ANNUAL REPORT AND BALANCE SHEET.

GENTLEMEN,

Your Council has pleasure in submitting the Thirty-fifth 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, notwithstanding the prevailing war conditions, revenue has again exceeded expenditure by an appreciable amount.

Investments.

At the close of the last financial year the Institute's investments stood at £6,916 5s. 9d. These were increased by £418 18s. 8d. during the year making the total moneys invested at the 31st December, 1944, £7,335 4s. 5d.

The investments are shown in detail in the Balance Sheet.

Subscriptions.

The subscriptions for the last three years are as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1942</td>
<td>...</td>
<td>1,592</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>1943</td>
<td>...</td>
<td>1,620</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>1944</td>
<td>...</td>
<td>1,737</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

The 1944 subscriptions of members on active service were remitted to the amount of £276 15s. 0d.

J. C. Fraser (President) was in the Chair, and there were present 140 members and visitors, and the Secretary.

OBITUARY.

The President referred to the death of the following members. J. N. Nayler (Retired Member), joined the Institute in 1924, died on the 1st October, 1944; intimation of his death has only now been received. H. Wrench (Associate Member), joined the Institute in 1936, died in December, 1944. J. R. Gauntlett (Associate), joined the Institute in 1935, died on the 1st November, 1944. D. Heslop (Member), joined the Institute in 1926, died in Durban on the 15th January, 1945.

As a token of respect to the memory of the deceased and as a mark of sympathy with the bereaved, all present stood in silence for a few moments.

MINUTES.

The Minutes of the 346th Ordinary General Meeting held on the 23rd November, 1944, were confirmed.

MEMBERSHIP.

While the scrutineers (W. Fenwick, J. Falcke) counted the ballot for those candidates named under Item 2 of the Agenda, all of whom were duly elected, the Secretary made the announcements covered by Items 3, 4, 5 and 6 of the Agenda.
Transactions.

The cost of production of the Transactions for the year was £1,044 2s. 4d. and the revenue from advertising and the sale of copies amounted to £1,104 15s. 4d., leaving a surplus of £60 13s. 0d. as compared with a surplus of £123 10s. 9d. last year. The decrease is accounted for by the increased charges for printing now in force.

Your Council, in collaboration with the other Constituent Bodies of the Associated Societies who are affected, made representations to the appropriate authorities in this connection, but it is not expected that any reduction will be made and it is gratifying, under these circumstances, to be able to report a surplus.

Your Council again thanks those commercial firms and organisations who use the Institute’s publication as an advertising medium, and records its appreciation of their continued support of the Transactions.

Entrance Fees.

£156 19s. 6d. was received in respect of entrance fees, which is practically the same amount as that received in 1943.

Stationery and Printing.

The amount expended on stationery and printing was £90 1s. 5d., compared with £80 7s. 6d. in 1943.

Assessment—Associated Societies.

£693 was paid to the Associated Societies in respect of assessment for 1944, and is an increase of £50 8s. 0d. on the amount paid for the year 1943.

Donation—Associated Societies.

The Associated Societies donated a sum of £211 10s. 6d. to the Institute, £158 0s. 6d. of which is for the purpose of assisting Student Members. The assessment of all members on active service has been remitted.

The Institute is indebted to the Controlling Executive of the Associated Societies for these considerations.

“Standard Regulations for the Wiring of Premises” and “Notes on the Regulations.”

Sales of the Institute’s Standard Regulations for the Wiring of Premises, and the Notes on the Regulations have been well maintained, and the amount received from the sales of these now shows a surplus of £129 14s. 9d. over the cost of printing, etc. This surplus is being kept as a reserve against the cost of the next issue of these publications. In addition to this it is estimated that the stocks on hand are sufficient to meet all requirements for the next twelve months.

General.

In view of the prevailing conditions and the fact that the subscriptions of members on active service have been remitted, it is most gratifying to your Council to be in a position to submit an Income and Expenditure Account showing a surplus of £699 2s. 9d. for the year under review.

Honours and Awards.

Premiums were awarded as follows for papers and discussions contributed during 1943:

V.F.P. Awards—Papers.

Class A.

(1) H. T. Aspinall (Member) £5 5s. 0d. for “Some Experiments on the Automatic Correction of Power Factor to a Predetermined Value.” (Transactions, September, 1943.)

(2) G. D. Walker (Associate Member) £3 3s. 0d. for “A Contribution to the Study of the Ionosphere.” (Transactions, May, 1943.)

(3) B. J. J. Nicora (Associate) £3 3s. 0d. for “The Present Status of the Most Important Electric Light Sources.” (Transactions, March, 1943.)

Class B.

Awards in this class apply to Student Members only. No award was made since the Student Section has been inactive during 1943, on account of the war.

V.F.P. Awards—Contributions to Discussions.

(1) J. Faloke (Member) £3 3s. 0d. for his discussion on the paper entitled
"Overhead Power Lines in South Africa—The Case for Rationalisation," by H. P. Alexander (Associate Member). (Transactions, November, 1943.)

South African Cable Makers’ Association Award.

No award was made from this fund for 1943.

F. C. Sturrock Award.

This award applies to Student Members only. No award was made since the Student Section has been inactive during 1943 on account of the war.

Institute’s Award Fund.

No award was made from this fund for 1943.

South African Railways and Harbours Award.

At the last Annual General Meeting of the Institute, held on the 27th January, 1944, the Hon. F. C. Sturrock, Minister of Transport, offered the Institute a "South African Railways and Harbours Annual Award" of £26 5s. 0d. for the paper or papers presented to the Institute of the greatest interest and value to his Administration.

The President, thanked Mr. Sturrock for his generous offer, made on behalf of the South African Railways and Harbours, which he was pleased to accept on behalf of the Institute.

Full details of the conditions attaching to this award will be published at a later date.

Acknowledgments to Donors.

Your Council expresses its thanks to the Victoria Falls and Transvaal Power Company, Limited, for its generous annual donation of £25 to the Awards Fund, and a further £25 to the funds of the Institute. The Institute is indebted to the Company for the valuable and practical interest it continues to take in the Institute’s progress and work.

Your Council also records its appreciation to the South African Cable Makers’ Association for its Annual Award Premium of £5 5s. 0d.

PAPERS.

The following papers were read during 1944 :—


"Recent Modifications and Additions to the Johannesburg Municipality’s Electricity Distribution System," by A. Ravno (Associate Member). (Transactions, May, 1944.)

"An Introduction to Radio-location," by Major G. R. Bozzoli (Associate Member). (Transactions, July, 1944.)

"Application of the Photo-electric Relay to Defence Training Equipment," by Alexander Weed (Associate Member). (Transactions, September, 1944.)

"Teleprinter Exchange Services," by G. R. P. Grove (Associate Member). (Transactions, September, 1944.)

"A General Description of the Orlando Power Station of the City of Johannesburg Electricity Undertaking," by G. J. Privett (Member). (Transactions, November, 1944.)

DISCUSSIONS.

Your Council is pleased to record its appreciation of the discussions on the papers read before the Institute during the year, but would be glad if more members, especially those resident outside the Witwatersrand area, would contribute to these discussions.

JOINT MEETING WITH THE UNIVERSITY OF THE WITWATERSRAND.

The Fourteenth Annual Joint Meeting with the University of the Witwatersrand was held at the University on Thursday, 22nd June, 1944, when Major G. R. Bozzoli (Associate Member), read a paper entitled "An Introduction to Radio-location."

The meeting was very well attended, there being present approximately 325 members and visitors, and in addition to the paper,
the operation of the equipment described in the paper was demonstrated and proved most interesting. Your Council here records its thanks to Principal H. R. Raikes and the University authorities for the arrangements made for this meeting.

JOINT MEETING WITH THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS OF SOUTH AFRICA AND RHODESIA.

The Association of Municipal Electricity Undertakings of South Africa and Rhodesia, held a conference in Johannesburg from the 24th to the 27th April, 1944, and your Council took the opportunity of arranging a joint meeting between the Institute and the Association, which meeting took place in Kelvin House on the 25th April, 1944, at 7.45 p.m. A paper was read by A. Ravnø (Associate Member) entitled “Recent Modifications and Additions to the Johannesburg Municipality's Electricity Distribution System.” The meeting, which was attended by about 170 members and visitors was highly successful, and A. T. Rodwell (Past President), as President of the Association of Municipal Electricity Undertakings of South Africa and Rhodesia expressed the thanks of his Association to the Institute for having arranged the meeting.

ANNUAL BANQUET, 1944.

Owing to the war, your Council decided not to hold a banquet this year.

VISIT TO THE ORLANDO POWER STATION OF THE CITY OF JOHANNESBURG ELECTRICITY UNDERTAKING.

By the courtesy of the Johannesburg City Council and the General Manager of the Electricity Department, members of the Institute and their friends paid a visit of inspection to the Council's Orlando Power Station on Saturday, the 18th November, 1944. Approximately 350 members and their friends participated in this excursion, and your Council here records the Institute's appreciation of the Johannesburg City Council's kind invitation, the transport facilities provided, and for the hospitality extended.

ATTENDANCE AT COUNCIL AND COMMITTEE MEETINGS.

During 1944, there have been seven meetings of the Council, six of the Finance and Papers and Editorial, and six of the General Purposes Committees. Attendances have been as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Council</th>
<th>Finance and Papers and Editorial</th>
<th>General Purposes</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. C. Fraser</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>L. H. L. Badham</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>G. A. Dalton</td>
<td>7</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>W. H. Milton</td>
<td>7</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>J. T. Allan</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>H. T. Aspinall</td>
<td>7</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>J. A. F. Michell</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>J. Monks</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>S. G. Redman</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>J. Russell</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>A. K. Scooby</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>J. Russell Stephens</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>J. P. Anderson</td>
<td>6</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>H. P. Alexander</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>G. Drewett</td>
<td>6</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>W. Hilarius</td>
<td>4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>A. W. Lineker</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>B. E. Mahon</td>
<td>7</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>
as compared with those of officers in the Medical and Veterinary Corps, and suggested that the professional allowance of officers serving in the South African Engineer Corps should be paid on a sliding scale according to rank and thus make the remuneration of engineers more in keeping with those of the other professions referred to.

In view of the importance of this matter, the President of the Associated Societies personally interviewed the Prime Minister, who, while sympathetically disposed to the proposals made, felt he would not be justified in doing anything in this connection at the present advanced stage of the war. The Controlling Executive therefore decided not to pursue the matter further at present, but to endeavour to safeguard the interests of professional men by seeing that when regulations are drawn up for the Permanent Defence Force after the war, professional men be paid allowances commensurate with their qualifications.

In response to a request made by the South African National Anti-Waste Organisation, the Controlling Executive, with the consent of all the Constituent Bodies, agreed to support a resolution passed by the South African Anti-Waste Organisation urging the Government to consider the early introduction of legislation for the decimalisation of the coinage, weights and measures of the Union of South Africa.

Professor John Orr kindly donated to the Associated Societies a large number of technical publications of South African and overseas organisations which it is hoped will, at a later date, form the nucleus of a technical library. Arrangements are being made for the appropriate housing in Kelvin House of these and other volumes donated to the Associated Societies.

One dance was held during the year, this being on the 29th December, and the proceeds amounting to £350 0s. Od. were donated equally to the South African Red Cross Society War Funds and the Missions to Seamen.

SAFETY PRECAUTIONS COMMITTEE.

The Safety Precautions Committee met twice during the year to consider several
Certificated Engineers, South Africa, to the
Government Mining Engineer for the
deletion of Regulation 292 (6) and to certain
suggested amendments to Regulation 305
of the Mines, Works and Machinery
Regulations. The reason for the proposed
deletion of Regulation 292 (6) was that the purpose
for which the Regulation had been framed
had now been served. The proposed
amendments to Regulation 305 would
remove an anomaly which at present exists,
whereby an engineer with an electrical
certificate of competency is not permitted
to sit the mechanical examination unless he
has served an apprenticeship in mechanical
engineering, while the reverse procedure
does not apply.

Government Certificates of Competency.

Reference was made in the last Annual
Report to a request received from the
University of Cape Town that University
graduates or anyone who has passed an
equivalent examination of equal or higher
standard be exempted from the technical
part of the examination for the Govern-
ment Certificates of Competency.

The University asked (1) if the Institute
would he prepared to support this proposal
in principle and (2) whether the Institute
would be prepared to join them in a deputa-
tion to the Minister of Mines to discuss
the matter and put forward proposals for the
amendment of the Regulations.

These proposals were considered at several
Council meetings without a decision being
arrived at.

Overhead Line Regulations.

It was mentioned in the last Annual
Report that the question of standardised
regulations for electrical overhead lines in
South Africa was receiving consideration.
Your Council subsequently decided that,
while the time is not ripe to go forward to
any Government Department with sugges-
tions for the amendment of the Overhead
Line Regulations, this Institute should
prepare a code for the guidance of smaller
concerns who might undertake the erection
of overhead transmission lines.

A committee is being appointed under the
chairmanship of E. T. Price (Past President),
to prepare the Code and representatives of
the Government Mining Engineer and the
Chief Inspector of Factories have been
nominated to its membership. Invitations
are being addressed to other interested
bodies and organisations to appoint repre-
sentatives to this committee.

Mines, Works and Machinery Regulations.

Your Council was pleased to support
representations made by the Institution of
Communications in regard to the Standard
Regulations for the Wiring of Premises and
to draft modifications to the regulations for
incorporation in the second edition of the
Standard Regulations for the Wiring of
Premises.

Winding and Locomotive Engine Drivers' Commission.

Mechanical and Electrical Engineers' Commission.

At the request of the Government Mining Engineer, your Council submitted nominations for a vacancy on each of the above
Commissions, and is pleased to report
that the Institute's nominee received the
appointment to the former Commission.

Public Service Enquiry Commission.

Your Council has decided to submit a
memorandum to the Public Service Enquiry Commission urging the recognition by the
Government of Corporate membership of
the Institute as a qualification for positions
of responsibility as Electrical Engineers in
the Government Service. This memorandum
will be submitted early in 1945.

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the Government Mining Engineer and the
Chief Inspector of Factories have been
nominated to its membership. Invitations
are being addressed to other interested
bodies and organisations to appoint repre-
sentatives to this committee.

Constitution and Rules.

The revision of the Institute's Constitu-
tion and Rules has been under considera-
tion by your Council and a special sub-committee
appointed to deal with this matter has now
almost completed its task. Your Council
hopes to reach finality in this matter early
in 1945.
OBITUARY.

Your Council deeply regrets to record the deaths during the year of W. B. Cleeves (Member), J. N. Nayler (Retired Member), R. R. Wood (Associate Member), J. M. du Toit (Associate Member), H. Wrench (Associate Member), W. K. W. Thomas (Associate), J. B. Gauntlett (Associate), and A. W. Stanton (Student).

MEMBERSHIP.

The membership of the Institute as at 31st December, 1944, is as follows:

<table>
<thead>
<tr>
<th>As at 31st December, 1943</th>
<th>5</th>
<th>148</th>
<th>338</th>
<th>328</th>
<th>236</th>
<th>1,055</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deductions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resignations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Deceased</td>
<td></td>
<td></td>
<td>1</td>
<td>4</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Struck Off</td>
<td></td>
<td></td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Transferred</td>
<td></td>
<td></td>
<td>5</td>
<td>9</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>146</td>
<td>329</td>
<td>312</td>
<td>220</td>
<td>1,012</td>
</tr>
</tbody>
</table>

| As at 31st December, 1944 | 5 | 154 | 356 | 353 | 276 | 1,144 |

Members show an increase of 6, Associate Members 18, Associates 25, and Students 40, making a total increase for the year of 89.

MEMBERS ON ACTIVE SERVICE.

The number of members known to be serving with the Forces at present is 202, and your Council conveys to them the good wishes of the Institute.

A list of these members appears elsewhere in this issue of the Transactions. Your Council has decided to remit the 1945 subscriptions of all members on active service.

PERIODICALS RECEIVED.

American Exporter.
Association of American Railways.

Beama Journal.
British Engineers' Export Journal.
Brown Boveri Review.
Britain To-day.
Electrical Communication.
Electrical Engineering (Science Abstracts).
Electrical Times, The.
Electricity Supply Commission—Southern Rhodesia (Annual Reports).
Electricity Supply Commission—Library Abstracts.
English Electric Review Journal.
Endeavour.
General Electric Journal.

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General Electric Journal.

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Britain To-day.
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Electricity Supply Commission—Southern Rhodesia (Annual Reports).
Electricity Supply Commission—Library Abstracts.
English Electric Review Journal.
Endeavour.
General Electric Journal.

Periodicals Received.

American Exporter.
Association of American Railways.

Beama Journal.
# THE SOUTH AFRICAN INSTITUTE OF ELECTRICAL ENGINEERS

## (INCORPORATED 1909)

### BALANCE SHEET AS AT 31st DECEMBER, 1944.

<table>
<thead>
<tr>
<th>Dr.</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V.F.P. AWARDS FUND</strong></td>
<td>£89 4 9</td>
</tr>
<tr>
<td>Balance at 31st December, 1944</td>
<td>£44 7 3</td>
</tr>
<tr>
<td>Add: Awards Unclaimed</td>
<td>44 17 6</td>
</tr>
<tr>
<td><strong>F. C. STURROCK AWARD</strong></td>
<td>5 0 0</td>
</tr>
<tr>
<td><strong>SOUTH AFRICAN CABLE MAKERS' ASSOCIATION AWARD</strong></td>
<td>5 5 0</td>
</tr>
<tr>
<td><strong>INSTITUTE'S AWARD FUND</strong></td>
<td>10 6 0</td>
</tr>
<tr>
<td><strong>SUBSCRIPTIONS PAID IN ADVANCE</strong></td>
<td>54 4 6</td>
</tr>
<tr>
<td><strong>SUNDAY CREDITORS</strong></td>
<td>714 14 5</td>
</tr>
<tr>
<td><strong>ANNUAL BANQUET RESERVE</strong></td>
<td>87 1 1</td>
</tr>
<tr>
<td><strong>STANDARD WIRING REGULATIONS AND NOTES ON STANDARD WIRING REGULATIONS</strong></td>
<td>129 14 9</td>
</tr>
<tr>
<td><strong>ACCUMULATED FUND</strong></td>
<td>7,639 10 4</td>
</tr>
<tr>
<td>Balance at 31st December, 1943</td>
<td>6,940 7 7</td>
</tr>
<tr>
<td>Add: Excess of Income over Expenditure for the year 1944</td>
<td>699 2 9</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>£8,735 0 10</strong></td>
</tr>
</tbody>
</table>

| **INVESTMENTS** | £7,335 4 5 |
| £1,300 Union Loan 3½ per cent. Local Registered Stock 1948/58 (at cost) | £1,277 15 6 |
| £2,000 Union of South Africa 3 per cent. Local Registered Stock 1958/65 (Second War Bond Issue) | 2,000 0 0 |
| £2,500 Union of South Africa 3 per cent. Local Registered Stock 1958/68 | 2,500 0 0 |
| 1,000 Union Loan Certificates | 804 3 4 |
| United Building Society Current Account | 753 5 7 |
| **TOTAL** | **£8,735 0 10** |

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### ASSOCIATED SCIENTIFIC AND TECHNICAL SOCIETIES OF SOUTH AFRICA.  
*Secretaries.*

Per A. J. ADAMS.

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We have audited the Balance Sheet of the **South African Institute of Electrical Engineers**, dated 31st December, 1944, above set forth and have obtained all the information and explanations we have required. Proper books and records have been kept. 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 us and as shown by the books.

**Johannesburg,**  
5th January, 1945.

---

**G. K. TUCKER & WILSON, Auditors.**  
Incorporated Accountants.
<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secretary's Fees and Rent</td>
<td>£600 0 0</td>
</tr>
<tr>
<td>Stationery and Printing</td>
<td>90 1 5</td>
</tr>
<tr>
<td>Postage</td>
<td>48 10 0</td>
</tr>
<tr>
<td>General Expenses</td>
<td>94 11 11</td>
</tr>
<tr>
<td>Assessments—Associated Societies</td>
<td>603 0 0</td>
</tr>
<tr>
<td>Certificates</td>
<td>33 11 0</td>
</tr>
<tr>
<td>Subscriptions Written Off</td>
<td>1 1 0</td>
</tr>
<tr>
<td>Audit Fee</td>
<td>26 5 0</td>
</tr>
<tr>
<td>Hinding of Transactions</td>
<td>3 10 0</td>
</tr>
<tr>
<td>Balance</td>
<td>699 2 9</td>
</tr>
<tr>
<td>Subscriptions Written Off</td>
<td>1,104 15 4</td>
</tr>
<tr>
<td>Less: Cost of Printing, Commission on 1,044 2 4</td>
<td></td>
</tr>
<tr>
<td>£2,379 13 1</td>
<td></td>
</tr>
</tbody>
</table>

Being Excess of Income over Expenditure carried to Accumulated Fund
Monthly Science News.
Railway Revenues and Expenses.
Russian Publications.
South African Engineering and Electrical Review.
South African Engineering.
South African Railways and Harbours Magazine.
Western Society of Engineers.
Wireless World.

**GENERAL.**

Taking into consideration the present abnormal times, the year 1944 must be regarded as entirely satisfactory.

The finances of the Institute, as the Balance Sheet shows, continue to improve and the membership which has this year increased to 1,144, is the highest figure reached since the inception of the Institute.

The attendance at general meetings, which averaged 154, is testimony of the keen interest taken by members in the Institute's proceedings.

Your Council looks forward to the coming year with every confidence in the Institute's continued progress and usefulness.

On behalf of the Council,

J. C. FRASER, President.
A. J. ADAMS, Secretary.

JOHANNESBURG
5th January, 1945.

The President, following the procedure adopted two years ago, proposed that the Annual Report be taken as read and commented on its main features as follows:

"I am more than pleased to be able to report that in spite of another period of abnormal and difficult times, the past year must be regarded as entirely satisfactory. The finances of the Institute, of which you will be given more details by the Honorary Treasurer, still continue to improve and are in a very sound position.

"We have maintained our usual high standard of papers and discussions.

"Our thanks are due once again to the Victoria Falls and Transvaal Power Company, Limited, for its generous annual donation of £50 and its continued interest in the Institute's progress, also to the South African Cable Makers' Association. The Students Section of the Institute is still in recess, due to the war, and, as a consequence, there have been no awards made from the F. C. Sturrock and Victoria Falls & Transvaal Power Co., Ltd.'s students fund. Our thanks are also due to The Hon. F. C. Sturrock, Minister of Transport, who, you will remember, at the last Annual General Meeting offered the Institute a South African Railways and Harbours annual award of twenty-five guineas, this being for the paper of greatest value and interest to the Railway Administration. Full details of the conditions attaching to this award will be published later.

"We were fortunate to have two joint meetings this year, the usual joint meeting with the Witwatersrand University, the attendance at which was probably a record, there being 325 members and visitors present. Your Council took the opportunity whilst the Association of Municipal Electricity Undertakings of South Africa and Rhodesia had its Convention in Johannesburg to hold a joint meeting with this Association. The meeting was well attended and it afforded an opportunity for members to fraternise once again.

"By the courtesy of the Johannesburg City Council and the General Manager of the Electricity Department, members of the Institute and their friends paid a visit to the Orlando Power Station during the year. This is the first visit by the Institute for some considerable time, and the fact that 350 took part in it should give the incoming Council some food for thought as to the feasibility of arranging further visits.

"The Controlling Executive of the Associated Societies provided members with lectures during the year, which were greatly appreciated, and dealt with matters of importance to engineers.

"The various sub-committees of the Institute have continued to function during the year and I would like to single out for special mention, if I may, the Constitution and Rules Sub-Committee under the chairmanship of our Vice-President, Mr. Dalton. This committee has put in a considerable amount of time revising the Constitution, and it is hoped that their efforts will reach finality in the early part of the new year.
The other committee I wish to refer to is the Papers and Editorial Sub-Committee under the chairmanship of our Honorary Editor, Mr. Lineker. Mr. Lineker and his committee have given a great deal of time to the publication of papers and the general make-up of the Transactions.

"Your Council has decided to submit a memorandum to the Public Services Enquiry Commission and is prepared, if necessary, to give evidence before that Commission.

"The committee which was constituted last year to prepare a code for overhead line regulations, has made progress and it is expected that it will include representatives of the Government Mining Engineer, the Chief Inspector of Factories and other interested bodies and organisations when it commences its sittings during the year.

"Our membership is still on the up grade, there being an increase of 6 members, 18 associate members, 25 students, making a net total increase of 89 for the year. Our total membership now stands at 1,144. As far as is known, there are 292 of our members serving with the Forces, and I take this opportunity of wishing them God-speed and expressing the sincere hope that they will be with us at our next Annual General Meeting.

"The interest members show in the Institute's work is revealed in the attendance at General Meetings, which has averaged 154 this year.

Members can look forward with confidence to the continued progress of the Institute, and I have very much pleasure in formally moving the adoption of the Annual Report and Balance Sheet for the year 1944 and ask the Honorary Treasurer, Mr. Joseph White, to second this."

Joseph White (Honorary Treasurer), in seconding the President's motion, said: "There is very little comment that I have to make regarding the finances of the Institute, because the figures speak for themselves. There are one or two points, however, that may be of interest.

"The increase in membership is reflected in the increase in the amount derived from subscriptions.

"In spite of the very considerable increase in the cost of printing, which has more than doubled since pre-war days, we still show a small profit of some £60 on the Transactions.

"We are again indebted to the Associated Societies for their annual donation, which this year amounted to £212, £158 of which is for the purpose of assisting our Students' Section. The assessment of all members on active service has again been remitted by the Associated Societies.

"When we consider that we also have remitted the subscriptions of all our members in the Forces and that all ordinary costs have risen, the excess of revenue over expenditure to an amount of £700 indicates a very healthy condition of affairs.

"I would like to render my personal thanks to Mr. Adams and his staff for the assistance they have given to me during my year of office as your Honorary Treasurer.

"I now have pleasure in seconding the adoption of the Annual Report, Balance Sheet and Income and Expenditure Account for 1944."

The President then put the motion to the meeting and it was carried unanimously.

DECLARATION OF ELECTION OF VICE-PRESIDENT AND MEMBERS OF COUNCIL.

The President announced the result of the ballot for Vice-President and Members of Council for 1945 as below. The total poll was 252 (Town members, 153 and Country Members 99). The total Electorate was 515, the votes polled being 49 per cent. There were two spoiled papers.

Vice-President : H. T. ASPINALL (unopposed).

Members of Council: (Members)—J. A. F. MICHELL, W. FENWICK, J. RUSSELL, J. RUSSELL STEPHENS.

(Associate Members): A. R. MULLINS, H. P. ALEXANDER, W. HILARIUS.

Vote of Thanks to Scrutineers.

J. RUSSELL, in proposing a vote of thanks to the scrutineers for the annual ballot, said: "I think members will have appreciated, from the size of the ballot lists which we recently received, the magni-
tude of the task which the scrutineers are called upon to undertake. The scrutineers for this year were L. H. L. BADHAM, A. T. RODWELL, K. B. FINDLAY, JOSPEH WHITE, E. VIVIAN FERROW and LIEUT.-COLONEL J. STEWART ROSS, and I have much pleasure in proposing a vote of thanks to these gentlemen for the good service which they have rendered.” H. P. ALEXANDER seconded and the vote of thanks was accorded with acclamation.

AUDITORS.

It was agreed, on the motion of J. T. ALLAN, seconded by J. P. ANDERSON, that Messrs. G. K. Tucker and Wilson be re-elected as the Institute’s Auditors for 1945.

HONORARY LEGAL ADVISERS.

J. RUSSELL STEPHENS proposed the re-election of Messrs. Stegmann & Able as the Institute’s Honorary Legal Advisers for 1944, A. W. LINEKER seconded, and the proposal was carried unanimously.

PRESENTATION OF AWARD CERTIFICATES.

The President called upon Mr. W. H. A. LAWRENCE (President of the Transvaal Chamber of Mines) to present the Award Certificates as set out in the Annual Report, and to address the meeting after the presentation of the Awards.

Mr. W. H. A. Lawrence (Visitor): Ladies and Gentlemen, I wish to thank you, Mr. President, and the Council of the Institute for your very kind invitation to me to come here to-night to present the Award Certificates.

As you are probably aware, my knowledge of technical matters in general and of electricity in particular is so slight as to be hardly noticeable, and I must confess that I joined you this evening with the same feeling, very much akin to awe, that I experienced when I took part in this annual presentation three years ago. My appreciation of the value of the work done by your Institute is, however, none the smaller and, indeed, is perhaps all the wider for my lack of technical capacity.

Listening to your Report this evening, Mr. President, I was greatly impressed by the fact that the high standard set in previous years has obviously been maintained during the past year, despite the serious difficulties of the times in which we are living.

The variety of the subject matters dealt with in the Papers and under the Awards makes it plain that your Institute continues to encourage its members to follow up new developments and to undertake research work of all kinds. Such enterprise is essential at all times if progress is to continue, but particularly under to-day’s conditions, when importations from overseas of electrical equipment are always difficult and sometimes impossible, research work of this nature is of the highest value to the electrical engineering industry, and to the mining industry, which I am representing here to-night.

I would like to congratulate you, Mr. President, on the excellent work done during the past year and I would also like to congratulate very warmly all those who have received Award Certificates to-night. May I add that the privilege of presenting those certificates has given me very great pleasure.

The President: Ladies and Gentlemen:

On your behalf, I thank Mr. Lawrence very sincerely for finding the time to come along to our meeting to-night, and ask you to show your appreciation in the usual way.

(Applause.)


The President: My last duty as President is a very pleasant one. I have now to ask your President Elect to occupy the Presidential chair. Mr. Badham needs no introduction to the majority of you, but to those who may not be quite so familiar with him as the Council members, may I just say that Mr. Badham is one of those gentlemen who, during the last war, gave up everything he had and went to fight for his country. On his return he was associated with the British Thomson Houston Company for a number of years, went to India, then came to South Africa on a three years’ contract. South Africa has pleased him so well that he has not gone back. He came out here in 1932, in which year he became a member of this Institute.
Mr. Badham is one of the most active electrical engineers on the Reef, looking after the interests of electrical engineers in many ways. How he manages it is difficult to say. For instance, he is Vice-President of the South African Federation of Engineering and Metallurgical Associations, Chairman of the Electrical Engineering and Allied Industries Association, and President of the South African Association of Production Engineers. That, ladies and gentlemen, is an indication of the energy which Mr. Badham possesses.

I am sure that we are very fortunate indeed in being able to secure Mr. Badham as our incoming President, and I would like to take this opportunity of not only congratulating him, but of congratulating members of the Institute on their choice. I will now ask Mr. Badham to occupy the Chair.

L. H. L. Badham (President): Mr. Fraser, Ladies and Gentlemen,—As I shall have the opportunity during my inaugural address of expressing my formal thanks, at this stage I propose to limit my remarks to, “thank you.”

It is now my duty and pleasure to request the Vice-Presidents to take their appointed places on the rostrum—Mr. Dalton on my immediate right, with Mr. Milton adjacent to him, whilst our newly-elected Vice-President, Mr. Aspinall, will please be seated on my left.

Mr. Dalton and Mr. Milton have previously been introduced to you, and it is a very great pleasure to welcome our new Vice-President, Mr. Aspinall, to his office.

Mr. Aspinall has been a very active member of Council, he has presented papers before the Institute and his scholastic appointment is such that he has had considerable bearing on the teaching of many of the younger members of the Institute.

My heartiest congratulations are offered to our Vice-Presidents and I anticipate the pleasure of their co-operation in the affairs of the Institute during the coming year.

Mr. Aspinall (Vice-President): Mr. President and Gentlemen.—I wish to express my appreciation of the confidence which you have shown in me in my election as Vice-President. As a member of the staff of the Technical College, I do feel that this election is in all probability a gesture of recognition of the part played by technical colleges and allied institutions in the training of electrical engineers in South Africa.

In conclusion, I would like to thank you all, and you, Mr. President, for your very kind remarks.

VOTE OF THANKS TO RETIRING PRESIDENT.

The President: Mr. Fraser, in recognition of your services as President and as a permanent record, it is with very great pleasure that I present you, on behalf of the members of the Institute, with this certificate, issued under the Seal of the Institute.

I have now much pleasure in asking Mr. E. Vivian Perrow to propose a vote of thanks to our Retiring President.

E. Vivian Perrow (Past President): Mr. President, Ladies and Gentlemen,—It gives me very much pleasure to propose that the thanks of the members of the Institute be accorded Mr. J. C. Fraser for the assiduous manner in which he carried out his duties as President of this Institute.

Mr. Fraser has not spared himself in ensuring that the work of the Institute has been carried on with that dignity and efficiency that has characterised previous presidents and which the report of the work accomplished during his year of office reveals.

As an old friend and colleague of Mr. Fraser, it gives me an added pleasure in having been asked to make this proposal, and I trust that as he is still quite a young man, as engineers go, the Institute will have the benefit of his assistance in its work for many years to come.

Mr. Fraser, as the Senior Vice-President here this evening, I have pleasure in welcoming you to the honourable order of Past President and moving that the thanks of the Institute be extended to you for your services as President.

The President: May I call on Mr. Michell to second the vote of thanks?

J. A. F. Michell: Mr. President, Mr. Fraser, Gentlemen.—I greatly appreciate the privilege of seconding the vote of thanks proposed by Mr. E. Vivian Perrow to our Retiring President. During the past year
Mr. Fraser has given unstintingly of his energies to further the interests of our Institute.

It is most fitting that his year of office should close with his assumption of duty as the head of the largest municipal electrical undertaking in South Africa.

In his Presidential Address last year, he spoke of the profession's being faced with expansion in the immediate future which would need all our foresight and vision if we were to succeed in the full development of the use of electricity for the service of our fellow men. In his own sphere he has displayed that vision and foresight and our Institute has had the benefit of it, too, in his guidance during the past year.

In seconding the vote of thanks, therefore, may I express the wish that Mr. Fraser will still be able to give our Institute the help and guidance he has given in the past and record our special thanks for his services.

The vote of thanks to the Retiring President was accorded by acclamation.

J. C. Fraser (Retiring President): Mr. President, Mr. Perrow, Mr. Michell, Ladies and Gentlemen,—I thank you most sincerely for the vote of thanks you have accorded me and for the flattering remarks which both Mr. Perrow and Mr. Michell have made about me.

As I conclude my year of office I would like to record my grateful thanks for the support and help I have received from the Past President, Vice-Presidents, members of Council and members, to the authors of papers and to all those who contributed in any way to make the year a success, and for the kind and ready assistance I have always received from Mr. Adams and his staff.

The Certificate you have presented to me this evening will always remind me of the kindness I received from my colleagues during the period I had the honour of being your President.

During the year the Institute has interested itself in many matters of national importance from an engineering point of view, and you can rest assured that your Council is always keeping a watchful eye on the problems that are with us now and those that lie ahead. It is probable that during the year 1945 much progress will be made in the development of measures arising from the Apprentice Act, the proposed National Standards Bureau, the Rehabilitation of Returned Soldiers and other economic, social and industrial post-war plans. Under the capable direction of our newly-installed President, Mr. Badham, I have every confidence in the Institute taking its share of responsibility in these matters.

Once again, Ladies and Gentlemen, I have to thank you, and I am sure you will join me in the hope that long before Mr. Badham vacates the Chair which he now occupies, we will have victory and peace amongst the European nations.

**GENERAL BUSINESS.**

**Welcome to Visitors.**

The President: Ladies and Gentlemen, I will take this opportunity of extending a very hearty welcome to our visitors. Among distinguished visitors here this evening we have Mr. W. H. A. Lawrence, President of the Transvaal Chamber of Mines; Mr. John V. Muller, Vice-President of the Associated Scientific and Technical Societies of South Africa; Mr. J. J. P. Dolan, President of the South African institution of Engineers; Mr. P. J. Louis Bok, President of the Chemical, Metallurgical and Mining Society of South Africa; Mr. R. G. Thomas, President of the Institution of Certified Engineers, South Africa; and Dr. H. J. van Eck, Immediate Past President of the Associated Scientific and Technical Societies of South Africa. We are indeed very greatly honoured and very pleased to have with us Presidents and members of our Associated Societies, as by such visiting we get that dissemination of ideas and that interchange of thought which are so essential in order that we may have the other man's point of view.

I will ask Mr. Muller if he will address the meeting.

John V. Muller (Vice-President, The Associated Scientific and Technical Societies of South Africa): Mr. President, Ladies and Gentlemen,—Owing to the unavoidable absence from Johannesburg of the President, Dr. J. H. Dobson, and the Senior Vice-President, Dr. Bernard Price, the honour devolves upon me of representing the Assoc...
ated Scientific and Technical Societies of South Africa at this the 35th Annual General Meeting of the South African Institute of Electrical Engineers. I am sure, Mr. President, that we all deplore the absence of the two gentlemen I have named. Since they are esteemed Past Presidents of your Institute, I feel it a very great privilege indeed to be upstanding here to represent the Associated Societies.

If I may trespass on the valuable time devoted to your Presidential Address, I would like to make one or two remarks. I would, first of all, congratulate the Institute on a very successful year of office, as has been indicated by your Immediate Past President, Mr. Fraser, in outlining the Annual Report and Balance Sheet.

In these difficult days it is very pleasing to feel that the barometer of membership is on the upgrade, and also that Revenue exceeds Expenditure, notwithstanding, as has been detailed, the sky-rocketing of the cost of printing, among other items. I would also refer to the excellence of the papers which have been delivered at this Institute's Proceedings, which all go to show what a live body your Institute is. May I refer in passing to something which is very dear to my heart, and that is the grants for Students. While those grants have not been made full use of this year owing to unusual circumstances, nevertheless, they are available, and will pave the way for selected students to acquire the technical knowledge to enable them to serve their country, a country of great distances, in which electric power plays such a predominant part.

I would also refer to the grant which has been made by the Honourable F. C. Sturrock, Minister of Transport, in connection with the best paper dealing with an electrical subject, having some bearing on railway work. We all know that the Railways are much criticised today, and it is good to know that such a grant has been made since it indicates the spirit and intention of the South African Railways in that they are open to receive suggestions of technical value in the furtherance of their great undertaking.

Coming to the Past President, Mr. J. C. Fraser, on behalf of the Associated Societies I would say that Mr. Fraser has had a very successful year of office. He has been eulogised by his colleagues, and, I think, rightly so, since my association with him in the dealings of the Associated Societies has indicated to me that he is a man of great principle and that the advancement of an Institute such as yours has undoubtedly been uppermost in his mind during his year of office. May I take this opportunity, on behalf of the Societies, of congratulating Mr. Fraser upon his appointment as General Manager of the Johannesburg Municipal Electricity Department. (Applause.)

To you, Mr. President, I offer my felicitations on your having been elevated to the Chair of your Institute. You follow, as you have no doubt gathered this evening, a line of distinguished Presidents, and you have your work cut out to emulate and uphold the traditions of your new office and the dignity with which those gentlemen conducted your proceedings. I would like to say to the general assembly here that, knowing Mr. Badham as I do, I feel sure that he will come up in every way to expectation. (Applause.) In his industrial activities he has served with great distinction the mining industry which I had the honour of being associated with over a long period, and his advice has at all times, whether the problem has been great or small, been of sterling value. I feel certain that he brings to bear on the Chair which he now occupies the knowledge gained by sound experience and that the Institute will benefit during his year of office.

Finally, I would thank you, Mr. President, and your Council for the hospitality which you have done me this evening and for the privilege which you have extended to me to address you on behalf of the Associated Societies, and again I would express the wish that you will have a very successful year of office. (Applause.)


The President announced that a letter has been received from the Institution of Electrical Engineers, London, to the effect that members of the South African Institute of Electrical Engineers may now subscribe, though this Institute, to the publications of the Institution of Electrical Engineers at specially reduced rates. This
offer is extended to members of sister institutions overseas with whom reciprocal arrangements for an interchange of visiting members exist, and is calculated to knit more closely together institutions which have in common the advancement of electrical engineering science for the welfare of mankind.

**PRESIDENTIAL ADDRESS.**

*By L. H. L. BADHAM.*

The honour that has been conferred upon me is very much appreciated and I take this opportunity to express my thanks. It will be my sincere endeavour to maintain the exacting standards set by my predecessors, and with your co-operation I will do my best to continue the traditions of this high position.

The critical times in which we are now participating require each and everyone of us to consider how best we can serve the country in the transition period from war to peace such that our ultimate domestic economy will be conducive to peaceful and settled development.

Undoubtedly the prime factor is employment and we will be faced with the problem of demobilised service personnel and redundant war workers. Modern mechanised warfare has necessitated that a relatively large proportion of the service personnel will have received specialised training in mechanical and other technical operations and many have expressed their wish to apply this training to civilian life.

The development of secondary industries in this country prior to the war was such that the employment potential on that basis, would be totally inadequate to absorb all the prospective new entrants to industry from the services, apart from the increased labour force which has been built up during the war period to meet the demands of munition production and essential supplies.

The position in South Africa with respect to accelerated production for war purposes differs from that of the older industrialised countries, inasmuch that whereas those countries obtained increased production largely by the transfer of labour from less essential industries, in this country new labour had to be recruited.

A comparatively large proportion of this labour had not been previously gainfully employed and was from the low income groups in the country districts. It is not unreasonable to assume therefore that this new class of factory operative will look to industry to enable it to maintain its improved standard of living.

The standard of living is dependent upon the income and the "real value of money," i.e., the goods and services obtainable for a given monetary unit. Any change in the standard arises from the differential of these two factors.

What, therefore, determines this differential? It is the "added value" arising from the production of the community after payment of all expenses incurred.

Production is dependent upon the skill and effort of the worker, the tools available to the worker and the managerial organisation of the methods and material supplies.

The statistics relating to the manufacturing industries of the Union of South Africa are published in the Official Year Book and that issued in 1941 (No. 22) gives a table of international comparison of factory returns.

From this publication, the figures in Table I have been prepared for the year 1938/9.

The most striking factor from the table is the low net annual output per employee compared to that of the other Dominions.
The average wage for Europeans in this country exceeds that of the others, whilst the average wage for all races is much lower.

It is evident, therefore, that South African industry requires to take stock of itself to determine the necessary measures to improve its overall efficiency.

One factor appears to be that of mechanisation, which emerges from the low value of the plant and equipment per employee. This value is about 75 per cent. of that in Australia, and this figure is supported by reference to the magnitude of the comparable ratio of the horsepower of electric motors per employee.

TABLE I.

<table>
<thead>
<tr>
<th></th>
<th>Union of South Africa</th>
<th>New Zealand</th>
<th>Australia</th>
<th>Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Employees</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Races: Male</td>
<td>312,385</td>
<td>362,957</td>
<td>76,868</td>
<td>412,591</td>
</tr>
<tr>
<td>Female</td>
<td>40,129</td>
<td>50,535</td>
<td>25,067</td>
<td>152,515</td>
</tr>
<tr>
<td>European: Male</td>
<td>116,193</td>
<td>115,782</td>
<td>—</td>
<td>152,515</td>
</tr>
<tr>
<td>Female</td>
<td>28,045</td>
<td>33,331</td>
<td>—</td>
<td>137,574</td>
</tr>
<tr>
<td><strong>Average Annual Wage per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Races</td>
<td>£213</td>
<td>£152</td>
<td>£217</td>
<td>£196</td>
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<td>European</td>
<td>£249</td>
<td>£296</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Non-European</td>
<td>£55</td>
<td>£71</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Net Annual Output per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td>£457</td>
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<tr>
<td></td>
<td>£361</td>
<td>£310</td>
<td>£366</td>
<td>£360</td>
</tr>
<tr>
<td><strong>H.P. of Electric Motors Installed, per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td>6-17</td>
</tr>
<tr>
<td></td>
<td>1-47</td>
<td>—</td>
<td>1-92</td>
<td>2-13</td>
</tr>
<tr>
<td><strong>Net Total H.P. All Types, per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1-6</td>
<td>1-76</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td><strong>Annual Cost of Fuel, Light and Power, per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td>£32-5</td>
</tr>
<tr>
<td></td>
<td>£17-2</td>
<td>£19-4</td>
<td>£15-4</td>
<td>£27-8</td>
</tr>
<tr>
<td><strong>Value of Plant and Equipment, per Employee</strong></td>
<td></td>
<td></td>
<td></td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>£187</td>
<td>£193</td>
<td>£482</td>
<td>£253</td>
</tr>
</tbody>
</table>

Considering the metallurgical and engineering industries as represented by Group IV of the tables of the South African Industrial Census, the average net total horsepower, of all types, per employee was 2-1 HP in 1938/9. In the United States of America, however, during the same period, the figures in Table II applied.

One factor is the make up of the labour force. In this country the non-European, at a very low rate of wage, is frequently very inefficiently employed on the assumption of cheap labour. This is augmented by a growing attitude that certain types of work are necessarily below the dignity of a European. The net result is that the total number of employees increases above that which would obtain overseas.

TABLE II.

<table>
<thead>
<tr>
<th></th>
<th>H. P. per Employee</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture of Iron and Steel Products (excluding Automobiles)</td>
<td>13-06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacture of Non-Ferrous Products</td>
<td>8-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacture of Electrical Machinery</td>
<td>3-97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacture of Machinery (excluding Electrical)</td>
<td>4-99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The housing, feeding and transport of the urbanised non-European worker are factors that must receive serious attention, as having a direct bearing on the efficiency of industry. The planning of industrial areas must therefore be correlated with accessible living facilities having suitable amenities for non-Europeans. This factor has usually been ignored for industry in general, although where large establishments have started, de novo, outside municipal boundaries, suitable provision has been made.
The prime feature is that the net average annual output per employee has increased by 18½ per cent, for all industries.

From the same source of information, the increase in the net average annual output per employee in Group IV, for private factories is 23½ per cent.

The engineering industry of South Africa, using the term in its widest sense, has shown during this war what has been possible with a comparatively small nucleus of skilled personnel, whereby the production of guns, shells, grenades, armoured cars, structural steelwork, electrical equipment and general engineering stores, etc., has reached considerable proportions. However, with respect to international developments, South Africa has not been able to keep fully abreast of the latest techniques.

It appears, therefore, that it will be necessary for highly trained personnel to be brought into this country and for this country to send personnel overseas to obtain experience in modern practice.

The recent industrial agreements for the engineering industries make provision for the employment of operative labour which will be necessary for the development of the manufacturing sides of these industries. The introduction of such labour will not, however, reduce the demand for the skilled artisan, but will, pari passu, increase the number.

The skilled artisan must maintain a high status, and it will be necessary therefore that the selection and training of our future artisans shall be of the best.

The haphazard system in vogue at present must go and the problem approached at an earlier stage, namely, in the primary schools.

It is unfortunate that, in this respect, it is a common fault for schools to adopt the system of training on the basis of rote, rather than on the development of imagination and thought. It is pleasing, however, to note that the type of question now appearing in the examinations for the Government Certificate of Competency is changing in this regard.

All schools should include a course of lectures describing the various careers that are open to the future citizen and vocational
the procedure for entering the various trades, etc.

Scientific testing of intelligence and mental rating together with aptitude testing should be carried out by skilled observers and the results supplied to the vocational guidance officials to be used as one of the criteria in indicating the probable type of career for which the subject is suitable.

After selection, prospective apprentices should receive training in the use of basic tools and an introduction to the technical aspect of their selected trade, before being placed into the whirl of industry itself.

In the engineering industry, the size of the various firms is such that in the majority of cases it would not be feasible for the individual employers to provide means of pre-trained selected applicants, before placing them in the actual factories.

This, however, could be overcome by co-ordinating the technical colleges and the organisations set up as a wartime measure for the basic training of military personnel, such as the Central Organisation of Technical Training, together with certain of the Government factories, for example, the Central Ordnance Factory. By this means ample experience and adequate plant would be available at relatively short notice.

The period of pre-training should be included in the term of total apprenticeship, and in my opinion, should be about nine months.

When the apprentice enters industry his technical education should be continued by attendance at technical college, preferably during the daytime, for which purpose one day a week should be granted, whilst optional evening classes should be available for those who wish to expand their knowledge.

Annual progress reports relating both to the practical and theoretical capabilities of the apprentices should be examined by competent authorities, and all those who do not attain a predetermined standard should terminate their training and be diverted to other channels of employment. Where outstanding ability is shown, means should be provided by which the apprentice shall receive additional educational and training facilities, through the Universities, to suit him for the higher executive positions.

The limitation of the size and the activities of individual firms also restrict the scope of practical training that apprentices receive. This could be overcome by organised schedules of training which would enable any particular apprentice to receive training at stated intervals at various sources of employment.

The Apprenticeship Act of 1944 empowers the formation of a National Apprenticeship Board to advise on the training of apprentices, but in my opinion, the control of apprentices should be vested in National Committees, with Regional Sub-Committees on a trade basis, and not on an industrial basis, as defined by the Department of Labour.

For instance, there should be a National Electrical Apprenticeship Committee, which should control and determine the conditions of training of all electrical apprentices, irrespective of which industry they are employed in during their period of apprenticeship.

Such a committee should comprise representatives of the principal types of employment potential such as power supply, electrical contracting, mining, transport, industry, etc., together with the trade unions concerned, educational authorities and this Institute.

The Regional Sub-Committee would comprise members of the employers and the employees in the particular district concerned. They would be responsible for the granting of all electrical apprentices in that area, and satisfy themselves that the training is in conformity with the requirements of the National Committee and arrange for the necessary interchange of apprentices.

The contract documents of apprentices should be endorsed giving particulars of the schedule of training received, as the present omnibus term "electrician" is far too wide to indicate the actual experience that has been obtained.

The present system of financing the technical colleges, whereby they receive a Government subsidy on a £ for £ basis on fees received, is fundamentally wrong and should be eliminated. Such a scheme is conducive to consideration of the quantity
“What is an executive?” may best be illustrated by the following extract from an address by Mr. G. Cheliotti:

“Executives are a fortunate lot, for, as everyone knows, an executive has nothing to do; that is except:

1. To decide what is to be done; to tell somebody to do it; to listen to reasons why it should not be done; why it should be done by somebody else, or why it should be done in a different way; and to prepare arguments in rebuttal that shall be convincing and conclusive.

2. To follow up to see if the thing has been done; to discover that it has not been done; to enquire why it has not been done; to listen to excuses from the person who did not do it; and to think up arguments to overcome the excuses.

3. To follow up a second time to see if the thing has been done; to discover that it has been done incorrectly, to point out how it shall be done; to conclude that as long as it has been done, it might as well be left as it is; to wonder if it were not the time to get rid of the person who cannot do a thing correctly; to reflect that in all probability any successor would be just as bad or worse.

4. To consider how much more simply and better the thing would have been done had he done it himself in the first place; to reflect satisfactorily that if he had done it himself, he would have been able to do it right in twenty minutes and that as things turned out, he, himself, spent two days trying to find out why it is that it had taken somebody else three weeks to do it wrong and to realise such an idea would have a very demoralising effect on the organisation, because it would strike at the very fountain of the belief of all employees that an executive has nothing to do.”

The published specification of a manager, drawn up by Mr. A. P. Young, of Messrs. The British Thomson Houston Co., Ltd., lists the following requisites:

(A) Power of Leadership—ability to foster teamwork:
1.—Reliability.
2.—Knowledge of the personal characteristics of his associates.
3.—Willingness to receive suggestions.
4.—Ability to criticise without antagonising.
will not be at a disadvantage when applying for that status.

The rehabilitation of the disabled soldier calls for concerted effort by all employers, and it may be taken as an axiom that the average disabled person wishes to be treated as a normal person who is prepared to co-operate in adding his quota to the productivity of the country. Investigation in nearly every organisation will show that there are innumerable jobs which can be co-ordinated into at least one full-time job for such a person.

The Ministry of Labour in Great Britain has organised an exhibition showing the range of work now being undertaken and these applications are worthy of study as a means of assisting in the solution of our own problems. In the engineering industry welding and the use of drilling, shaping and milling machines together with capstans and presses, are among the classes of work adapted, whilst checking and inspection offer a wide scope.

The Directorate of Demobilisation have prepared a scheme for the reorientation of the ex-Serviceman for industry, but the success of the whole proposal depends upon the availability of employment.

International conditions are such that overseas countries will want to increase their exports whilst this country must continue the export of gold. How, then, can industry develop and the economics of international trade be maintained?

The average per capita income for the Union of South Africa is very low and consequently the purchasing capacity is low. By increasing production, the real worth of the community will increase and the purchasing capacity will rise. The range of products that can be economically manufactured in this country is, of necessity, limited, so that an increased demand will arise for imported commodities, although their character will change.

Whilst my remarks have been confined to industry, the position of agriculture is of prime importance in the welfare of the country, and it may be of interest to consider the part that the electrical engineer can play in that respect.

In 1937 there were approximately 105,000 individual farms with a total number of
Henri Estienne coined an epigram: "Si jeuness savoit ; si vieillesse pouvoit"—"If youth knew; if age could." In your Institution you have the grand opportunity of making good some of the deficiencies of the ages by mutual contact and inspiration and in your paper you have taken the lead in so far as youth is concerned. I wish to congratulate you in setting this lead and in giving such sound constructive and succinct advice on vocational and technical training.

In the Second Report of the Social and Economic Planning Council, dealing with social security, the importance of improved educational facilities and of vocational training was stressed in the attainment of our objective of a higher standard of living for everybody. After comparing the number of children receiving vocational training in South Africa with the total number of school-going age, the Council came to the conclusion that in the field of educational training, as in that of general education, the Union has enormous leeway to make up.

This matter is so important that I should like to quote from the report: "While some hold that apprenticeship training is also a preparation for life and that its period should not be reduced, the consensus is that the usual five years' apprenticeship is too long. It is believed that the training can be given for a shorter period and yet be more efficient by applying one or more of the following methods:—

(a) By insisting upon a higher educational standard so that apprenticeship training need not in part have to supply the general education which it is the function of the ordinary schools to provide;

(b) by making a year's pre-apprenticeship training at all technical colleges or trade schools compulsory for all prospective apprentices, in order to get a better selection of apprentices for the various trades and to acquaint the youths with the basic processes with which they will be concerned; those who fail can become semi-skilled operatives;

(c) by limiting apprenticeship to workshops with adequate facilities;

(d) by ensuring, through inspection, that proper workshop experience is gained by the apprentices in accordance with a definite programme; and
The figures in Table IX show that the decline has been most pronounced in the leather, furniture, building, carriage and railway coachbuilding industries. The fact that definite long-term trends can be discerned shows the danger of definite apprenticeship ratios leading to irregular adaptation of the composition of the labour force to the altering requirements of industry.

124. Other Vocational Training.—While the training of skilled artisans is important, the Council considers that in the Union too much attention has been given to this aspect of training compared with the training of the labour force generally. Not only is apprenticeship declining in the old craft industries; it is quite unsuited to most new industries. To show the differences in labour usage, industry may be divided into three broad groups:

TABLE IX.
REGISTERED CURRENT APPRENTICESHIP CONTRACTS IN VARIOUS TRADES EXPRESSED AS PERCENTAGES OF (a) EUROPEAN MALE WAGE-EARNERS AND (b) TOTAL EMPLOYEES IN THOSE TRADES.

<table>
<thead>
<tr>
<th>Year</th>
<th>Leather</th>
<th>Carriage and Railway Coach-Building</th>
<th>Baking</th>
<th>Engineering (including Motor Engineering)</th>
<th>Furniture</th>
<th>Printing</th>
<th>Building</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
<td>(a)</td>
<td>(b)</td>
<td>(a)</td>
<td>(b)</td>
<td>(a)</td>
</tr>
<tr>
<td>1927</td>
<td>9</td>
<td>2.6</td>
<td>3.7</td>
<td>1.6</td>
<td>3.2</td>
<td>0.9</td>
<td>26</td>
</tr>
<tr>
<td>1928</td>
<td>7.5</td>
<td>2</td>
<td>3.8</td>
<td>1.7</td>
<td>4.5</td>
<td>1.3</td>
<td>30</td>
</tr>
<tr>
<td>1929</td>
<td>6.1</td>
<td>1.6</td>
<td>3.6</td>
<td>1.7</td>
<td>4.9</td>
<td>1.5</td>
<td>33</td>
</tr>
<tr>
<td>1930</td>
<td>5</td>
<td>1.6</td>
<td>3.1</td>
<td>1.5</td>
<td>7.7</td>
<td>2.3</td>
<td>32</td>
</tr>
<tr>
<td>1933</td>
<td>2.2</td>
<td>0.6</td>
<td>2.8</td>
<td>1.2</td>
<td>7.9</td>
<td>2.7</td>
<td>29</td>
</tr>
<tr>
<td>1935</td>
<td>2.2</td>
<td>0.7</td>
<td>2</td>
<td>1</td>
<td>6.2</td>
<td>2.1</td>
<td>25</td>
</tr>
<tr>
<td>1936</td>
<td>2.2</td>
<td>0.7</td>
<td>2</td>
<td>0.9</td>
<td>6.0</td>
<td>2.0</td>
<td>24</td>
</tr>
<tr>
<td>1937</td>
<td>1.5</td>
<td>0.4</td>
<td>1.8</td>
<td>0.8</td>
<td>5.8</td>
<td>1.9</td>
<td>25</td>
</tr>
<tr>
<td>1938</td>
<td>1.3</td>
<td>0.4</td>
<td>1.8</td>
<td>0.8</td>
<td>5.1</td>
<td>1.6</td>
<td>27</td>
</tr>
<tr>
<td>1939</td>
<td>0.9</td>
<td>0.2</td>
<td>2</td>
<td>0.9</td>
<td>3.9</td>
<td>1.2</td>
<td>32</td>
</tr>
</tbody>
</table>

are acquired. The average mind makes generalisations from its training experience that are applicable to a wide variety of life experiences. In any case, whenever training for a specific vocational purpose is provided, it should be given to the individual just as near as is possible to the time at which he enters an occupation.”

126. It is apparent, therefore, that general vocational education should be linked up with the ordinary school system. This association is indispensable if the Council's proposals for extended general education are to produce their best effects since the secondary education of academically- and technically-minded children must be differentiated so that every pupil will have the opportunity of pursuing his particular bent. The Union's Secretary for Education has emphasised in his Annual Reports that the traditional classical curriculum of the secondary school, which was possibly appropriate for a day and age when only a small percentage of the population was expected to attain this educational level, is entirely unsuitable as the sole type of formal schooling in a society in which the majority of young people attend the secondary school. General vocational training must thus come in in order to provide an intelligent understanding, rather than manipulative skill for which special industry arrangements can continue, in the place of some of the academic content which has no functional value.

127. Need for Further Enquiry. In the circumstances, the Council is of opinion that the closer integration of general vocational instruction into the curriculum of the ordinary schools must receive early consideration. At the same time the trade training given under the apprenticeship and learnership systems, and possible new development in these fields, must be reviewed. The Council cannot with its own facilities take the matter further than its present studies have led it. It has not the technical staff to formulate a specific scheme and secondment from other departments to the Council can occur only with the approval of the Government. Likewise, the co-option of experts to serve on investigating committees under the Council is dependent upon such approval. In order to obtain results within a reasonable period, the creation of such a committee under the Council's aegis is requested. Its members should include the

(a) Machine-building industries (cars, agricultural implements, machines, aeroplanes) in which large-scale production prevails, since standardised construction prevents hand-manufacture. Here a large number of highly-trained engineers and artisans are required, but most of the workmen acquire the necessary skill by day-to-day association with the work.

(b) Machine-using industries (textile, clothing, footwear, wood-working, food, tobacco, etc.), which are semi-automatic and in which specialisation is practised so that great skill is not a requisite. The workers need only a short period of training during which they learn a single operation or a limited range of operations.

(c) Machine-repairing and other industries (engineering and allied industries, ship-building and repairing, building, printing, scientific instrument-working, etc.), where a large proportion of the workers must possess all-round manual skill.

125. Industrial development, on mass production lines, has been such that smaller proportions of the industrial labour force require great skill in manual operations. On this account, Mr. Harriman declared at 24th Session of the I.L.O., that “increasingly large numbers of workers in the United States can receive all the specific training they need in one week on the job; or at most in one month. For that reason, more and more of our workers either get in the schools the general education which they need as preparation for complete living, or they do not get it at all. They cannot get it on the job. The trend should be towards longer periods of general education.” This view has been elaborated as follows by the United States President's Advisory Committee on Education: “Less specialised training for specific occupations and more generalised training in broader vocational skills should characterise vocational curriculums. The demands of modern industrial and commercial life are so varied and are changing with such rapidity, that there should be greater flexibility in courses and curriculums that prepared for service in commerce and industry. The schools should carry the training of the prospective worker up to the point where certain generalised skills and information, of value in a variety of actual working conditions,
possible avenues of future employment. If
the boys happen to be bright in school work,
they may proceed to the university, but still
with no very clear idea of their future career.
I can talk from experience, as I myself have
been through this. The school must impart
those attitudes which make for successful
association with other people, and more
particularly in home and family life. It
must impart an attitude towards the future
career. The outlook for farming as a career
for the European is limited. For the non-
European the outlook is even worse. How
can we achieve that contact with industry
which our farming boys need? In the large
cities the position is not very much better.
It is extremely difficult in our complicated
modern life for the city boy to get work
experience during his school life. I think
that the camp idea should be explored and
applied. I can think of nothing better for
our South African conditions. As you know,
this system has been applied to some extent
in the United States of America, but even
there most children who need camp experi-
ce do not get it. It is very necessary for
our boys from the farms, from the towns
and from the cities to get the benefit of
supervised group living and
supervised work
experience, much of which could be obtained
by the construction of camp requirements
and facilities in the initial stages. I cannot
amplify the idea too much in the limited
time available, but it has occupied my mind
for a long time.

I still think that a thorough investigation
of the most suitable organisation for training
for industry by an influential and representa-
tive body is of the greatest importance.
In such an investigation the reorganisation
of school curricula will have to be taken into
consideration as well as the relative func-
tions of the Education Departments of the
Union and the various Provinces.

I think that work experience is necessary
as part of schooling so that the necessary
work habits can be acquired before youth
becomes adult and also in order to assist
youth in discovering its interest and capacity
through contact with several types of work.

I am thinking particularly of the country
youth who probably gets his education on a
farm school and then afterwards in a small
rural town. He and his parents are strongly
imbued with the great value of a sound
school education and they make great sacri-
fices in order to achieve this in the hope
that the boy will be able to fit into society
with benefit to both. The boy gets more
experience on the farm as a farmer, but in
the small rural town, he has work contact
neither with farming nor with industry.
The situation is quite pathetic. Many times
I have been approached by farmer parents
about placing their children in industry
because they see no future for all of them
on the land. They are making great sacri-
fices in sending their children long distances
to school, the children when they go to a
small town are usually deprived of work
contact and they know nothing about the

I remember discussing these ideas with
Dr. Hans Pirow, whose tragic and untimely
death was one of the greatest losses this
country has suffered for a long time. We
can ill afford the loss of such great broad-
minded and constructive men. He said to
me in his typical way: “And you know,
van Eck, when the youngsters who are now
racially separated in our schools work
together, camp together, sleep in the same
hut and wear one another's socks, they
cannot drift apart very far in after life.
You cannot dislike a man whose socks you
have worn.”

The lack of work contact is also experi-
cenced by the university-trained engineer,
and I was particularly interested in the
arrangements for the recognition of the
“vacation” and “student” apprentice.
One can go on talking about vocational
training, but the main thing is that we do something about putting our ideas into practice.

Mr. President, you have raised some very important other issues, stimulating thought. Your Table I indicated relative employment figures of males and females in industry compared with other countries. In South Africa we still offer too few opportunities for female employment. Relatively, we have a smaller proportion of females employed in industry compared, say, with Canada or Australia. A greater diversification of industry will achieve this essential to a higher standard of living and a greater national income.

I was interested in your figures on the net increase in the average annual output per employee of 18½ per cent. for all industries. While I have great faith in the potentialities of our employees, I am afraid I do not share the view that we have increased our output per employee during the war. My opinion is that during the war our physical volume of output per employee has remained more or less stationary. The money figures expressing volume of output must be corrected by the price rises which have taken place. This is perhaps to be expected as we have not been able to install much new power plant, which we can rectify after the war.

Mr. Chairman, on behalf of this meeting, I wish to propose a very hearty vote of thanks to Mr. Badham for his stimulating and thoughtful address.

The Chairman: I now call upon Mr. Joseph White to second the vote of thanks.

Joseph White (Past President): Mr. Chairman and Gentlemen,—Our new President has given us an address which provides much food for thought. It is a downright statement of fact and is delivered straight from the shoulder in the manner we are accustomed to expect from Mr. Badham.

The problems he has outlined are crying out for solution and immediate action, and the advice he gives is extremely valuable.

Post-war employment of returned soldiers and war workers is constantly in the minds of all, especially when we have to consider the large numbers of young people leaving our schools and universities every year and who must also be provided for.

While it is popular to put the onus of finding additional employment on the shoulders of secondary industry, it should be borne in mind that even in highly industrialised countries, factories are not responsible for the employment of all the employable population. In the United States it has been stated that factories can never provide work for more than 40 per cent. of the employables, indeed, pre-war manufacturing accounted for only one-third of those gainfully employed. Before the war, commerce and services provided employment for a far larger number than did the manufacturing industries.

Much time is required for the establishment of any industry and even if brand new factories could be built and equipped overnight, there would still remain the problem of finding a market for the product, the question of competitive costs and the training and housing of employees. The mental picture of acres of factories employing tens of thousands of employees at high rates of pay with short working hours that is drawn for us by almost every publication one picks up, is, I am afraid, divorced from reality, especially when, apparently, the Government is expected to produce these results by legislation and select committees.

We will have to realise that, under our democratic system, all that governments can do is to create the necessary conditions which will make it possible for the population as a whole, by its own energy and enterprise, to develop unrestrictedly and so provide opportunities for balanced employment throughout the country.

Owing to the spate of constant publicity about the re-employment of returned soldiers, there is being engendered a jittery and panicky complex in the public outlook. This, to my mind, is entirely unnecessary. The splendid men who have made such a good show on the various battle fronts are not the ones to return home, throw up their hands in despair and sit down helplessly waiting for someone to do something about it. My own experience after the last war taught me that most men had definite ideas about their future career, and there is no reason to suppose that they will be different this time. Excellent organisation has been established to assist ex-soldiers to a new start, and we can be sure that they will avail
ing squatters to seek work in the towns for part of the year and compelling them to return to the farms for the balance, is detrimental to a disciplined outlook on the part of the native, and considerably reduces his productivity in both spheres, since neither is looked upon as a career or a permanent occupation.

Mr. Badham’s remarks on the training of apprentices in the skilled trades, and on the training of engineers in general, deserve considerable attention, as he has arrived at his conclusions by experience gained the hard way. I am sure there will be little divergence of opinion as to the soundness of his recommendations.

Modesty forbids me from making any comment on managerial and executive functions, but I will say this: that the old idea of society being divided into two divisions—capital and labour—has had to be revised. The new conception now provides for Capital, Labour and Management, and the two former would not be much use without practical and experienced management.

In conclusion, I would earnestly endorse our President’s plea for the engineer to study administration, accountancy and the commercial aspects of his profession. The question of engineering economics is receiving great attention by engineers overseas. One recent speaker at a Scottish centre of the Institution of Electrical Engineers emphasises the necessity for engineers acquiring a knowledge of engineering economics by saying:

“In my opinion the principles of engineering economics should be included in the curriculum of every engineering student. The subject matter is not difficult, and the knowledge gained is invaluable, not only for a more intelligent understanding of the student’s future work, but for his own self-protection.

“At the present time there is a grave danger that the profession of engineering may become dominated by cost accountants. . . . The cost-accountancy hierarchy, usually without the slightest knowledge of engineering technique, frequently dictates, or restricts, the activities of engineers in matters which can best be decided by the engineers themselves.

I would draw your attention to an extract from a speech made by Calvin Coolidge as long ago as 1914. He said:—

“The people cannot look to legislation generally for success. Industry, thrift and character are not conferred by act or resolve. Government cannot relieve from toil. It can, of course, care for the defective and recognise distinguished merit. The normal must take care of themselves. Self-government means self-support.”

Another thought our President has given us is along the thorny path of the correct utilisation of native labour. We must face the fact that the training of natives for skilled and even semi-skilled work is frowned upon by a very large number of people in this country, but in spite of this, I think that much could be done to increase the individual productivity of the native. Mechanical appliances could be supplied in abundance and manhandling of goods and materials reduced to a minimum. The President’s plea for complete rural electrification, if carried out, would go far to assist in this object.

Casual and uncontrolled native labour should be reduced as far as possible and the natives should be encouraged in every way to work steadily at their jobs throughout the year.

Conditions for native farm labour under the squatter system should be such as will encourage the squatter to remain on the land permanently. The present system of allow-
"Apart from a working knowledge of cost accounts, the engineer should acquaint himself as soon as possible with many of the wider aspects of the field of economics. As a result of the war, the engineer has gained a recognition of his high importance, which should not lightly be relinquished. In the 'brave new world,' yet to be built, the engineer should shoulder not only the burden of wealth production, but also the responsibility of its utilisation and distribution."

I feel very happy to have the privilege of seconding the vote of thanks to Mr. Badham for his able and constructive address.

The Chairman: Ladies and gentlemen, you have heard an epoch-making and memorable address from our President. You have also heard the vote of thanks proposed by Dr. van Eck and seconded by Mr. White. May I ask you to show your appreciation by acclamation. (Applause.)

The President resumed the Chair, and said: "Ladies and Gentlemen.—Your reception of my address and the remarks of Dr. van Eck and Mr. White, are very gratifying and greatly appreciated, and I thank you."

There were no contributions under the two remaining items on the Agenda, and the meeting then terminated (9.45 p.m.).

PUBLICATIONS OF THE INSTITUTION OF ELECTRICAL ENGINEERS, LONDON.

With reference to the President's announcement at the Annual General Meeting regarding the publications of the Institution of Electrical Engineers, London, following are the details of the publications and the special subscription rates at which these are available to members of the South African Institute of Electrical Engineers:

The Journal of the Institution of Electrical Engineers.

Issued in three parts annually. Part I (General) contains all material of general interest together with abstracts of all the papers accepted for publication in full in the other two parts. Each of these abstracts is designed to bring out the main points of the paper concerned for the benefit of those readers who have no specialised knowledge of the subject dealt with.

Papers appear in full, together with the Discussions on them, in the other two parts (Part II, "Power Engineering," and Part III, "Radio and Communication Engineering").

The contents of the various parts are as follows:

Part I "General" (Volume commences in January; 12 monthly numbers).—Addresses and Lectures of a general character; Abstracts of all papers in Parts II and III; Progress Reviews; Formal Proceedings of The Institution; "Institution Notes"; Obituary Notices; Council's Report; Accounts, etc.

Part II "Power Engineering" (Issued every other month; Volume commences in February).—Power Generation, Transmission and Distribution; Power Applications; Meters and Instruments; Design of Machinery and Testing; Formal Proceedings of the Installations, Measurements and Transmission Sections.

Part III "Radio and Communication Engineering" (Volume commences in March; 4 quarterly numbers).—Radio and Television; Telegraphy and Telephony; Formal Proceedings of the Radio Section.

Obtainable by members of the South African Institute of Electrical Engineers, if ordered in advance, at the following special subscription rates:

Part I—10s. 6d. per annum, post free.
Part II—15s. 9d. per annum, post free.
Part III—10s. 6d. per annum, post free.

All three Parts—£1 11s. 6d. per annum, post free.

Science Abstracts.

Prepared and published by The Institution of Electrical Engineers in association with the British Physical Society, the American Physical Society and the American Institute of Electrical Engineers.

Consists of full abstracts from leading scientific and technical journals and the publications of learned societies of the whole world, and presents a concise record of progress in Electrical (including Radio) Engineering.
Engineering and Physical Science in a form convenient for immediate reference.

Issued in two complementary sections. Section A (Physics Abstracts) and Section B (Electrical Engineering Abstracts). Volume commences in January; 12 monthly numbers.

Obtainable by members of the South African Institute of Electrical Engineers, if ordered in advance, at the following special annual subscription rates:—

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The above specification has just been issued by the British Standards Institution. It provides for salt-glazed ware pipes which have chemically resistant properties somewhat higher than those normally associated with salt-glazed ware pipes supplied to B.S. 65.

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