexander and Dr W. Cormack for their services as Honorary Editor and Assistant Honorary Editor respectively.

He formally moved the adoption of the Annual Report and the Statement of Income and Expenditure and the Balance Sheet for 1951 and asked the Honorary Treasurer, Mr Joseph White, to second the motion.

Joseph White (Past President, Honorary Treasurer) said he would try to give those present a picture of the Institute’s financial position at the moment.

This past year, for the first time, the subscription paid to the Institute amounted to over £3,000.

The excess of income over expenditure for the year was about £663, which was £300 less than last year, but that could be accounted for by the increased costs of everything and the higher administration costs. Of that £663 the Council had placed £300 to the credit of the Education and Bursary Fund. That Fund now stood at £1,865 in spite of the fact that during the past year the Council had awarded bursaries to the value of £250.

So far as the Transactions was concerned, we had just about made ends meet; in fact, we had come out on the right side by about £35. Compared with last year, that was a big drop. We had made a profit last year of about £216. The difference was due to, as members would remember, the number of very large Transactions and the number of Transactions with lengthy but very interesting and valuable discussions.

He would like to take the opportunity of giving his personal thanks to Mr Adams, Mr Southgate and their staff for their help and guidance. As members all very well knew, all the work was done by them; he himself was merely a figurehead, and not a very artistic one at that!

Finally, he had great pleasure in seconding the adoption of the Annual Report, the Balance Sheet and Statement of Accounts for the year 1951. Adopted.

Auditors

I. de Villiers (Member) proposed and M. Hewitson (Associate Member) seconded that Messrs G. K. Tucker and Wilson be re-elected as the Institute’s Auditors for 1952. Adopted.

Honorary Legal Advisers

G. Williams (Member) proposed and R. Gettliffe (Associate Member) seconded that Messrs Stegmann and Abel be re-elected as the Institute’s Honorary Legal Advisers for 1952. Adopted.

Presentation of Award Certificates

The President called upon Mr T. P. Stratten, representing Mr R. B. Hagart, Vice-President of the Transvaal Chamber of Mines, to present the certificates awarded during the year 1951, and added that it was a pleasure also to welcome Mr Stratten as a Past President of the Institute.

Mr T. P. Stratten: As you know, I am here this evening deputising for Mr R. B. Hagart, the Vice-President of the Transvaal Chamber of Mines, who unfortunately at the last minute was not able to come. So I would like, first of all, to apologize on his behalf for his absence, and to convey to you the very best wishes of the Transvaal Chamber of Mines for your future success and its congratulations on the achievements of the past, and particularly to you, Mr President, for all that has been done during the past year.

I think everybody in the country, and certainly everyone in the gold mining industry is very conscious of the great part played by this Institute in the general engineering advancement of the country. I think the rate of this advancement at the present time is really something quite phenomenal. I have had recent opportunities of going overseas and of getting some feeling as to the rate of expansion that is going on both in North America and in Britain, and, of course, that expansion is on a very vast scale but, when one considers it in terms of the size of their population and then compares it with the rate of expansion that we have here in terms of our much smaller population, I come to the conclusion that the rate of expansion and effort that we are trying to do here is probably equally as great as and perhaps even greater than what is going on overseas. I think, when we add together the work that is being
undertaken here—the big developments in our gold mining industry in the Free State and on the Far Western Rand, the uranium plants that are to be put up, the big oil from coal project that is going through, the big expansion of our steel industry, the enormous expansion that is called for on our railway system, and so on—we must all realize that we have undertaken a vast amount of work and our success will rest very largely on the engineers of this country and particularly on the ability of the electrical engineers to match up to it on the electrical engineering side. They are, as it were, in the forefront of the battle, because on them rests the supply of the necessary power before anything else can be started.

So, Mr President, I would like again to express, on behalf of Mr Hagart and the Transvaal Chamber of Mines, the Chamber’s deep appreciation of all that is being done by the electrical engineering fraternity, and by this Institute in particular.

Finally, I would again like to congratulate not only those who have received award certificates but all the others who make this Institute such a virile one by writing papers and making contributions to papers.

The awards presented by Mr Stratten to the respective recipients are listed in the Annual Report.

DECLARATION OF OFFICE BEARERS AND MEMBERS OF COUNCIL FOR 1952

The President announced the result of the ballot for Council as follows:

The total poll was 321, of which town members contributed 184, country members, 137. The total electorate was 709. The votes polled was 45.2 per cent and the number of spoilt papers, 2.


Associate Members: W. Cormack, A. C. Backeberg, H. O. Collett.

The Council for 1952 is, therefore, as follows:

President: J. T. Allan.


Immediate Past President: A. W. Lineker.

Honorary Treasurer: Joseph White.


In addition, the following Past Presidents have accepted the invitation to serve on the Council for 1952:


H. P. Alexander (Member) proposed a vote of thanks to the scrutineers, who were A. W. Lineker, J. T. Allan, G. A. Dalton, K. B. Findlay, E. Vivian Perrow, A. T. Rodwell, J. Stewart Ross and Joseph White. A. C. Backeberg (Associate Member) seconded the vote of thanks.

DECLARATION OF ELECTION OF HONORARY VICE-PRESIDENT

The President announced that under Clause 3.10 of the Constitution, the Council had elected Mr A. R. Sibson of Bulawayo as an Honorary Vice-President of the Institute for the year 1952.

INDUCTION OF J. T. ALLAN AS PRESIDENT FOR 1952

The President: I now come to my final duty as President—the induction of the President for the year 1952, Mr J. T. Allan.

Mr Allan received his technical education at the University of Glasgow where he graduated as a Bachelor of Science in electrical engineering in 1924. In 1925 he joined the firm of Higgs Motors, Birmingham, in the capacity of Electrical Designer and in 1927 was appointed to the staff of Handsworth Technical College, Birmingham. In 1929 he was appointed Lecturer in Electrical Engineering at the University of the Witwatersrand where he remained until 1941, obtaining there the degree of Master of Science in electrical engineering in 1936.

In 1941, Mr Allan became Chief Designer to the firm of Alpha Harris which was engaged on the production of electrical equipment in aid of South Africa’s contribution to the war effort; in 1943 he joined
Allenwest (S.A.), Ltd., to organize local manufacture by that company of switchgear for the War Supplies Directorate and, on the cessation of hostilities, he remained on the staff of Allenwest (S.A.), Ltd., with whom he is still associated.

In spite of having forsaken the academic side of electrical engineering to return to a more mundane aspect in the shape of the manufacture of electrical equipment, Mr Allan still retains a very active interest in the production of electrical engineers as distinct from equipment and he has been a member of the Council of the University of the Witwatersrand since 1944.

Mr Allan joined the Institute in 1930 as an Associate Member and transferred to Member in 1939, he was elected to the Council in 1940 and to the office of Vice-President in 1950. Owing to the untimely death of Mr Drewett, President-Elect for the year 1952, Mr Allan—to use his own words—has been deprived of a year's apprenticeship; in this respect, I can assure him that he has the consideration and understanding of the membership in having to assume his duties as President at such short notice. However, one of his best known attributes is the unostentatious manner in which he gets through a large amount of work in a short time so the Council has no doubts as to the manner in which he will carry out his presidential duties in spite of the curtailed period of indenture. Mr Allan's accession to the Office of President is a fitting and well-deserved tribute for many years of service to the Institute and in handing over to him I wish him every success in his year of office.

J. T. ALLAN (President) having taken the Chair said: I wish to thank Mr Lineker for his very kind introduction, and the Council and membership for the confidence they have shown in me. I feel that this is the beginning of a very responsible year of office and I trust that I will be able to live up to the very fine tradition set by Past Presidents, and in particular to the example set by my immediate predecessor.

My pleasure in accepting this high honour is tinged with sadness, since my apprenticeship to this office has been shortened by the death of Mr Drewett. We will all miss his kindly manner and experienced leadership.

I now have much pleasure in inviting Mr A. R. Mullins to take his place on my right, as senior Vice-President and Mr J. P. Anderson to take his place on the rostrum on the right of Mr Mullins.

J. P. ANDERSON (Vice-President): I deeply appreciate the honour you have done me in electing me a Vice-President of this Institute. I feel also that it is an honour done to the Transport undertaking which I serve, and which seventy years ago, this year, first brought electricity into use in this continent. I will do my best to undertake the duties you have given to me and consider it a great honour at all times.

THE PRESIDENT: I will now call upon Professor Bozzoli to take his place on the dais, on my left.

PROFESSOR G. R. BOZZOLI (Vice-President): I can only but echo the remarks made by Mr Anderson and to add that I appreciate this election very, very much indeed. I consider it a great tribute to the University with which I am associated that a member of the University staff should be asked to sit at this rostrum at this Institute, with which the University has been so closely associated for, as you heard to-night, twenty-one years. I shall be very pleased indeed to do what I can to further the interests of the Institute and I thank you very much indeed for your confidence in me.

PRESENTATION OF CERTIFICATE AND VOTE OF THANKS TO RETIRING PRESIDENT

E. VIVIAN PERRÓW (Past President): I appreciate very much having been asked to express the thanks of the Institute to Mr Lineker for his work on its behalf during his Presidential Year.

Those of us who have had the privilege of serving on the Council during the past year, and perhaps some have been critical observers, have been impressed by Mr Lineker's chairmanship of Committee, Council and General Meetings and his skill and assiduity in managing the affairs of the Institute.

Looking back over the work of the year just completed, I feel I can safely say that one of the outstanding instances of Mr Lineker's efforts and a monumental work,
has been the issuing of the Institute’s memorandum to members on the question of the ‘Registration of Engineers’ for, although a committee was formed to draw up the memorandum, I can assure you that Mr Lineker had so well prepared the way that only the dotting of the ‘i’s’ and crossing the ‘t’s’ was left for the other members to do. This memorandum was acclaimed by sister Institutions and many engineers.

It is my pleasure, therefore, to propose that the thanks of the Institute be accorded Mr Lineker in appreciation of his activities during his Presidential Year.

Mr Lineker, you have now joined the Noble Order of Past Presidents, but I can assure you that you are much too young to retire from active work on behalf of the Institute and we look forward to your assistance on the Council for many years to come.

I ask you Mr Lineker, to accept this certificate which records the Institute’s recognition of your services as President, but unfortunately, cannot give any indication of the work you have so unstintingly performed.

I trust you will be blessed with long life, health and happiness to enjoy the possession of this certificate for many years to come.

A. W. LINEKER, (Immediate Past President): That a President is entitled to a vote of thanks for endeavouring to carry out those duties for which he was elected and so merely doing what was expected of him, is a question which might conceivably give rise to some argument. Be that as it may, it is nonetheless gratifying, having derived no small amount of interest and pleasure in the performance of those duties, that he should then receive special thanks for having done what he should and it is particularly pleasing when those remarks of appreciation are couched in the terms which Mr Vivian Perrow has used in referring to my efforts.

With regard to that memorandum on Registration of Engineers, it is true that I provided the draft on which the sub-committee worked but those members who have served on sub-committees of the South African Institute of Electrical Engineers and particularly the Constitution and By-Laws and, perhaps the Code of Practice for overhead lines, will be familiar with the remark—shall we say sympathetic remark—to somebody who has come forward with a bright idea, after an hour or two of discussion on the said bright idea, “Well, never mind, old man, you have at least got the full-stop left.”

Well, gentlemen, I have enjoyed my term of office, and what has made that possible is the assistance and co-operation which I have had from the Council. I have already expressed my appreciation to the Council, but I take this opportunity of placing it on record and, of course, of thanking Mr Adams, Mr Southgate and their staff; that as you know, is a hardy annual but I have had this privilege that, in my year of office, I had the honour of making the announcement that the Institute took some concrete recognition of Mr Adams’ services, by electing him an Honorary Member to mark a period of twenty-one years’ devoted service to the Institute; I should like to point out, too, if I may do so with all due modesty, that I don’t think there are many other Presidents who have had the privilege of making the announcements of two elections to Honorary Membership in one year, or of collecting two certificates on one night!

Gentlemen, I thank the membership who have accorded me the privilege, through the Council, of occupying the Presidential chair during the past year. As I have already said, I have enjoyed my term of office and now, in spite of what Mr Vivian Perrow remarked a little earlier, now that I am one of the “old men of the tribe,” I am looking forward to sitting back and watching somebody else do it. Again, thank you.

PRESIDENTIAL ADDRESS

The President asked the Senior Vice-President, Mr A. R. Mullins, to occupy the Chair while he delivered his Presidential Address.

The vote of thanks was proposed by H. T. Aspinall (Past President) and seconded by L. H. L. Badham (Past President).

The President resumed the Chair and declared the meeting closed at 10.5 p.m.
PRESIDENTIAL ADDRESS

EDUCATION AND INDUSTRY

By J. T. ALLAN, M.Sc. (Eng.)

CONTENTS

1. INTRODUCTION
2. THE CONTRIBUTION OF TECHNICAL EDUCATION TO INDUSTRIAL PROGRESS
   2:1 The training of apprentices
   2:2 The training of engineering staff
   2:3 The training of specialists
3. THE CONTRIBUTION OF INDUSTRY TO THE PROGRESS OF TECHNICAL EDUCATION
   3:1 Apprentice training
   3:2 University training of staff
   3:3 Specialist training
4. THE GOVERNMENT CERTIFICATE OF COMPETENCY
5. CONCLUSION

1. INTRODUCTION

I have taken as the subject of my address 'Education and industry—a general survey'... What does technical education require of industry?

2. THE CONTRIBUTION OF TECHNICAL EDUCATION TO INDUSTRIAL PROGRESS

Progress in the development of both secondary and primary industries depends on an adequate supply of suitable personnel. Personnel selection, aptitude tests and such like are beyond the scope of this address. I will limit my remarks to an attempt to answer the question—'What types of technical education does industry require?'

Briefly there are three types of employee requiring different types of education and training to fit them for their respective places in organized industry.

(i) Industry requires a specialized training for apprentices to make them useful, intelligent journeymen and some, in due course, foremen.

(ii) Industry requires a general fundamental training for its engineering staff.

(iii) Industry requires a specialized advanced technical training for development and research personnel.

The type of training in each case is different in its aim and must, likewise, be different in content and background.

2:1 The training of apprentices

I do not propose to consider this in detail—there are others better qualified to do that—but I hope I will be pardoned if I draw attention to a few general principles which are apt to be forgotten in arranging details. As stated above, the primary object is to produce an adequate supply of intelligent journeymen, some capable of becoming foremen and a few, engineers.

How is this to be achieved? Firstly by making it possible for them to take an
intelligent interest in their jobs. This should be the feature which differentiates the journeyman from the operator who merely repeats, in mechanical fashion, what he has been shown. The journeyman must understand what he is doing and why he is doing it.

Secondly by making the apprentice realize that the book work is directly related to the craft he is learning. It is essential that he feels that his technical studies are leading him somewhere—to a bigger and better job.

Thirdly, and this is perhaps the most difficult in modern times, by making him realize that craftsmanship, and the satisfaction that comes from a job well done, is far more important than the job itself. Modern education is inclined to make the youth of to-day dissatisfied with manual labour. He would rather have a dead-end ‘collar-and-tie’ job than an ‘honest-to-goodness’ skilled mechanical job. We must try to instil in every apprentice a desire to become a craftsman, proud of his job.

Practical training is obtained at the bench and trade school and will not be discussed here. The academic part of the apprentice’s training is the essential function of the technical colleges as at present constituted. In these our youth must be taught to think clearly and logically and be trained in the use of language as a means of expressing themselves.

Putting this another way, we must get away from subjects with high-sounding names and abstruse contents and concentrate on the three ‘A’s of technical education:—

(i) Ability to understand instructions
(ii) Ability to think
(iii) Ability to report accurately.

The teaching of technical subjects should be limited to the fundamentals of mathematics and physics. I hasten to add that these two major heads can be split into a number of subjects such as:—

(i) Arithmetic, leading to algebra
(ii) Geometry, leading to drawing
(iii) Mechanics, leading to the fundamentals of mechanical engineering
(iv) Electricity and magnetism, leading to the fundamentals of electrical engineering

and so on. Each subject must be taught in terms of facts within the student’s daily experience. They must be related to his trade and easily applied to the job in hand, as we are trying to help the apprentice to solve his problems and not to cram him with facts.

We often hear the term ‘workshop arithmetic’ used in a derogatory sense but anyone who has worked in an engineering workshop knows how important it is and how few journeymen are proficient in it. There is plenty of scope for the teaching of applied arithmetic—especially mental arithmetic. The same may be said of the other ‘subjects’ referred to above. For example, how many journeymen can make a respectable ‘workshop sketch’?

A complete overhaul of the subjects taught and the methods of teaching them to apprentices will be required to give the above ideals practical expression. This can be done, given goodwill and co-operation between industrialists and educationalists.

Two outstanding difficulties remain. In the first place, the supply of suitable teachers is inadequate. The usual part-time teacher, no matter how expert in his trade or profession, is usually a teacher only as a means of making ends meet. Can sufficient full-time—largely daytime—teachers be attracted to the profession? Others can answer that better than I, but I think it is possible provided it makes it worth while. The second difficulty is the present compulsory attendance of apprentices which lays an impossible burden on technical colleges and results in large unmanageable classes, where one ‘mulish’ student can prevent any useful work being done. The old proverb is very apt in this connection—’you can take a horse to the water but you cannot make him drink.’ Surely our educationalists and industrialists can get together and devise a voluntary system based on making the value of technical education obvious to even the least interested.

2.2 The training of engineering staff

‘Engineering staff’ is not such a clearly defined group as ‘apprentices.’ It includes students who will become designers, sales engineers, production engineers, consulting engineers, and those who will ultimately
have administrative control of engineering projects and firms. What must they be taught? Not to be complete ready-made engineers—that is impossible! They must be prepared so that they can be readily absorbed into industry and quickly trained for specific jobs. They must be men of vision to see that they are 'effective cogs in a huge machine' without becoming 'slaves of the machine.'

This is essentially the province of the universities, as they alone can provide that cultural background which should be the hallmark of every graduate. It will be assumed that the student enters on his university career properly equipped to think logically and express himself clearly, and has a reasonably sound grasp of the fundamentals of mathematics and science. This is not always so and this aspect of the problem will be mentioned again later.

What then must be added by the university?

(i) A sound knowledge of the basic sciences from which engineering has sprung—physics, chemistry and mathematics (pure and applied)

(ii) A sound knowledge of the properties of the materials used in engineering—'strength of materials' covers only a portion of this subject

(iii) An introduction to the design of mechanisms and the principles of heat engines

(iv) An introduction to the principles of electrical machinery.

(v) Laboratory work to demonstrate the application of these principles (i.e. to clarify the teaching of (iii) and (iv)

(vi) Advanced laboratory work to give the student confidence in the handling of simple machinery and an opportunity to show his ability for applied research

(vii) An introduction to the organization of workshops and offices. This might well be a combination of production engineering and administration with a sketch of the financial background

(viii) Some cultural instruction combined with social and sporting activities, to make a complete and educated man from the raw student.

It must be made clear that the object of university education is to provide the graduate with the mental tools of his profession. It is not an essential function of a university to cram him with facts. The possession of a parchment certificate should be an indication of ability, not of the quantity of facts absorbed. Every graduate should be an educated man, of many interests and wide general knowledge. He should be able to mix in any company and add something of interest to any general conversation. (It is to be hoped that he will also know when to remain silent). University life—especially if sufficient hostels are available—tends to rub off some of the corners from the raw product of the schools. Student cultural societies serve a very useful purpose in widening interest and cultivating the art of mixing. The sports field serves to keep the body fit and instil the team spirit. Far too much emphasis has been laid on the passing of exams in a minimum period. This discourages participation in student activities which, to my mind, are an essential part of university life. Many a graduate, well-inflated with technical knowledge gets sadly deflated when he strays out into the work-a-day world to earn his living. The engineer, who is 'only an engineer,' is only 'half an engineer!'

In this connection, a word regarding the value of hostels may not be out of place. Living in a hostel the student obtains unofficial assistance with his studies, since he cannot fail to discuss his problems with his fellows. If the older students can be encouraged to help the juniors, both will benefit tremendously. As the old saying has it you don't know a thing till you tell it to someone else.' Quite apart from this purely technical gain—which can be offset by social distractions—the men learn to live and work together. They naturally take an active part in organizing the student life of the university and get a splendid training in leadership.

The main subjects of the curriculum as set out in the foregoing are not essentially different from those normally provided though the emphasis has been altered from 'specialization' to 'generalization.' Turning to the ancillary subjects included under (vii) we find that a little is being done regarding 'production engineering.' This, however, tends to be in an over-specialized
form. General office, factory and mine organization, and a study of the methods of personnel control, each in a very general way, is all that is required at this stage. If time permits, a survey of the methods used to finance business, and an introduction to industrial and company law would be valuable. How many university students ever hear of the Factories Acts and the regulations controlling mines, workshops and factories?

How far are our universities meeting the requirements set out above? Probably as well as can be expected. Tremendous pressure has been exerted on them by fond parents, certificate hunters and industrialists, forcing them to turn out specialists. Premature specialization defeats the objects of university education and turns universities into technical colleges. This tendency is very noticeable overseas and has developed rapidly here also. I think I have said enough to show that it is not the function of the under-graduate course to produce specialists. Twenty years ago the degree of B.Sc. in engineering at the University of the Witwatersrand was a degree in mechanical and electrical engineering. Our graduates were sought after by overseas firms because this broad training made them much more adaptable than those available locally. Now we have separate degree courses in mechanical and electrical engineering and even split the electrical engineers into heavy and light current groups. Is this really justified? I personally doubt it.

At the technical universities of South Africa—and most overseas universities outside America—the hostel accommodation is hopelessly inadequate. This reduces the essential cohesion of the student body and makes effective post-graduate solidarity almost impossible. Except in America the universities are not effectively supported by their graduates. Financial support from graduates of standing—for the provision of student amenities such as hostels—seems a very reasonable return for an academic education received at ‘half price.’ (It must be remembered that a student’s fees barely cover half the cost of the education received.)

2.3 The training of specialists

There are two types or groups of specialists which require advanced training. Only one of those, however, is directly connected with industry. The two groups may be labelled—

(i) fundamental research workers
(ii) industrial research and development workers.

It is the first group which widens our horizons of knowledge by research in nuclear physics, astronomy, mathematics and the like. This group would normally consist of graduates who had shown aptitude for the exact sciences whilst under-graduates. Their further development is obviously the responsibility of the universities.

The second group is directly connected with industry. It has two functions which must interlock—

(i) to apply the results of fundamental research to industry
(ii) to develop industry in new directions to take advantage of new knowledge and materials.

This group will be largely but not entirely drawn from the graduate staff of industry. There will always be the practical man, with a flair for finding new methods, who rises from the ranks. He should receive every possible encouragement.

How is this spearhead of industry to be trained? Except in very large organizations, such as the Chamber of Mines, these men must receive technical assistance and training in ‘advanced technical colleges.’ Such training, for specialists, is now being provided in ‘super’ technical colleges overseas. It is obvious that the staffs of these colleges must be drawn from the cream of industrial development personnel. To a certain extent the teachers in this type of college would remain in this group—as consultants. They could not be drawn from the ranks of the underpaid who fill so many part-time posts in our colleges. Industry must provide the staff and it is only fair to assume that it should be able to call on their services as consultants. In fact, unless these men can keep in touch with industrial development they will be unable to lead the leaders. They must on no account be buried in masses of routine work. The development of this new function of our technical colleges opens up a great future for them. It will be far more profitable than the continued teaching of unwilling apprentices, or any endeavour
to compete with the universities in the training of engineering staff.

Have the technical colleges of South Africa considered this development? I doubt it! Have the industrialists realized the need for this development? I doubt it! I feel that it is essential to both quantitative and qualitative development of industry. We must increase both the quantity and the quality of the goods we produce, and—fond hope—reduce the cost.

3. THE CONTRIBUTION OF INDUSTRY TO THE PROGRESS OF TECHNICAL EDUCATION

The progressive development of technical education depends on the effective cooperation of industry and industrialists. I feel that education and industry have strayed too far apart, but while saying this, I have also tried to show that technical education must not be the slave of industry, rather an equal partner in the development of the country.

Having divided technical education into three types it is convenient to consider the contribution which industry can make to each of these types.

3.1 Apprentice training

Having discussed this from an educational point of view and suggested that an overhaul is required we must now consider how industry can help. There are three aspects which must be examined:

(i) the attitude of the apprentice towards education and craftsmanship
(ii) the aim and content of apprentice education
(iii) the staff needs of our technical colleges.

A good deal of improvement in the first of these can be obtained by a change in the attitude of employers and foremen. In the past, there has been a tendency to treat apprentices and operators as a single group. In fact, in some cases the operator has been encouraged as cheap labour, and the apprentice discouraged as a drag on the journeyman. The foreman has on occasion grumbled about the apprentice's broken time, caused by time off for classes. This has lead to a feeling of frustration on the part of the apprentice. The higher wage of the operator is also a sore point with the apprentice who does not always realize that he is paying for his training. These unresolved complexes have caused many an apprentice to break his contract for the sake of the fleshpots of the operator. This is a short-sighted move on the part of the apprentice no doubt, but if allowed to spread would be disastrous to industry. What steps are being taken to counter it?

Something drastic must be done to make craftsmanship the aim of apprenticeship. Many apprentices merely count the days or years till they will be free—journeymen, in name at least. They do not realize that they have the skill of an operator only. Industrial development must suffer from this attitude. I do not think that industry is, as yet, fully aware of the seriousness of this. Is it not possible to make the length of an apprenticeship depend on the skill of the apprentice? Trade tests are difficult to carry out, and I dislike them in principle as much as I dislike examinations, but I feel that both are necessary evils. The standard of workmanship required from a journeyman must be improved if industry is to survive, let alone progress.

The aim and content of the technical courses provided by the colleges have been discussed already. Drastic changes in the existing system are not possible without the backing of industry. In fact, the demand for change must come from industry. I do not know how far the present syllabus is influenced by the Apprenticeship Board but it is obvious that it must be the coordinating body. One point only I would stress at this stage, namely, the need for greater flexibility. There is a tendency for a course, once established, to become rigidly fixed. Education like industry cannot stand still—it progresses or perishes. One aspect of this need for flexibility was demonstrated by the ex-servicemen who recently passed through our colleges and universities. The needs of these men were totally different from those of boys straight from school. A first step towards flexibility would be the splitting up of large classes into small homogeneous sections and varying the method of instruction to suit the needs of each section. Even the syllabus for each section need not be the same. This of course requires more staff. What
can industry do to assist the technical colleges with their staff problem?

This leads to the third aspect which we must consider. Industry has in general agreed to give apprentices time off during the day in the hope of obtaining greater co-operation. Can this be carried a stage further? Can industry second some of its academically inclined staff to assist in the teaching? Surely such men would take more interest in their classes than men who were only supplementing an inadequate income. The step seems logical and would lead to increased co-operation all round.

What else can industry do to assist the apprentice group? There will always be a few outstanding men who show marked aptitude and ability at their trade. Provided they also show personality—leadership—they must be given special treatment. They will obviously 'graduate' to staff positions either as engineers, designers or development men. Help for these men can be provided by industry—with advantage to all concerned.

This assistance may take one of two forms:

(i) Assistance to study the latest developments in a particular industry. This usually involves an overseas post-graduate apprenticeship. (It should be made clear that the term 'post-graduate' includes those who 'graduate'—make good—in industry as well as those with degrees.)

(ii) Assistance to broaden their technical and general education by taking a university degree.

Some industries are pioneering in these directions but more is required. It is essential for the healthy progress of industry that the 'bright lads' receive as much encouragement as possible. I hasten to add that the ordinary bursary or scholarship which is obtained as the result of an annual competition (or examination) does not quite meet the bill. The individual employer or where the industrial unit is too small, a group of employers, must assume almost parental responsibility for their 'bright young men.' There must be that personal contact to give encouragement and guidance without which a bursary may easily be wasted. There will be failures, no doubt, but they will be the exceptions and more than paid for by the successes.

3.2 University training of staff

How can industry help to make the universities more effective? Most businessmen are too busy to consider how their future staff is being trained, but both industry and the universities would benefit by increased co-operation. There are three aspects of this co-operation which I would like to discuss briefly:

(i) Increased co-ordination of academic and practical training

(ii) Increased use of the facilities provided by the universities for technical research and consultation

(iii) Increased financial support of the universities with a larger share in their running control.

The university student who starts his course straight from school is something of a problem. Matriculation, originally an examination for university entrants, no longer serves to select those who can benefit by a university degree course. It is only a school-leaving examination, and results are largely produced by cramming, not by educating the scholar. The methods usually suggested to overcome this are, a 'post-matric' year at school, or a 'pre-university' year at the university. These are both expensive and in many cases impracticable.

I would suggest that industry can help to provide a solution by taking part in a new form of 'sandwich system.' Let the matriculant who aspires to be an engineer enter the university as at present, but at the end of his second year of study, turn him over to industry. The first two years at the university follow on naturally from the work done at school—they are largely preparatory. Industry would be asked to provide two years of practical training to complete this preparatory period. These years would also have a selective effect, eliminating the obviously unsuitable.

The two years' practical training should cover as wide a field of industrial experience as possible—say, for example, nine months in the shops, three months on test, six months in the drawing office, six months estimating, 'engineering' and sales. At
the end of this period, the student, if he still wanted to make a career of engineering, would return to the university. He would then be able to take a much more intelligent interest in the third and fourth years of the course.

This scheme has the following advantages:

(i) it produces more mature students in the 'technical' years of study
(ii) it avoids the 'post-matric' year
(iii) the student will enter his third year of study with a fairly accurate idea of his requirements
(iv) the graduate will be more readily absorbed into industry
(v) if the youth doesn’t settle down either to university studies or engineering practice, less time and money will be wasted before he switches to something else.

I could enlarge on the above, but instead I will quote the case of one very fine engineer who involuntarily followed a similar course. He took three years to complete the first two years of study. This was due, his father thought, to over-concentration on student affairs. Be that as it may, he left the university and over a period of years worked himself up to a very responsible position. He always regretted his failure to complete his degree. He also realized the value of a degree. He gave up his job temporarily and returned to the university. He completed his course with distinction, because he knew what he wanted and how to get it. Because of his increased sense of responsibility—maturity—he was an example to his fellow students and an inspiration to the staff.

Another example which supports this suggested system is the success of the ex-serviceman. They were determined to make up for 'lost time' and in spite of all difficulties—overcrowding, inadequate staff and lack of equipment—were very successful. I feel sure that all who came into contact with them will confirm that they raised the standard of college life. They were an inspiration to the ordinary student.

Turning now to the second aspect of cooperation stated above. It is essential, for both industry and the universities, that fuller use should be made of the staff for consultation and of the students for minor research. Similarly industry must be prepared to assist in illustrating the teaching given by the universities. A certain amount is done but a great deal more could be done. Why is it not done? I think the answer lies in two things:

(i) the lack of interest shown by industry until recently in the educational system
(ii) the inadequacy of the university staff.

The first of these is gradually giving way to the realization of the importance of education. There seems to be little prospect however of the universities obtaining adequate staff in the near future. The staff find their time very fully occupied with routine teaching and 'clerical' work. They find very little time for research or consultative work if they take a conscientious interest in their students. Their contact with industry gradually becomes negligible and their teaching 'academic' and sterile. Industrial help is required under the third heading to correct this state of affairs.

As mentioned earlier, student's fees cover only half the cost of providing a university course. Who pays the balance? The taxpayer who, to a larger extent, is the industrialist. The taxpayer has no control over the use to which his money is put. In any case, after the cost of the civil service has been deducted, only a fraction of it reaches its destination. Even so the government is contributing nearly 50 per cent of the total income of the universities, and still this income is inadequate. If the government grant exceeds half the total income of any university it obtains complete financial control. I seriously suggest that industry should make a larger direct contribution, so as to gain control. The proverb says 'he who pays the piper calls the tune,' but that does not hold if the payment is made through the government. Probably £40 paid directly for educational purposes is equivalent to £100 paid in taxes for the same purpose—and think of the advertising value of such a contribution!

I look forward to the day when the university staff, on the engineering side, will be doubled, the government subsidy halved, and industry providing the necessary funds. Industry would then be
represented by several graduates on the Council of the University. The need for some such development is evident to anyone who has studied the present university problem at first hand.

3.3 Specialist training

If I have made out a case of an advanced technical college, then it follows that we must consider how it is to be staffed and equipped. The specialized nature of the training and its very close co-ordination with industry, point immediately to an organization controlled and financed by industry.

Industry must supply the driving force to call these colleges into existence. Modification of the present educational system for apprentices will remove some of the burden on technical colleges. This will provide some of the space, staff, equipment and finance for this advanced work but industry will have to see that the scope of the work is enlarged to meet its needs. With co-operation and goodwill a scheme can be worked out to the advantage of all concerned. I will leave that at that.

4. THE GOVERNMENT CERTIFICATE OF COMPETENCY

How can this well-established hurdle be fitted into a scheme such as outlined in this address. I think I am correct in assuming that the certificate examination was originally really a trade test—a true certificate of competency—designed to control the promotion of journeymen to foremen. It was never intended—as now—to control the employment of engineers. The examination has to a large extent failed as a selective test for a variety of obvious reasons which I need not discuss.

How can the machinery available be put to new uses and made to serve industry instead of hampering it? The trade-test aspect of the examination should again be used to separate those capable of responsibility (i.e. the foreman from the journeyman). The more advanced theoretical side should similarly be developed as a means of testing those who are endeavouring to pass on to staff positions.

The first of these tests or examinations could very well carry the present name and the successful candidate be awarded a 'Certificate of Competency.' The technical colleges should provide adequate training classes for this examination and also assist in setting and conducting the examination. Their experience in setting examination papers would help to maintain a uniform standard, avoiding the unduly specialized question and the ambiguously worded simple question. There might well be a series of different certificates each qualifying for one industry or group of industries. A knowledge of the regulations controlling the daily running of a shop or factory or mine—as affecting journeyman or foreman—would naturally form an essential part of this examination. Part at least of this examination should be oral.

The second of these tests would then be of a more advanced technical nature and serve to prove the ability of candidates for staff positions. I would suggest that this might be designated the 'Diploma of Competency.' The syllabus could be modelled on that for the Associate Membership examination of our Institute but should contain sections dealing with the Factories Act and industrial administration. This diploma would be granted only after adequate study—most likely on a part-time basis—and a suitable public examination. The training for this examination would normally be carried out by the technical colleges but co-operation from the universities is desirable. If the examination papers were prepared jointly by the technical colleges and the universities the diploma would tend to assume the qualities of a degree and be accepted as equivalent.

5. CONCLUSION

In conclusion I must stress that this outline of an improved educational system for the engineering industry and profession is first of all very sketchy and secondly only a summary of my personal thoughts on the subject. It does not include a consideration of general or school education, though this undoubtedly requires attention. To produce a complete and adequate description of a system with all the detail required could not be considered in the time available and it would make this address far too long. If I have started a
few discussions on the needs for a revision of ‘industrial education’ I have achieved my object.

**VOTE OF THANKS**

H. T. ASPINALL (Past President): A presidential address does not normally form a subject for debate, but the points raised by the President in his interesting and refreshing address call for comment.

First of all, I would like to deal with certain aspects of technical training by technical colleges as discussed by Mr Allan. In the early part of the address it is suggested that the teaching of technical subjects in these colleges should be restricted to the fundamentals of mathematics and physics. Such subjects as those listed are included in the junior grades but facilities must be provided for the senior students wishing to take courses for the National Engineering Diploma, overseas institution examinations, etc.

The idea that technical college courses and the contents of syllabuses remain rigidly fixed is fairly widespread. The natural result of this impression is that a call is made periodically for the whole system to be thoroughly overhauled. The existing scheme of technical training has been developed over a long period of years; it has been moulded to suit the needs of industry in South Africa and overseas. Technical education has its imperfections, but these are not due to lack of change. Every five years under the aegis of the Union Education Department all courses and syllabuses are revised and syllabuses for new subjects applicable to recent developments in industry are compiled. Members of staff of technical colleges are invited to submit suggestions and industry is consulted where necessary. There is, too, evidence of many suggested changes in the Report of the Commission of Technical and Vocational Education, 1948.

Mr Allan advocates the voluntary system of attendance at classes. It is estimated that if this were put into effect the existing enrolments would fall to less than ten per cent and the thirty per cent of the students who now prove themselves each year would be lost to industry. It is my opinion that the absence of interest and unwillingness of a number of apprentices are not, in general, a result of compulsory attendance, but rather a lack of selection of the apprentice and a general lack of suitable applicants. At the present time many entrants to industry have a low standard of education and a negligible capacity for work of any description. The need for attracting the more intelligent and better educated youth to industry is apparent. Many boys view the emoluments attaching to a five years' apprenticeship with disfavour and adopt a less interesting career with higher pay at the commencement.

In the address interesting reference is made to the shortcomings of a good proportion of part-time teachers and the need for attracting personnel to the full-time teaching profession. This is particularly important at the present time in view of the gradual adoption by employers of the scheme of one day per week attendance of apprentices at classes. Under the present Director, the full-time staff of the engineering departments of the Witwatersrand Technical College has been increased during the last few years from six to over forty members. The classes are of reasonable size and an improvement in the average standard of teaching has been effected.

Mr Allan rightly emphasizes the importance of the training of research workers to develop industry in South Africa by the application of the results of basic experimental work. The suggestion is made that overseas practice be followed and that advanced technical colleges undertake the necessary training. The question arises: Will the Universities allow this development? There is little doubt that the answer will be in the negative. In Britain, technical colleges provide not only advanced technical training for specialists, but courses to prepare part-time students for the external B.Sc. (Eng.) of London University. The principals of universities are averse to the provision of similar facilities in South Africa. There is no possibility of technical colleges competing with universities in the training of engineering staff. The recruits drawn by the institutions are drawn from two entirely different fields. A good proportion of engineering students from high schools are able to attend university through the generosity of parents, but the number of university scholarships is low in this country. In general, technical college
students are associated with industry and the advanced students who have proved themselves in their studies cannot for purely economic reasons undertake full-time engineering courses at a university. The cost of an extensive university bursary scheme would be prohibitive and the best solution is to follow Britain’s successful lead and allow technical colleges with approved laboratory facilities to provide external engineering degree courses. The suggestion that the university undergraduate enters industry for an interim period of two years is an excellent one. A scheme of this kind should certainly help to reduce the mortality rate at universities. The remarks on the importance of the cultural background and the corporate life at universities need no emphasis. It would appear, however, that the increasing technical knowledge, particularly in the electrical engineering field, must lead to greater specialization and will render less and less time available to the student of engineering for cultural activities at universities.

To meet the demands of a substantial section of engineers and prospective engineers, the suggestion is made that the existing examination for the Engineers’ Certificate of Competency be replaced by two examinations, one designated for foremen and the other for those desirous of promotion to staff positions. Presumably the second category includes the men many of whom ultimately prove outstandingly successful as engineers in works and on mines, etc.

As recommended by the Commission on Technical and Vocational Education the existing National Diploma in Production Engineering could be suitably modified to become a Certificate of Foremanship or, as is now proposed, a Certificate of Competency. The suggestion of an advanced technical examination necessitating a systematic course of study is an excellent one.

Throughout the address an eloquent appeal is made for greater co-operation between industry and technical education so essential to the industrial progress of this country. An indication has been given as to the direction in which closer collaboration can be effected. Incidentally, technical colleges would be happy to share with the universities any moneys which industry may choose to disburse.

Mr Allan has been closely associated with the activities of the University of the Witwatersrand for many years. He resigned from the university staff and returned to participate in the higher reward of industry. He is in a position to discuss with authority from both viewpoints the various aspects of a very interesting subject.

Mr Chairman, I have very much pleasure in proposing a vote of thanks to our President for his thought-provoking address.

L. H. L. Badham (Past President): The subject of the address this evening is exercising the minds of all those who have the industrial future of South Africa at heart. The background of our President’s career, viz. university graduate, manufacturing design engineer, university lecturer and commercial engineer, enable him to illuminate facets of the problem from varied angles.

Referring to Mr Allan’s grouping of the types of employee required by industry, this, in my opinion, is incomplete to comply with the increasing development of the manufacturing engineering industries. Taking the case of (i) the trade apprentice has many opportunities of becoming a charge hand before attaining foremanship; about 20 per cent of the skilled labour force would consist of this type.

Furthermore, a very important group has been omitted between (i) and (ii) viz., the ‘technician,’ as apart from the ‘engineer’ as defined in the address. The technician should have a good all-round knowledge of workshop practice and a specialized knowledge of a particular product. Such personnel play a very important role in the engineering industry and their selection and training is vital to industry. Generally, they are recruited from the very bright trade apprentices and high school students who obtain their technical training at the technical colleges. In South Africa, unfortunately, the provision of an all-round workshop training for this type of person presents some difficulties owing to the wording of the Apprenticeship Act and certain Industrial Agreements together with the attitude of some of the trade unions.

In the United Kingdom this type of training is called an ‘engineering apprenticeship’ and has been very successful. The ‘cream’ of this group, by continued
study, generally attain to some of the highest positions in industry.

Mr Allan opposes compulsory attendance at technical classes, and although I agree in principle, to my mind it would not be to the advantage of the young apprentices as a whole. Compulsory attendance is not new; it was a condition of contract when I commenced my apprenticeship training in Great Britain thirty-six years ago and is still enforced.

The principle accepted by the National Apprenticeship Board and which is now recommended for adoption by the various apprenticeship committees, is that a definite standard target of technical education be set—not too high—after which attendance becomes voluntary. This provides an incentive to the apprentice who wishes to cease attendance and is a great improvement on certain of the old conditions which specified continuous attendance throughout the period of apprenticeship.

Furthermore, the recent amendments to the Apprenticeship Act make provision for apprentices who have attained a pre-determined technical standard, to take a trade test in their penultimate year of training, which, if successful, enables them to terminate their contract and confers full journeyman status.

I concur entirely with Mr Allan's view on the function of university training and that Matriculation does not really constitute a university entrance examination. It is interesting to note that last year, one of the British universities which has an appreciable technical bias, had a debate on 'the proper place which technology should occupy in a university?' My views on 'post-matric' and 'pre-University' training are in accordance with the report of the De Villiers Commission on Technical and Vocational Education, which proposes a two-year course, and although its implementation would involve additional expense it would lead to the more effective utilization of our universities.

The universities and technical colleges are complementary, not competitive institutions. The fact that a technical college is able to prepare part-time students for degrees, leads to a higher standard for the staff of the college and also gives the keen student an additional incentive. My experience as a part-time lecturer for the final year degree course, over a period of eight years, at a technical college in Great Britain, showed that the scheme is practicable and produces graduates of high calibre.

As an interim measure, pending the introduction of fully organized general pre-university courses, I would like to see universities and technical colleges co-operate so that the technical colleges could introduce a full-time course which would eliminate, at least, the present first year engineering course at university.

Alternatively, a two-year 'sandwich' course arranged by industry and the colleges would be more effective and preferable, but the organization would prove more difficult, particularly with the present stature of South African industry.

The number of rejects after the first year of studies in engineering at South African universities is relatively high and the above proposals would operate as a filter with particular advantage to the universities, which would not shorten their courses of study, but enable them to give a broader content.

Mr Allan advocates 'super-technical' courses at the technical colleges with the staff provided by industry. I do not think that this is feasible at the present stage of our industrial development and even in the United Kingdom the scheme is very restricted.

At one technical college in Britain, of which I am aware, part-time three-year courses of post-graduate lectures are given in subjects such as mathematics, mechanical engineering, electrical machine design, electronics and electromagnetic theory. This college was fortunate, in as much that it is situated in a district containing two large manufacturing companies, each of which has a very well-organized apprentice-training scheme. The courses are attended not only by students of the college who have obtained their degrees externally, but by university graduates who are 'graduate apprentices,' as well as by junior engineers. The part-time lecturers are generally eminent engineers and physicists who are specialists in their subjects which they apply to the solution of day-to-day problems.

Mr Allan chides South African industry on its attitude towards training, quite rightly to a large extent, but it must be borne in mind, that the manufacturing
engineering industry of the Union is very young. Overseas it is the large industrial manufacturing establishments that sponsor training schemes and offer the largest scope of employment for graduate engineers.

Ten years ago there was hardly an establishment in the Union that could offer full training facilities to the new graduate engineer and there are not many now. However, I know that many industrialists are keenly interested in the problem and considering ways and means to meet the position. Several companies with overseas associates are sending selected young men abroad for further experience whilst others are offering 'overseas works scholarships,' which are available to engineering students on graduation. It is rather surprising to find, however, that the number of applicants for such scholarships is few; the reason probably being that due to the general shortage of personnel, a graduate can obtain an appointment at a relatively good salary without having completed a full course of training.

The Steel and Engineering Industries Federation of South Africa, the Chamber of Mines and Iscor offer annual scholarships to enable selected apprentices to attend university, but the number is insufficient and then it touches only one aspect of the problem.

The engineering industry is not large enough to organize a 'summer school of engineering' for the staffs of the universities, but I am confident that the time is not far distant when individual concerns will be prepared to organize factory visits associated with authoritative technical discussions, which will enable our universities to keep contact with industrial progress.

Our universities are understaffed and underpaid and I take this opportunity of expressing appreciation to the staffs of the universities who carry on under such conditions. Teachers are born not made; we should encourage, rather than take advantage of, those who have the flair to impart knowledge.

To my mind, it should be possible to arouse the interest of industry such that industrial groups would endow 'chairs' at the universities and if the accumulation of the requisite capital sum be not attainable at an early stage, then, that the provision of annual grants for a period of years be guaranteed. Such grants should be permissible charges for purposes of taxation, as they would contribute very definitely to the development of industry and the Union of South Africa as a whole.

It is my privilege and pleasure to second the vote of thanks accorded the presidential address.
ANNUAL REPORT AND BALANCE SHEET
For the year ended 31st December 1951

GENTLEMEN,

Your Council has pleasure in submitting the Forty-second Annual Report of the Institute as follows:—

FINANCE

The finances of the Institute continue on a sound basis and it is pleasing to report that revenue has again exceeded expenditure.

INVESTMENTS

At the close of the last financial year investments stood at £10,455 9s. 4d. but owing to the heavy expenditure incurred in the printing of the Second Edition of the Standard Regulations for the Wiring of Premises it has been necessary to withdraw funds from the Institute's current account with the United Building Society to meet this commitment and consequently investments show a small decrease of £238 13s. 10d.

The investments are shown in detail in the Balance Sheet.

SUBSCRIPTIONS

Subscriptions for the last three years are as follows:—

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>1949</td>
<td>£2,683 5 6</td>
</tr>
<tr>
<td>1950</td>
<td>2,945 4 0</td>
</tr>
<tr>
<td>1951</td>
<td>3,109 11 3</td>
</tr>
</tbody>
</table>

TRANSACTIONS

The cost of producing the Transactions for the year under review was £3,201 4s. 9d. and the revenue from advertisements and sale of copies amounted to £3,236 14s. 2d. leaving a surplus of £35 9s. 5d. The reduced surplus this year is due mainly to the increase in printing charges and the greater length of certain of the papers and the number of discussions.

Your Council desires to record its appreciation to those commercial firms who use the Transactions as an advertising medium.

SECRETARIAL FEES

In view of continued rising costs and higher administrative expenses your Council increased the secretarial fees paid by the Institute to the Associated Societies from £67 10s. 0d. to £100 0s. 0d. per month as from 1st January 1951. A further increase was made from the 1st November this year to bring the amount of these fees to £102 10s. 0d. per month.

ASSOCIATED SOCIETIES

(a) Assessment:

£1,141 7s. 0d. was paid to the Associated Societies in respect of assessment for 1951; this is a decrease of £24 13s. 6d. on the amount paid in 1950.

(b) Donation:

The Associated Societies donated the sum of £233 12s. 6d. to the Institute.

The Institute is indebted to the Controlling Executive of the Associated Societies for this consideration.

GENERAL

In view of the continued increase in costs, it is gratifying to the Council to be in a position to submit an income and expenditure account showing a surplus of £363 5s. 7d. after allocating an amount of £300 to the Institute's Education and Bursary Fund.

HONOURS AND AWARDS

Premiums were awarded as follows for papers and discussions published during 1950:—

INSTITUTE PREMIUM


INSTITUTE PRIZE

Awarded to a selected Student in Electrical Engineering at the Witwatersrand Technical College—L. G. Choveaux (Student).
SOUTH AFRICAN RAILWAYS AND HARBOURS AWARD

C. A. Martin A.M.(s.a.)I.E.E. for the paper 'Earth leakage protection,' Transactions, June 1950.

ESCOM PREMIUMS—PAPERS

(1) G. Williams, M.(s.a.)I.E.E., for the paper 'Electrolysis and earth-leakage current investigation on the Witwatersrand electrified section of the South African Railways,' Transactions, November 1950.

(2) H. A. Eastman, M.(s.a.)I.E.E., for the paper 'The Table Bay Power Station, Cape Town,' Transactions, October 1950.

ESCOM PREMIUMS—CONTRIBUTIONS TO DISCUSSION


SOUTH AFRICAN CABLE MAKERS’ ASSOCIATION AWARD

(1) D. Hogg, A.M.(s.a.)I.E.E., for the paper 'The measurement of atmospheric radio noise in South Africa in the low-frequency band,' Transactions, July 1950.

(2) A. W. Lineker, M.(s.a.)I.E.E., for a contribution to the discussion on the paper 'Electrolysis and earth-leakage current investigation on the Witwatersrand electrified section of the South African Railways,' by G. Williams, M.(s.a.)I.E.E., Transactions, November 1950.

F. C. STURROCK AWARD

(1) C. B. M. du Plessis, Graduate(s.a.)I.E.E., and D. F. Odendaal, Student(s.a.)I.E.E., for their joint paper 'Magnetic noise in synchronous salient-pole electrical machines,' Transactions, September 1950, written in collaboration with L. Coetzee.

(2) D. Bruckman, Graduate(s.a.)I.E.E., and W. S. Carey, Student(s.a.)I.E.E., for their joint paper 'A comparison of triodes and beam-tetrodes as power-output valves in audio amplifiers,' Transactions, September 1950, written in collaboration with D. J. Fuller.

M.J.T. AWARD

This award has been donated by a member of the Institute who wishes to remain anonymous. Conditions governing the award are at present under discussion by a committee of the Institute.

ACKNOWLEDGMENT TO DONORS

Your Council expresses its appreciation to the South African Cable Makers’ Association for its Annual Premium of £25 5s. 0d. ; to the South African Railways and Harbours Administration for its Annual Award of £26 5s. 0d.; to the Electricity Supply Commission for its annual ‘Escom Premium’ of £25 and to the anonymous donor of the M.J.T. award.

PAPERS

The following papers were read during 1951:

‘The m.k.s. system of units,’ by R. Kitai, (Graduate), Transactions, February 1951.

‘Some recent developments in electric motors with special reference to the use of new insulation materials,’ by H. West, Transactions, March 1951.

‘The specification of power transformers,’ by E. T. Norris, Transactions, April 1951.

‘International standardization in electrical engineering,’ by O. J. Alexander (Associate Member), Transactions, May 1951.

‘The development of broadcasting in the Union of South Africa,’ by H. O. Collett (Associate Member), Chairman, Light Current Section, Transactions, May 1951.

This address was presented to the members of the Light Current Section of the Institute on the 29th May 1951.

‘The production of copper conductors for electrical purposes,’ by N. G. Beveridge (Associate Member), Transactions, June 1951.

‘Some recent developments in the design and manufacture of turbo-generators with particular reference to hydrogen-cooled machines,’ by H. M. Oliver and T. R. Strawson (Associate Member), Transactions, July 1951.

The First Bernard Price Memorial Lecture—

‘The work of the Bernard Price Institute of Geophysical Research, 1938-1951,’ by Professor B. F. J. Schonland (Member), Transactions, August 1951.

‘Some technical considerations relating to design, performance and application of high-voltage switchgear,’ by C. H. W. Lackey, Transactions, September 1951.

‘The reticulation of an all-electric town,’ by J. K. Gillett (Associate Member), Transactions, October 1951.


‘Automatic telephone traffic with reference to prediction processes,’ by R. J. F. Bathgate, Transactions, December 1951. (This paper was presented to members of the Light Current Section of the Institute on the 13th March 1951).
ATTENDANCE AT COUNCIL AND COMMITTEE MEETINGS

<table>
<thead>
<tr>
<th>Designation of Committees</th>
<th>Council</th>
<th>Finance</th>
<th>Papers</th>
<th>General Purposes</th>
<th>Examinations</th>
<th>Status</th>
<th>Honours and Awards</th>
<th>Education and Bursary Fund</th>
<th>Annual Banquet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note: Meetings of Committees b and c are held concurrently.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Meetings held during the year</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>A. W. Lineker (President, Chairman a, f, g, h) <strong>ex-officio all Committees</strong></td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>G. Drewett (Vice-President, Chairman c)</td>
<td>8</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. T. Allan (Vice-President, Chairman d)</td>
<td>9</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. R. Mullins (Vice-President, Chairman b)</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Joseph White (Honorary Treasurer, Chairman e)</td>
<td>13</td>
<td>10</td>
<td>10</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>J. A. F. Michell (Immediate Past President)</td>
<td>10</td>
<td>8</td>
<td>8</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. P. Alexander</td>
<td>14</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. P. Anderson</td>
<td>12</td>
<td></td>
<td>6</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. K. Boozel</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. de Villiers</td>
<td>10</td>
<td></td>
<td>7</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R. W. Kane</td>
<td>6</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. Monks</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. Williams</td>
<td>8</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G. H. Woods</td>
<td>8</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. C. Backeberg</td>
<td>8</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W. Curnack</td>
<td>13</td>
<td></td>
<td>11</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H. O. Collis</td>
<td>9</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R. G. Gillette</td>
<td>14</td>
<td></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. E. Gillett</td>
<td>13</td>
<td></td>
<td>11</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>B. P. Heaton</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. H. Aspinall</td>
<td>8</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. H. L. Bisdham</td>
<td>10</td>
<td></td>
<td>9</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>G. A. Dalton</td>
<td>8</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. H. Dobson</td>
<td>3</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J. C. Fraser</td>
<td>4</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W. H. Milton</td>
<td>12</td>
<td></td>
<td>10</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>B. Vivian Pever</td>
<td>14</td>
<td></td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

REPRESENTATION, 1951

ASSOCIATED SCIENTIFIC AND TECHNICAL SOCIETIES OF SOUTH AFRICA

TRANVUEAL CHAMBER OF MINES PREVENTION OF ACCIDENTS COMMITTEE

SOUTH AFRICAN STANDARDS INSTITUTION
(This Institution terminated its activities during the year.)

WORLD POWER CONFERENCE—S.A. NATIONAL COMMITTEE

SAFETY PRECAUTIONS COMMITTEE

BUILDING RESEARCH ADVISORY COMMITTEE

W. ELDSON-DEW BURSARY COMMITTEE

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH
(A) NATIONAL COMMITTEE FOR SCIENTIFIC RADIO
G. R. Bozzoli.

(B) COMMITTEE ON ELECTROTECHNICS AND ELECTRONICS

In addition, the Institute is represented on a number of Committees constituted by the South African Bureau of Standards.
DISCUSSIONS ON PAPERS

It is pleasing to your Council to be able to record that a large number of members contributed to the discussions on papers read before the Institute and it is hoped that this interest will be enhanced during the coming year since extensive discussion can increase appreciably the interest and value of papers.

JOINT MEETING WITH THE UNIVERSITY OF THE WITWATERSRAND

FIRST BERNARD PRICE MEMORIAL LECTURE

The Twenty-first Annual Joint Meeting with the University of the Witwatersrand was held on Thursday, 23rd August 1951, when Professor B. F. J. Schonland, Director of the Bernard Price Institute of Geophysical Research, delivered the First Bernard Price Memorial Lecture entitled ‘The work of the Bernard Price Institute of Geophysical Research, 1938-1951.’ A vote of thanks was proposed by Dr H. R. Raikes, Principal of the University of the Witwatersrand and seconded by Dr H. J. van Eck, Chairman, Industrial Development Corporation of South Africa, Ltd.

This meeting was well attended, there being present approximately 140 members and visitors and your Council places on record its thanks to Principal H. R. Raikes and the University authorities for the arrangements made.

THE ASSOCIATED SCIENTIFIC AND TECHNICAL SOCIETIES OF SOUTH AFRICA

The following are the Office Bearers of the Associated Societies for the year 1951/1952:

**President:** Dr S. H. Haughton.

**Vice-Presidents:** Mr J. E. Worsdale and Mr F. G. Hill.

**Honorary Treasurer:** Mr Joseph White.

Registration and control of the scientific and technical professions

This matter has received the serious consideration of the Associated Societies over a number of years and, although many meetings have been held in an endeavour to reach finality, the lack of unanimity amongst the Constituent Societies on this question has made it impossible for the Associated Societies to formulate a statement either for or against such registration and control as representing the views of all its members.

In the circumstances the Associated Societies as a representative body, was unable to reply to the questionnaire on this subject issued by the Secretary for Commerce and Industries but forwarded to him copies of the opinions expressed by each of the Constituent Societies in reply to the questionnaire and to a Memorandum on this subject prepared by the Controlling Exe-
cutive itself: as the result of this action, a copy of your Council’s Memorandum giving a comprehensive survey of the question of Registration, which was circulated to all members of the Institute on the 22nd August 1951, was forwarded to the Secretary for Commerce and Industries through the Associated Societies as stated.

Facilities for part-time university courses

This matter has been receiving the attention of the Associated Societies for a considerable period and the Societies were represented at a meeting held in Cape Town on the 1st June 1951 convened by the Secretary for Education, Arts and Science, and attended by the Principals of Universities and Technical Colleges.

This was the second meeting held to consider this subject and, although no finality was reached, it is nevertheless pleasing to report that efforts are still being made to find ways and means of making available the required facilities.

Serving of lunches in Kelvin House.

It is regretted that, owing to insufficient support allied with present-day catering difficulties, the serving of lunches in Kelvin House had to be discontinued on the 31st October 1951. It is hoped that at some future date conditions will permit of this desirable club facility being restored.

OBITUARY


The condolences of the Institute have been extended to the relatives of the deceased.

LIGHT CURRENT SECTION

The following are the Office Bearers of the

Light Current Section of the Institute for the 1951/1952 Session:

Chairman: Mr H. O. Collett.
Vice-Chairman: Mr M. Hewitson.
Immediate Past Chairman: Professor G. R. Bozzoli.

Members of the Committee are, Messrs E. H. Harwood, F. J. Hewitt, L. Webster, Joseph White and the President (ex officio).

The Section held five General Meetings during the year details of which are as follows:


(This paper will be published in the December 1951, issue of the Transactions.)

17th April: Informal discussion on u.h.f. radio (systems of modulation).

29th May: Inaugural Address entitled ‘The development of broadcasting in the Union of South Africa,’ by H. O. Collett.

(This Address was published in the May 1951 issue of the Transactions.)

9th October: Cinematograph films depicting the manufacture of modern automatic telephone exchange equipment.


The meetings of the Section were well attended by members of all grades, which augurs well for the future.

ANNUAL BANQUET

The Institute's Annual Banquet was held in the Main Hall, Kelvin House, Johannesburg, on Friday, 16th November 1951, and there were present 150 members and guests.

The toast list was as follows:

HIS MAJESTY THE KING

THE UNION OF SOUTH AFRICA

Proposed by Dr F. J. de Villiers (Chairman of the Electricity Control Board)
Response by Mr L. C. Burke (Postmaster General)
THE SOUTH AFRICAN INSTITUTE OF ELECTRICAL ENGINEERS

Proposed by Dr S. H. Haughton
(President of The Associated Scientific and Technical Societies of South Africa.)
Response by Mr A. W. Linesker
(President.)

THE ENGINEERING PROFESSION

Proposed by Dr A. W. Rowe
(President of The South African Institution of Mechanical Engineers.)
Response by Mr J. P. Leslie
(President of The South African Institution of Civil Engineers.)

OUR GUESTS

Proposed by Mr J. T. Allan
(Vice-President of The South African Institute of Electrical Engineers.)
Response by Mr Gideon Roos
(Director-General of The South African Broadcasting Corporation.)

EDUCATION AND BURSARY SCHEME

Your Council is pleased to report that, in terms of the Institute’s Education and Bursary Scheme, six bursaries have been awarded for the year 1952. Three bursaries, including the ‘Harvey Bursary’ to Students of the Witwatersrand Technical College; two to Students of the University of the Witwatersrand and one to a Student of the University of Natal.

The ‘Harvey Bursary’ for 1952 was awarded to Mr N. W. Dakin.

It will be noted from the accounts that a further sum of £300 has been added to the Education and Bursary Fund.

STANDARD REGULATIONS FOR THE WIRING OF PREMISES

The second edition of the Standard Regulations for the Wiring of Premises was published by the Institute in English on the 22nd August 1951. The translation of this edition has now been completed and it is anticipated that copies of the Regulations in Afrikaans will be available early in the new year.

Your Council places on record its thanks and appreciation to the members of the Safety Precautions Committee for the time and work devoted to compiling this second edition of the Regulations and trusts that their designed object of promoting efficiency and safety will be achieved.

Steps are being taken to have the second edition promulgated by the four Provincial Administrations of the Union and by the various municipalities on similar lines to the first edition.

FORMATION OF THE CAPE TOWN LOCAL CENTRE

Reference was made in the last Annual Report to the formation of the Cape Town Local Centre of the Institute. Draft rules for the conduct of Local Centres have now been approved by your Council and it is expected that a Local Centre of the Institute will be established in Cape Town in the near future.

THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTHERN AFRICA—1951

Mr E. Vivian Perrow (Past President) represented the Institute at the above Convention held in Cape Town from Tuesday, 8th to Friday, 11th May 1951.

THE SOUTH AFRICAN BUREAU OF STANDARDS

The Institute is represented on a number of committees appointed by the South African Bureau of Standards to prepare specifications which affect the electrical engineering profession and receives copies of draft specifications issued by the Bureau for criticism and comment by your Council.

FACTORIES, MACHINERY AND BUILDING WORK ACT, 1941

At the request of the Chief Inspector of Factories your Council appointed a sub-committee to consider proposed amendments to certain of the Regulations promulgated under the abovementioned Act. The sub-committee met jointly with a sub-committee of the Institution of Certified Engineers, South Africa, which had also been invited to submit its comments on the proposed amendments and certain suggested alterations have been submitted to the Chief Inspector of Factories.
MECHANICAL AND ELECTRICAL ENGINEERS’ COMMISSION

WINDING AND LOCOMOTIVE ENGINE DRIVERS’ COMMISSION

At the request of the Government Mining Engineer, your Council nominated members to fill a vacancy which had occurred on the former Commission. Nominations for the Winding and Locomotive Engine Drivers’ Commission were not put forward as the vacancy was for a mechanical engineer.

MINES, WORKS AND MACHINERY REGULATIONS

At the invitation of the Government Mining Engineer, your Council submitted its comments on various proposed amendments to the Mines, Works and Machinery Regulations.

VOCATIONAL GUIDANCE OFFICIAL RESEARCH

At the invitation of the Departmental Psychologist of the Department of Public Education, Provincial Administration of the Cape of Good Hope, members selected by the Council completed a questionnaire, which the Department uses to study the vocational interests of boys and girls who seek advice in regard to the choice of a vocation.

The Department asked for the assistance of the Institute in this matter to provide typical answers to key questions that might be expected from successful workers in particular occupations, in this case, those associated with electrical engineering.

Your Council was pleased to help in this important service to youth.

CONFERENCE OF ENGINEERING INSTITUTIONS OF THE BRITISH COMMONWEALTH

As a member of this Conference the Institute is in constant touch with similar organizations in the Commonwealth and much interesting information has been interchanged during the year under review.

As a result of this membership the Institute is also in touch with similar Conferences covering Western European countries and the United States of America through the London Secretariat of the Commonwealth Conference.

JOINT ENGINEERING CONFERENCE

The Institute was represented at the Joint Engineering Conference held in London from 4th to 15th June 1951, by Mr J. T. Allan (Vice-President).

The Conference was opened by The Right Honourable Richard Stokes and a comprehensive programme of papers had been arranged.

Arrangements were also made for the delegates to visit places of interest during the period of the Conference.

HONORARY SERVICES

Your Council acknowledges, with thanks and appreciation, the services rendered to the Institute during the year under review by Joseph White (Past President) as Honorary Treasurer, H. P. Alexander (Member) as Honorary Editor and by Dr W. Cormack (Associate Member) as Assistant Honorary Editor.

GENERAL

In general, the year 1951 can be regarded as satisfactory and although costs continue to rise the finances of the Institute as reflected in the Balance Sheet are sound.

The membership continues to increase and now totals 1,657, the highest figure attained since the formation of the Institute.

The interest taken by members in the activities of the Institute is exemplified by the attendances at General Meetings which this year averaged 80.

In addition to the items mentioned in this report, various matters concerning the electrical engineering profession have been considered from time to time and, where deemed expedient, representations made to the appropriate authorities.

The Council looks forward to the coming year with confidence in the Institute’s continued progress and usefulness to the profession.

On behalf of the Council,

A. W. LINEKER, President.
A. J. ADAMS, Secretary.

JOHANNESBURG,
8th January 1952.
# THE SOUTH AFRICAN INSTITUTE OF ELECTRICAL ENGINEERS

## (INCORPORATED 1909)

### Dr.

**INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31ST DECEMBER 1951**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretarial Fees and Rent</td>
<td>£1,207 10 0</td>
</tr>
<tr>
<td>Stationery and Printing</td>
<td>428 1 0</td>
</tr>
<tr>
<td>Postages</td>
<td>180 4 11</td>
</tr>
<tr>
<td>General Expenses</td>
<td>179 16 1</td>
</tr>
<tr>
<td>Assessment—Associated Societies</td>
<td>1,141 7 0</td>
</tr>
<tr>
<td>Certificates</td>
<td>90 6 0</td>
</tr>
<tr>
<td>Subscriptions Written Off</td>
<td>72 14 3</td>
</tr>
<tr>
<td>Audit Fees</td>
<td>31 10 0</td>
</tr>
<tr>
<td>Institute’s Awards</td>
<td>15 0 0</td>
</tr>
<tr>
<td>Light Current Section</td>
<td>25 13 6</td>
</tr>
<tr>
<td>Depreciation</td>
<td>10 0 0</td>
</tr>
<tr>
<td>Witwatersrand Technical College Prize</td>
<td>10 0 0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3,392 2 9</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscriptions</td>
<td>£3,109 11 3</td>
</tr>
<tr>
<td>Entrance Fees</td>
<td>319 4 0</td>
</tr>
<tr>
<td>Donation</td>
<td>233 12 6</td>
</tr>
<tr>
<td>The Associated Scientific and Technical Societies of South Africa</td>
<td></td>
</tr>
<tr>
<td>Interest on Investments</td>
<td>357 11 2</td>
</tr>
<tr>
<td>Transactions</td>
<td>35 9 5</td>
</tr>
<tr>
<td>Advertising and Sales</td>
<td><strong>£3,236 14 2</strong></td>
</tr>
<tr>
<td>Less Cost of printing, commission on advertise-ments, etc.</td>
<td>3,201 4 9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>£4,055 8 4</strong></td>
</tr>
</tbody>
</table>

**Education and Bursary Fund** | 300 0 0

**Balance—Being Excess of Income over Expenditure carried to Accumulated Fund** | 363 5 7

**Total** | **£4,055 8 4**
V.F.P. AWARDS FUND
(Awards unclaimed) £15 10 7

EDUCATION AND BURSARY FUND 1,866 19 7
Balance 31st December 1950 2,116 19 7
Add Balance of V.F.P. Award Fund 10 10 0
Donation from Member 1 1 0
Interest on Investments 55 10 8
Institute's Contribution, 1951 300 0 0

Less 1952 Bursaries 250 0 0
Add Institute's contribution 1951 1,566 19 7

F. C. STURROCK AWARD 12 10 9
Balance 31st December 1951 9 14 7
Add Awards unclaimed 3 5 3

SOUTH AFRICAN CABLE MAKERS' ASSOCIATION AWARD 12 10 9
Balance 31st December 1951 4 10 9
Add Awards unclaimed 8 0 0

SOUTH AFRICAN RAILWAYS AND HARBOURS AWARD 7 0 1
(Earned unclaimed)

ESCOM PREMIUM 59 8 10
Balance 31st December 1951 27 8 10
Add Awards unclaimed 32 0 0

M.J.T. AWARD 50 6 8
Balance 31st December 1951

Subscriptions Paid in Advance 59 19 6
Sundry Creditors 1,244 5 6
Annual Banquet Reserve 62 10 4
Accumulated Fund 11,423 2 0
Balance 31st December 1950 11,059 16 5
Add Excess of Income over Expenditure for the year 1951 363 5 7

£14,814 13 8

ASSOCIATED SCIENTIFIC AND TECHNICAL SOCIETIES OF SOUTH AFRICA, Secretaries. Per A. J. ADAMS.

We have audited the Balance Sheet of The South African Institute of Electrical Engineers, dated 31st December 1951, above set forth and have obtained all the information and explanations we have required. We have satisfied ourselves of the existence of the securities. Proper books and records have been kept, and in our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the affairs of the Institute according to the information and explanations given to us and as shown by the books.

Johannesburg, 7th January 1952.

G. K. TUCKER & WILSON, Auditors, Incorporated Accountants.
South African Institute of Electrical Engineers

EMPLOYMENT BUREAU

APPOINTMENTS REQUIRED

OVERSEAS TRAINED ENGINEER, A.M.I.E.E., Associate Member of the Institute with wide mechanical experience—production, commercial, sales and managerial—seeks position where qualifications, energy and initiative can be used to mutual advantage.

Address A. R. 83, care of the Secretaries, The South African Institute of Electrical Engineers, P.O. Box 5907, Johannesburg.


YOUNG POST OFFICE COMMUNICATIONS ENGINEER, Student of the Institute, having obtained Advanced Technical Certificate Part II and completed apprenticeship, seeks any employment which offers good future; willing to work and study to obtain advancement.

Address A.R. 84, care of the Secretaries, The South African Institute of Electrical Engineers, P.O. Box 5907, Johannesburg.


SWITCH PROBLEMS?

SANTON

ROTARY SWITCHES SOLVE THEM FOR YOU

Available for back of panel (flush mounting) or front of panel (surface mounting).

SANTON ROTARY SWITCHES

for meter control, motor control, etc. in A.C. and A.C./D.C. models from 10-180 amps, 1-16 poles, 2-6 positions.

Further details from

A. C. GOWLETT (Pty.) LTD.

49-50 STANLEY HOUSE, COMMISSIONER STREET, JOHANNESBURG

Phone 33-3272