A.M.E.U
All Municipality Addresses

VERRIGTINGS

van die

39ste KONVENSIE

11 tot 14 Mei, 1965

te PORT ELIZABETH

DIE VERENIGING VAN MUNISIPALE
ELEKTRISITEITSONDERNEMINGS VAN SUIDELIKE AFRIKA

PROCEEDINGS

of the

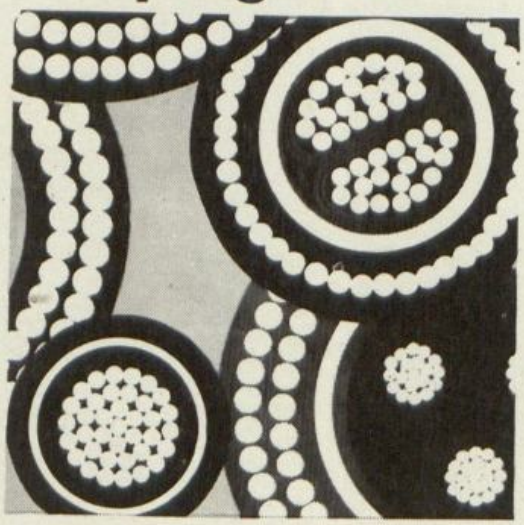
39th CONVENTION

11th to 14th May, 1965

at PORT ELIZABETH

THE ASSOCIATION OF MUNICIPAL ELECTRICITY
UNDERTAKINGS OF SOUTHERN AFRICA

Pattern of progress



Electric cables–sinews of industry–carrying power and progress to every corner of our land. Whatever the cable, big or small, high-tension or otherwise, African Cables Limited have the means and know-how to manufacture to the highest international standards. Every product leaving our Vereeniging factory is backed by the unequalled technical resources of the Cable Makers Association of Britain –an organisation which spends over R2,000,000 a year on research and development.

CERTIFICATION

MARK

Regd. Trade Mark

Your enquiries will be welcomed by our distributors, who have branches and agents throughout South Africa

A.E.I. Henley Africa (Pty.) Ltd.
British Insulated Callender's Cables (S.A.) (Pty.) Ltd.
Charles Elvey Agencies (Pty.) Ltd.
Crompton Parkinson (S.A.) (Pty.) Ltd.
Enfield Cables (S.A.) (Pty.) Ltd.
Fraser & Chalmers (S.A.) (Pty.) Ltd.
G.E.C. (S.A.) (Pty.) Ltd.
Hubert Davies & Co. Ltd.
Johnson & Phillips (S.A.) (Pty.) Ltd.
Wilson & Herd (Pty.) Ltd.

African Cables Limited

LPE 1747

PROCEEDINGS

of the

~~39 th~~ TEC MEET. CONVENTION

~~11th~~ to ~~14th May~~, 1965

at PORT ELIZABETH

THE ASSOCIATION OF MUNICIPAL ELECTRICITY
UNDERTAKINGS OF SOUTHERN AFRICA

VERRIGTINGS

van die

39 ste KONVENSIE

11 tot 14 Mei, 1965

te PORT ELIZABETH

DIE VERENIGING VAN MUNISIPALE
ELEKTRISITEITSONDERNEMINGS VAN SUIDELIKE AFRIKA

CONTENTS

INHOUD

SIEMENS

Do you take a long-term view of your outdoor lighting?

Good lighting enables danger to be recognized in good time. Light helps pedestrians and drivers, residents and non-residents alike. Light makes the district more attractive and business centres more lively.

Residential and housing-estate streets, bridges, public gardens or parks, promenades and filling stations are some of the places in which our ALH 613 post-top lantern can be employed. This is but one of many among our extensive range of street luminaires.

We shall be glad to furnish detailed information about our complete programme of luminaires and to advise you on your lighting problems.

SIEMENS S. A. (PTY.) LTD

Johannesburg
(P.O. Box 4583) Phone 23-6391, 23-3721.

Cape Town
(P.O. Box 860) Phone 2-7751

Durban
(P.O. Box 2533) Phone 2-9779

Windhoek
M & Z Motors & Engineering Ltd.,
(P.O. Box 192) Phone 5401

362-077 e

LIST OF ADVERTISERS
LYS VAN ADVERTEERDERS

President 1965/66

D. Murray-Nobbs

Die Vereniging van Munisipale Elektrisiteitsondernemings van Suidelike Afrika
Uitvoerende Raad 1965/66
The Association of Municipal Electricity Undertakings of Southern Africa
Executive Council 1965/66

Front Row: Rdl. P. J. Theron, Rdl. L. Jamneck, G. C. Theron, D. Murray-Nobbs (President), R. G. Ewing, Rdl. H. C. Boneschans, C. Lombard.
Middle Row: J. C. Waddy, A. C. T. Frantz, W. Rossler, Clr. B. D. Eager, R. Leishman, Clr. H. G. Kipling, Clr. R. P. Glenday, H. T. Turner, J. K. von Ahlften, Clr. D. H. White-Cooper.
Back Row: E. E. de Villiers, Clr. P. R. W. Colditz, J. G. F. Erikson, D. R. Verschoor, P. A. Giles, R. W. Barton, Clr. W Smart, L. Lewis, Rdl. F. F. Deysel.
Inset: Rdl. N. P. Rademeyer, Rdl. W. F. Meyer.

39th Annual Convention, Platform Party, Feathermarket Hall, Port Elizabeth

The Association of Municipal Electricity Undertakings of Southern Africa
50th Anniversary Banquet — Port Elizabeth, 13th May, 1965.
Die Vereniging van Munisipaliteitsondernemings van Suidelike Afrika
50ste Herdenking Feesmaaltyd — Port Elizabeth, 13 Mei, 1965.

Note - Standing Committees: President, Past President, President Elect & respective Councillor Reps + Secretaries ex officio.
Dagbestuur

EXECUTIVE COUNCIL 1965 - 1966

President:
D. MURRAY NOBBS (Port Elizabeth).

President Elect:
G. C. THERON (Vanderbijlpark).

Immediate Past Presidents:
R. W. BARTON (Welkom).
P. A. GILES (East London).

Engineer Members:
R. LEISHMAN (Johannesburg).
H. T. TURNER (Umtali).
E. E. DE VILLIERS (Bloemfontein).
J. C. WADDY (Pietermaritzburg).
C. LOMBARD (Germiston).
L. LEWIS (Windhoek).

Co-opted Members:
J. K. VON AHLFTEN and Cr. F. F. DEYSEL (Springs).
A. C. T. FRANTZ and Cr. G. E. FERRY (Cape Town).

Cities or Towns Represented:
JOHANNESBURG - UMTALI - VANDERBIJLPARK BLOEMFONTEIN - PIETERMARITZBURG - PORT ELIZABETH - EAST LONDON - WELKOM - GERMISTON.

Chairmen of Regional Branches:
Natal: J. G. F. ERIKSON (Estcourt) to October, 1965; K. J. W. HALLIDAY (Port Shepstone) from October, 1965.
Cape Eastern: D. R. VERSCHOOR (Fort Beaufort).
Highveld: ~~W. ROSSLER~~ (Kroonstad) to 4th June, 1965; ~~L. FUTCHER~~ (Kempton Park) from 4th June, 1965.
F. de C. Pretorius, Box 118 Potchefstroom.

Secretaries:
DAVIDSON & EWING (PTY.) LTD.
P.O. Box 7462, Johannesburg.

Sub-Committees:
Papers: D. Murray Nobbs (President), G. C. Theron (President Elect), P. A. Giles and C. Lombard.
Finance: R. Leishman (Convenor) and C. Lombard.
Recommendations Committee for New Electrical Commodities: C. Lombard (Convenor) and R. W. Barton (Alternate).
Rights of Supply - Industrial Consumers: C. Lombard (Convenor) and P. A. Giles.
Erection of Rural Electrification Power Lines within Road Reserves: D. R. Verschoor (Convenor), W. Rossler and J. G. F. Erikson.

Representatives:
Electrical Wiremen's Registration Board: C. Lombard.
Wiring Regulations Committee: R. Leishman.
~~S.A. Bureau of Standards: G. C. Theron~~.
Co-ordinating Representative on SABS sub-Committees Theron.

UITVOERENDE RAAD 1965 - 1966

President:
D. MURRAY NOBBS (Port Elizabeth).

Aanstaande President:
G. C. THERON (Vanderbijlpark).

Voormalige Presidente:
R. W. BARTON (Welkom).
P. A. GILES (Oos Londen).

Ingenieur Lede:
R. LEISHMAN (Johannesburg).
H. T. TURNER (Umtali).
E. E. DE VILLIERS (Bloemfontein).
J. C. WADDY (Pietermaritzburg).
C. LOMBARD (Germiston).
L. LEWIS (Windhoek).

Gekoöptiëerde Lede :
J. K. VON AHLFTEN en Rdl. F. F. DEYSEL (Springs).
A. C. T. FRANTZ en Rdl. G. E. FERRY (Kaapstad).

Stede of Dorpe Verteenwoordig:
JOHANNESBURG - UMTALI - VANDERBIJLPARK BLOEMFONTEIN - PIETERMARITZBURG - PORT ELIZABETH - OOS LONDEN - WELKOM - GERMISTON.

Voorsitters van Streektakke:
Natal: J. G. F. ERIKSON (Estcourt) tot Oktober 1965; K. J. W. HALLIDAY (Port Shepstone) vanaf Oktober 1965.
Oostelike Kaap: D. R. VERSCHOOR (Fort Beaufort).
Hoëveld: ~~W. ROSSLER (Kroonstad)~~ tot 4de Junie 1965; ~~L. FUTCHER (Kempton Park)~~ vanaf 4de Junie 1965.

Sekretarisse:
DAVIDSON en EWING (EDMS.) BPK.
Posbus 7462, Johannesburg.

Onder-Komitees:
Verhandelinge: D. Murray Nobbs (President), G. C. Theron (Aanstaande President), P. A. Giles en C. Lombard.
Finansiële R. Leishman (Sameroeper) en C. Lombard.
Aanbevelings oor Nuwe Elektriese Toerustings: C. Lombard (Sameroeper) en R. W. Barton (Plaasvervangende).
Regte van Voorsiening - Industriële Verbruikers: C. Lombard (Sameroeper) en P. A. Giles.
Oprigting van Landelike Elektrifikasie van Kraglyne langs Padreserwes: D. R. Verschoor (Sameroeper), W. Rossler en J. G. F. Erikson.

Verteenwoordigers:
Raad vir Registrasie van Draadwerkers: C. Lombard.
Bedrading Regulasies Komitee: R. Leishman.
~~S.A. Buro van Standaarde: G. C. Theron~~.
Koördinerende Verteenwoordiger op SABS sub-Komitees Theron.

Technical Training sub-Committee - Theron Convenor Lombard & Leishmann
Advisory Committee for Electrical Engineering CSIR - Theron.

S.A. National Committee of the International Electro-Technical Commission: D. Hugo and J. Wilson (Alternate).

S.A.I.E.E. Committee to revise the Code of Practice for Overhead Lines for conditions prevailing in South Africa: C. Lombard.

World Power Conference: R. W. Barton.

Electrolysis: Witwatersrand Main Committee: R. W. Leishman. Durban Sub-Committee: R. M. O. Simpson. Cape Town Sub-Committee: A. C. T. Frantz.

Orange River Hydro-Electric Project Sub-Committee (when formed): P. A. Giles, E. E. de Villiers and A. C. T. Frantz.

Hot-Dip Galvanised Zinc Coatings Sub-Committee: P. A. Giles.

S.A. Nasionale Komitee van die Internasionale Elektrotegniese Kommissie: D. Hugo en J. Wilson (Plaasvervangende).

S.A.I.E.I. Komitee belas met die Hersiening van die Gebruikskode vir Bogrondse Geleidings: C. Lombard.

Wêreld Krag Konferensie: R. W. Barton.

Elektroliese: Witwatersrandse Hoof Komitee: R. W. Leishman. Durbanse Sub-Komitee: R. M. O. Simpson. Kaapstadse Sub-Komitee: A. C. T. Frantz.

Oranje Hidro-Elektriese Skema Sub-Komitee (wanneer saamgestel): P. A. Giles, E. E. de Villiers en A. C. T. Frantz.

Versinking volgens die warm Dompel Metode: P. A. Giles.

Past Presidents/Oud-Presidente:

1915-17	J. H. Dobson, Johannesburg*
1917-19	J. Roberts, Durban*
1919-20	B. Sankey, Port Elizabeth*
1920-22	T. C. W. Dod, Pretoria*
1922-24	G. H. Swingler, Cape Town*
1924-26	J. Roberts, Durban*
1926-27	B. Sankey, Johannesburg*
1927-29	J. M. Lambe, East London*
1929-31	R. Macauley, Bloemfontein*
1931-33	L. L. Horrell, Pretoria*
1933-34	L. F. Bickell, Port Elizabeth*
1935-36	G. G. Ewer, Pietermaritzburg*
1936-37	A. Rodwell, Johannesburg*
1937-38	J. H. Gyles, Durban*
1938-39	H. A. Eastman, Cape Town
1939-44	I. J. Nicholas, Umtata
1944-45	A. Rodwell, Johannesburg*
1945-46	J. S. Clinton, Salisbury
	J. W. Phillips, Bulawayo
1946-47	G. J. Muller, Bloemfontein
1947-48	C. Kinsman, Durban
1948-49	A. Foden, East London
1949-50	D. A. Bradley, Port Elizabeth
1950-51	C. R. Hallé, Pietermaritzburg.
1951-52	J. C. Downey, Springs
1952-53	A. R. Sibson, Bulawayo
1953-54	J. C. Fraser, Johannesburg
1954-55	G. J. Muller, Bloemfontein
1955-56	D. J. Hugo, Pretoria
1956-57	J. E. Mitchell, Salisbury
1957-58	J. L. van der Walt, Krugersdorp
1958-59	C. G. Downie, Cape Town
1959-60	R. W. Kane, Johannesburg
1960-61	R. M. O. Simpson, Durban
1961-62	C. Lombard, Germiston
1962-63	P. A. Giles, East London
1963-64	J. C. Downey, Springs
1964-65	R. W. Barton, Welkom
1965-66	D. Murray Nobbs, Port Elizabeth

Secretary and Treasurer/Sekretaris en Tesourier:

F. T. Stokes, E. T. Price
E. Poole*
E. Poole*
L. L. Horrell*
H. A. Eastman
E. Poole*
R. G. Tresise
P. Adkins*
E. Poole*
E. Poole*
F. A. P. Perrow
E. Poole*
E. Poole*
E. Poole*
E. Poole*
E. Poole until December, 1940*
L. L. Horrell, January, 1941*
L. L. Horrell*
L. L. Horrell to November, 1945*
A. T. Taylor, December, 1945*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor*
A. T. Taylor to 30th June, 1955*
Arthur Tingey, Ewing & Co., 1st July, 1955.
Davidson & Ewing (Pty.) Ltd., 1st July, 1956.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.
Davidson & Ewing (Pty.) Ltd.

*Deceased/Oorlede.

Municipality Box Nos.

All correspondence to be addressed to:
The Secretaries,
Davidson & Ewing (Pty.) Ltd.,
P.O. Box 7462, Johannesburg,
Telegrams: "Minute" Phone 834-3021

Rig alle korrespondensie aan:
Die Sekretarisse,
Davidson en Ewing (Edms.) Bpk.,
Posbus 7462, Johannesburg,
Telegramme: „Minute" Foon 834-3021

LIST OF MEMBERS/LYS VAN LEDE 30-6-65

Honorary Members/Ere-Lede:

1949 Bradley, D. A., 9 Target Kloof Road, Port Elizabeth.
1960 Castelyn, F. J. C., 1a Arboretum Avenue, Bloemfontein.
1963 (1944) Downey, J. C., 10 Jessop Road, Selection Park, Springs.
1963 (1947) Downie, C. G., ~~Tshayile, 5 Hillside Road, Fishhoek, C.P.~~. (Past President).
1951 (1922) Eastman, H. A., Torwood, Parel Vallei, Somerset West, C.P.
~~1958 (1931) Ewer, Col. G. G., 174 Edmonds Road, Durban (Past President).~~ deceased.
1955 (1944) Fraser, J. C., 26 Grace Road, Mountain View, Johannesburg (Past President).
1948 (1938) Foden, A., 4 Hardy Road, Selborne, East London (Past President).
1958 (1944) Hallé, C. R., P.O. Box 399, Pietermaritzburg (Past President).
1956 Jaffray, A. Morton (Alderman), 8 Fairbridge Avenue, Salisbury.
1964 (1946) Kane, R. W., 21 Kernick Avenue, Melrose North, Johannesburg (Past President).
1954 (1938) Kinsman, C., 7 Highgate Place, Durban North (Past President).
1956 (1939) Milton, W. H., c/o Electricity Supply Commission, P.O. Box 1091, Johannesburg.
1962 (1948) Mitchell, J. E., P.O. Box 819, Kitwe, N. R. (Past President).
1964 (1934) Muller, G. J., 35, Wilcocks Road, Bloemfontein.
1962 (1935) Sibson, A. R., P.O. Box 9074, Hillside, Bulawayo, S.R. (Past President).
1962 (1949) Van Der Walt, J. L., P.O. Box 35, Vereeniging (Past President).

Council Members/Raadslede:

1962 (1935) Adelaide, P. O. Box 38.
1946 (1917) Aliwal North, P.O. Box 46.
1948 (1934) Alberton, P.O. Box, 4.
1948 Barberton, P.O. Box 33.
1935 (1926) Beaufort West, P.O. Box 9.
1961 Bedfordview, P.O. Box 3.
1935 (1917) Benoni, P.O. Box 45.
1950 (1919) Bethal, P.O. Box 3.
1944 (1915) Bethlehem, P.O. Box 130.
1939 (1917) Bloemfontein, P.O. Box 288.
1964 Bloemhof, P. O. Box 18.
1936 (1915) Boksburg, P.O. Box 215.
1945 (1927) Brandfort, P.O. Box 13.
1938 (1927) Bulawayo, P.O. Box 591.
1948 Brakpan, P.O. Box 15.
1948 Brits, P.O. Box 106.
1962 Broken Hill, P.O. Box 24.
1949 Bothaville, P.O. Box 12.
1937 Burgersdorp, P.O. Box 13.
1935 (1915) Cape Town, P.O. Box 298.
1935 (1916) Craddock, P.O. Box 24.
1935 (1916) Cradock, P.O. Box 24.
1960 Carletonville, P.O. Box 3.
1964 Carolina, P.O. Box 24.
1949 Ceres, P.O. Box 44.
1953 (1933) De Aar, P.O. Box 42.
1935 (1915) Durban, P.O. Box 147.
1953 Dewetsdorp, P.O. Box 13.
1962 Dundee, P.O. Box 76.
1935 (1919) East London, P.O. Box 134.
1935 Eshowe, P.O. Box 37.
1948 Edenvale, P.O. Box 25.
1952 Estcourt, P.O. Box 15.
1957 Empangeni, P.O. Box 2.
1935 (1927) Fort Beaufort, P.O. Box 36.
1965 Fort Victoria, P.O. Box 17.
1936 (1922) George, P.O. Box 19.
1952 Germiston, P.O. Box 145.
1964 Gobabis, P.O. Box 33.
1935 (1934) Graaff-Reinet, P. O. Box 71.
1936 (1924) Grahamstown, P.O. Box 176.
1947 (1915) Greytown, P.O. Box 71.
1963 Gwelo, P.O. Box 278.
1948 (1915) Harrismith, P.O. Box 43.
1949 Heidelberg, P.O. Box 201.
1959 Hermanus, P.O. Box 20.
1935 (1915) Johannesburg, P.O. Box 1049.
1964 Keetmanshoop, P.O. Box 25.
1952 Kempton Park, P.O. Box 13.
1935 (1917) Kimberley, P.O. Box 194.
1935 (1916) Klerksdorp, P.O. Box 160.
1935 (1934) Kokstad, P.O. Box 8.
1951 Komgha, P.O. Box 21.
1965 Koppies, P.O. Box 14.
1945 (1916) Kroonstad, P.O. Box 302.
1935 (1917) Krugersdorp, P.O. Box 94.
1954 Kenhardt, P.O. Box 15.
1960 Knysna, P.O. Box 21.
1935 (1915) Ladysmith, P.O. Box 29.
1945 Louis Trichardt, P.O. Box 96.
~~1948 Livingstone, P.O. Box 29.~~
1937 (1927) Ladybrand, P.O. Box 64.
1959 Lydenburg, P.O. Box 61.
1963 Makwassie, P.O. Box 2.
1935 (1926) Mafeking, P.O. Box 42.
1935 Matatiele, P.O. Box 35 .
1964 Meyerton, P.O. Box 9.
1965 Messina, P.O. Box 44.

1939 (1929) Middelburg, P.O. Box 55.
1935 (1926) Middelburg, P.O. Box 14, Tvl.
1954 (1929) Mossel Bay, P.O. Box 25.
1963 Mooi River, P.O. Box 47.
1945 Nelspruit, P.O. Box 45.
1948 (1915) Newcastle, P.O. Box 21.
1914 N'Dola, P.O. Box 197.
1936 Nigel, P.O. Box 23.
1948 Odendaalsrus, P.O. Box 21.
1959 Orkney, P.O. Box 34.
1944 (1915) Oudtshoorn, P.O. Box 255.
1935 (1926) Paarl, P.O. Box 12.
1935 (1920) Pietersburg, P.O. Box 111.
1935 (1915) Pietermaritzburg, P.O. Box 321.
1936 Piet Retief, P.O. Box 23.
1936 (1934) Port Alfred, P.O. Box 13.
1935 (1915) Port Elizabeth, P.O. Box 116.
1936 Port Shepstone, P.O. Box 5.
1948 (1915) Potchefstroom, P.O. Box 113.
1944 Potgietersrust, P.O. Box 34.
1935 (1915) Pretoria, P.O. Box 440.
1951 Parys, P.O. Box 39.
1953 Postmasburg, P.O. Box 5.
1959 Peri-Urban Areas Health Board, P.O. Box 1341, Pretoria.
1935 (1915) Queenstown, P.O. Box 113.
1948 Que Que, P.O. Box 15.
1935 (1929) Randfontein, P.O. Box 139.
1935 (1929) Robertson, P.O. Box 52.
1935 (1926) Roodepoort-Maraisburg, P.O. Box 217, Roodepoort.
1944 (1920) Rustenburg, P.O. Box 16.
1956 Riversdale, P.O. Box 29.
1935 (1926) Salisbury, P.O. Box 990.
1956 Sasolburg, P.O. Box 60.
1935 (1916) Somerset East, P.O. Box 21.
1948 (1927) Somerset West, P.O. Box 19.
1935 (1916) Springs, P.O. Box 45.
1935 (1931) Springfontein, P.O. Box 10.
Stanger, P.O. Box 72.
1938 (1916) Stellenbosch, P.O. Box 17.
1935 (1915) Standerton, P.O. Box 66.
1959 Stilfontein, P.O. Box 20.
1959 Stutterheim, P.O. Box 2.
1959 (1927) Tarkastad, P.O. Box 21.
1949 The Strand, P.O. Box 3.
1957 Tzaneen, P.O. Box 24.
1963 Thabazimbi, P.O. Box 90.
1936 (1920) Uitenhage, P.O. Box 45.
1936 (1927) Umtata, P.O. Box 57.
1935 (1927) Umtali, P.O. Box 121.
1960 Vanderbijlpark, P.O. Box 3.
1949 Ventersdorp, P.O. Box 15.
1935 Vereeniging, P.O. Box 35.
1961 Viljoenskroon, P.O. Box 37.
1955 Virginia, P.O. Box 156.
1947 (1929) Vrede, P.O. Box 155.
1935 Vryburg, P.O. Box 35.
1948 (1920) Vryheid, P.O. Box 57.
1960 White River, P.O. Box 2.
1935 (1934) Walmer, P.O. Box 5010.
1955 Warmbaths, P.O. Box 48.
1956 Wellington, P.O. Box 12.
1953 Welkom, P.O. Box 708.
1953 Westonaria, P.O. Box 19.
1946 Willowmore, P.O. Box 15.
1944 (1919) Winburg, P.O. Box 26.
1915 (1924) Windhoek, P.O. Box 59.
1955 (1927) Witbank, P.O. Box 3.
1936 (1922) Worcester, P.O. Box 37.
1960 Walvis Bay, P.O. Box 2.
1964 Wolmaransstad, P.O. Box 17.

Dates in brackets initial membership as or by Engineer. Membership not necessarily continuous.

Engineer Members/Ingenieur-Lede:

1947 Aalbers, C., Municipal Electrical Engineer, P.O. Box 12, Wellington, C.P.
1933 Adams, C. H., Municipal Electrical Engineer, P.O. Box 19, Somerset West, C.P.
1949 Asselbergs, P. C., Town and Electrical Engineer, ~~P.O. Box 21, Empangeni, Natal~~. Phalaborwa. Tvl.
1964 Bailey, R. V., ~~Municipal~~ Electrical Engineer, P.O. ~~Box 20, Hermanus, C.P.~~ 55 MIDDELBURG CAPE.
1962 Baillie, T. H., Town Electrical Engineer, P.O. Box 24, Broken Hill, Zambia.
1965 Barnard, H., ~~Deputy~~ Town Electrical Engineer, P.O. Box 15, Brakpan, Tvl.
1948 Barratt, V. E. O., Municipal Electrical Engineer, P.O. Box 113, Queenstown, C.P.
1964 Barrie, J. J., Municipal Electrical Engineer, P.O. Box 25, Edenvale, Tvl.
1948 Barton, R. W., Electrical Engineer, P.O. Box 708, Welkom, O.F.S. (Past President).
1959 Beard, G. R., Town Electrical Engineer, P.O. Box 176, Grahamstown, C.P.
Resigned 1957 ~~Beesley, W., Town Electrical Engineer, P.O. Box 29, Livingstone, Zambia~~.
1959 Billington Eales, A., Town Electrical Engineer, P.O. Box 2, Stutterheim, C.P.
1957 Booysens, L., Town and Electrical Engineer, P.O. Box 155, Vrede, O.F.S.
1960 Boshoff, J. J., Assistant Electrical Engineer, P.O. Box 3, Vanderbijlpark, Tvl.
1962 Boshoff, M. H. L., Assistant Electrical Engineer, P.O. Box 45, Uitenhage, C.P.
1959 Botes, P. J., Municipal Electrical Engineer, P.O. Box 217, Roodepoort, Tvl.
1958 Brown, D. C., Municipal Electrical Engineer, P.O. Box 3, The Strand, C.P.
1965 Buchanan, E. G., Town Electrical Engineer, P.O. Box 61, Lydenburg, Tvl. ~~Empangeni~~, EMPANGENI Natal 21
1948 Cherry, J. R., Municipal Electrical Engineer, P.O. Box 139, Randfontein, Tvl.
1955 Clarke, M. P. P., Municipal Electrical Engineer, P.O. Box 21, Somerset East, C.P.
1956 Craig, J. S., Borough Electrical Engineer, P.O. Box 21, Newcastle, Natal.

CARPENTER B.F. Electrical Engineer P.O. Box 45 Umtata

J.F. MACHUTCHON Asst. Electr. Engineer Box Cape Town
E.B. Pike Town Elect. Eng. Box Tarkastad
G.P. van Wyk Schoombee Box

EXECUTIVE

REGIONAL CHAIRMEN

1965 Cronje, W. F., Electrical Engineer, Peri-Urban Areas Health Board, P.O. Box 1341, Pretoria, Tvl.

1956 Dawson, J. D., Municipal Electrical Engineer, P.O. Box 45, Uitenhage, C.P.

1965 Dernier, W., Electrical Engineer, P.O. Box 46, Aliwal North, C.P.

1955 De Villiers, E. E., City Electrical Engineer, P.O. Box 288, Bloemfontein.

1964 De Villiers, S. de V., Municipal Electrical Engineer, P.O. Box 44, Ceres, C.P.

1957 Dreyer, H. C., Electrical Engineer, P.O. Box 12, Paarl, C.P.

1950 Dreyer, L., Municipal Electrical Engineer, P.O. Box 19, Westonaria, Tvl.

1957 Dunstan, R. S., Deputy City Electrical Engineer, P.O. Box 369, Port Elizabeth.

1963 Du Plooy, D. P., Electrical Engineer, P.O. Box 45, Nelspruit, Tvl.

1963 Du Toit, A. A., Municipal Electrical Engineer, P.O. Box 19, George, C.P.

~~1963 Edwards, H., Municipal Electrical Engineer, P.O. Box 55, Middelburg, C.P.~~

1950 Erikson, J. G. F., Borough Electrical Engineer, P.O. Box 15, Estcourt, Natal.

1944 Fisher, K. M., Municipal Electrical Engineer, P.O. Box 3, Bedfordview, Tvl.

1957 Fohren, H., Borough Electrical Engineer, P.O. Box 37, Eshowe, Zululand.

1961 Frantz, A. C. T., City Electrical Engineer, P.O. Box 82, Cape Town, C.P.

1952 Futcher, L., Municipal Electrical Engineer, P.O. Box 13, Kempton Park, Tvl.

1965 Fraser, D. H., Deputy City Electrical Engineer, P.O. Box 147, Durban, Natal.

1945 Gericke, J. M., Municipal Electrical Engineer, P.O. Box 99, Klerksdorp, Tvl.

1939 Giles, P. A., City Electrical Engineer, P.O. Box 529, East London, C.P. (Past President).

~~1936 Grandin, P. C., Municipal Electrical Engineer, P.O. Box 114, Gatooma, Rhodesia.~~

1944 Gripper, H. J., Municipal Electrical Engineer, P.O. Box 21, Knysna, C.P.

1954 Hafele, C. F., Deputy City Electricity Engineer, P.O. Box 288, Bloemfontein, O.F.S.

1953 Haig-Smith, D., Municipal Electrical Engineer, P.O. Box 24, Cradock, C.P.

1949 Halliday, K. W. J., Municipal Electrical Engineer, P.O. Box 8, Port Shepstone, Natal.

1927 Harvey, A. Q., Town Electrical Engineer, P.O. Box ~~45~~ 96, Warmbaths, Tvl.

1953 Hatwich, A. H. J., Town and Electrical Engineer, P.O. Box 13, Dewetsdorp, O.F.S.

1953 Heunis, G. B., Town and Electrical Engineer, P.O. Box 66, Standerton, Tvl.

1965 Heydenrych, J. E., Electrical Engineer, P.O. Box 14, Middelburg, Tvl.

1956 Hobbs, I. L., Town Electrical Engineer, P.O. Box 156, Virginia, O.F.S.

1965 Hosking, N. G., Deputy General Manager, Electricity Department, P.O. Box 699, Johannesburg.

1938 Hugo, D. J., City Electrical Engineer, P.O. Box 423, Pretoria, Tvl.

1944 Inglis, J. I., Town Electrical and Water Engineer, P.O. Box 111, Pietersburg, Tvl.

1949 Kirberger, M. N., Town Engineer, P.O. Box 3, Bethal, Tvl.

1959 Keoslag, H. J., Electrical Engineer, P.O. Box 29, ~~Riversdale, C.P.~~

1949 Kruger, M. J. C., Municipal Electrical Engineer, P.O. Box 13, Port Alfred, C.P.

1931 Lategan, J. F., Town Electrical Engineer, P.O. Box 17, Stellenbosch, C.P.

1953 Lees, D., Town Electrical Engineer, P.O. Box 45, Benoni, Tvl.

1944 Leishman, R. ~~S.~~, General Manager, Electrical Department, P.O. Box 699, Johannesburg.

1956 Lewis, L., Town Electrical Engineer, P.O. Box 59, Windhoek, S.W.A.

1947 Lombard, C., City Electrical Engineer, P.O. Box 145, Germiston, Tvl (Past President).

1944 Lotter, G. A., Town Electrical Engineer, P.O. Box ~~26~~ 34 ~~Louis Trichardt, Tvl.~~

1955 Lynch, E. C., City Electrical Engineer, P.O. Box 73, Salisbury, Rhodesia.

1953 Macques, J. A., Municipal Electrical Engineer, P.O. Box 42, De Aar, C.P.

1948 Mathews, J. A., City Electrical Engineer, P.O. Box 194, Kimberley, C.P.

1948 McIntyre, H. A., Assistant Town Electrical Engineer, Box 35, Vereeniging, Tvl.

1954 McNeil, J. L., Borough Electrical Engineer, P.O. Box 72, Stanger, Natal.

1945 Meintjies, P. A., Municipal Electrical Engineer, P.O. Box 16, Rustenburg, Tvl.

1952 Millen, T. J., Town and Electrical Engineer, P.O. Box 24, Tzaneen, Tvl.

1929 Mocke, T. M., Town and Electrical Engineer, P.O. Box 23, Piet Retief, Tvl.

1955 Nobbs, D. Murray, City Electrical Engineer, P.O. Box 369, Port Elizabeth, C.P.

1964 Odendaal, M. W., Town Electrical Engineer, P.O. Box 4, Alberton, Tvl.

1957 ~~Paull, R. A., Municipal Engineer, P.O. Box 57, Umtata, Transkei.~~

1963 Peters, A. G., Town Electrical Engineer, P.O. Box 278, Gwelo, Rhodesia.

1952 Potgieter, N. A., Municipal Electrical Engineer, P.O. Box 106, Brits, Tvl.

1951 Pretorius, D. R., Town Electrical Engineer, P.O. Box 39, Parys, O.F.S.

1952 Pretorius, E. de C., Electrical Engineer, P.O. Box 113, Potchefstroom, Tvl.

1960 Pretorius, J. W., Assistant Electrical Engineer, P.O. Box 23, Nigel, Tvl.

1957 Rautenbach, G. F., Electrical Engineer, P.O. Box 99, Klerksdorp, Tvl.

1965 Reichert, W. J., Town Electrical Engineer, P.O. Box 25, Keetmanshoop, S.W.A.

1948 Reyneke, G. M., Town Electrical Engineer, P.O. Box 26, Winburg, O.F.S.

1962 Rishworth, D. L., Town Electrical and Mechanical Engineer, P.O. Box 21, Odendaalsrus, O.F.S.

1954 Ross, J. W., Municipal Electrical Engineer, P.O. Box 34, Potgietersrust, Tvl.

1935 Rossler, W., Town Electrical Engineer, P.O. Box 302, Kroonstad, O.F.S.

1944 Rush, W., Town Electrical Engineer, P.O. Box 47, Mooi River, Natal.

1954 Simpson, A. C., Municipal Electrical Engineer, P.O. Box 5010, Walmer, C.P.

1953 Simpson, R. M. O., City Electrical Engineer, P.O. Box 147, Durban, Natal (Past President).

1937 Smith, E. L., Municipal Electrical Engineer, P.O. Box 215, Boksburg, Tvl.

1962 Stanton, R. J. G., Deputy Town Electrical Engineer, P.O. Box 255, Oudtshoorn, C.P.

1934 Stevens, F., Borough Electrical Engineer, P.O. Box 29, Ladysmith, Natal.

1965 Strauss, J. C., Town Electrical Engineer, P.O. Box 60, Sasolburg, O.F.S.

1956 Sulter, F. J., Assistant Electrical Engineer, P.O. Box 145, Germiston, Tvl.

1962 Summers, H. E., City Electrical Engineer, P.O. Box 1803, Bulawayo, Rhodesia.

1962 Surtees, E. H., Electrical Engineer, P.O. Box 76, Dundee, Natal.

1962 Te Brugge, E. J., Town Electrical Engineer, P.O. Box 42, Mafeking, C.P.

~~1947 Thackwray, W. G., Town Electrical Engineer, P.O. Box 8, Kokstad, E.G.~~

1946 Theron, G. C., Town Electrical Engineer, P.O. Box 3, Vanderbijlpark, Tvl.

1945 Theron, W. C., Municipal Electrical Engineer, P.O. Box 37, Worcester, C.P.

1950 Turnbull, A. F., Town and Electrical Engineer, P.O. Box 35, Vereeniging, Tvl.

1931 Turner, H. T., Town and Electrical Engineer, P.O. Box 121, Umtali, Rhodesia.

1964 Van den Berg, A. J., Town Electrical Engineer, P.O. Box 94, Krugersdorp, Tvl.

1955 Van der Merwe, F. J., Municipal Electrical Engineer, P.O. Box 20, Stilfontein, Tvl.

1957 Van Heerden, W. J., Electrical Engineer, P.O. Box 201, Heidelberg, Tvl.

1956 Van Meerdervoort, J. K. L., Pompe, Town Electrical Engineer, P.O. Box 43, Harrismith, O.F.S.

Resigned? 1965 ~~Van Nickerk, G., Municipal Electrical Engineer, P.O. Box 57, Vryheid, Natal.~~

1965 Van Wyk, A. A., Town Electrical Engineer, P.O. Box 9, Meyerton, Tvl.

1945 ~~Vergottini, P. L., Municipal~~ Electrical Engineer, P.O. ~~Box 15, Brakpan, Tvl.~~

1951 ~~Verschoor, D. R., Town and Electrical Engineer, P.O.~~ Box 36, Fort Beaufort, C.P.

1957 Von Ahlften, J. K., Town Electrical Engineer, P.O. Box 45, Springs, Tvl.

1955 Vorster, P. J., Municipal Electrical Engineer, P.O. Box 3, Witbank, Tvl.

1954 Waddy, J. C., City Electrical Engineer, P.O. Box 399, Pietermaritzburg, Natal.

1952 Waldron, F. R., Municipal Electrical Engineer, P.O. Box 86, Walvis Bay, S.W.A.

1952 Ward, H. V., Borough Engineer, P.O. Box 71, Greytown, Natal.

1961 Wiehahn, G. D., Town Engineer, P.O. Box 551, Bethlehem, O.F.S.

1952 Williams, A. H., Assistant Electrical Engineer, P.O. Box 45, Springs, Tvl.

1938 Wilson, J., ~~Assistant~~ City Electrical Engineer, P.O. Box 423, Pretoria, Tvl.

1956 Yodaiken, J., Municipal Electrical Engineer, P.O. Box 197, Ndola, Zambia.

Technical Associates/Tegniese-Geassosieerders:

1965 Barnard, W., Assistant General Manager (Technical Administration) Electricity Department, P.O. Box 699, Johannesburg.

Associates/Geassosieerders:

1965 Clarke, J., Municipal Electrical Engineer, P.O. Box 115, Que Que, Rhodesia.

1963 Coetzee, J. C., Town Engineer, P.O. Box 18, Bloemhof, Tvl.

1965 De Bruyn, Town Electrical Engineer, P.O. Box 15, Willowmore, C.P.

1965 De Jager, M. J., Electrical Engineer, P.O. Box 90, Thabazimbi, Tvl.

1962 De Witt, F., Electrical Engineer, P.O. Box 38, Adelaide, C.P.

1960 Flint, V. G., Town Electrical Engineer, P.O. Box 14, Koppies, O.F.S.

1962 Huysamen, G. A., Electrical Engineer, P.O. Box 5, Posmasburg, C.P.

1959 Jordaan, J. H. Municipal Electrical Engineer, P.O. Box 35, Vryburg, C.P.

1959 Laas, C. P., Electrical Engineer, P.O. Box 15, Kenhardt, C.P.

1959 Lochner, J. van S., Town Electrical Engineer, P.O. Box 64, Ladybrand, O.F.S.

1956 McNamara, A. B., Electrical Engineer, P.O. Box 21, Komgha, C.P.

1962 Ploos-van Amstel, W. F., Electrical Engineer, P.O. Box 37, Viljoenskroon, O.F.S.

1962 Van der Schyff, G. W., Town Engineer, P.O. Box 24, Carolina, Tvl.

1965 Wilson, A. McD., Town Electrical Engineer, P.O. Box 17, Fort Victoria.

Associate Members/Verbonde Lede:

1946 Andrew, W. M., 7 Tainton Avenue, Bonnie Doon, East London, C.P.

1951 Attridge, W. H., P.O. Box 412, Sasolburg, O.F.S.

1944 Burton, C. R., 54 Memorial Road, Kimberley, C.P.

1956 Barnard, F. J. W., c/o. Electricity Supply Commission, P.O. Box 12, Springs, Tvl.

1960 Bozyczko, W. B., P.O. Box 133, Bramley, Tvl.

1948 Conradie, D. J. R., P.O. Box 1009, Bloemfontein, O.F.S.

1954 Coetzee, F. J., P.O. Box 21, Evaton, Tvl.

1939 Dalton, G. A., 111 Eckstein Street East, Observatory Extension, Johannesburg, Tvl.
1934 Dawson, C., Electricity Supply Commission, P. O. Box 2408, Durban, Natal.
1965 De Wet, D. P., P.O. Box 19, Groot Brakrivier, C.P.
1948 De Wit, T., P.O. Box 44, Brits, Tvl.
1960 Ford, W. P., P.O. Box 40, Lusaka, Zambia.
1960 Gill, G. B., Zululand Electrical Utility Co. (Pty.) Ltd., P.O. Box 29, Gingindhlovu, Natal.
1936 Heasman, G. G., P.O. Box 77, Fort Victoria, Rhodesia.
1962 Honiball, G. T., 35 End Street, Rowhill, Springs, Tvl.
1962 Liebenberg, S. J., Electrical and Mechanical Engineer, Department of Bantu Administration and Development, P.O. Box 384, Pretoria, Tvl.
1960 McGibbon, J., P.O. Box 92, Carletonville, Tvl.
1926 Marchand, B., P.O. Box 223, Witbank, Tvl.
1946 Mole, E. W., P.O. Box 118, Bramley, Johannesburg.
1926 Muller, H. M. S., P.O. Box 112, Upington, C.P.
1961 Magowan, J. M., Southern Rhodesia Electricity Supply Commission, P.O. Box 377, Salisbury.
1934 Rossler, A., 3 Greenwood Road, Pietermaritzburg, Natal.
1953 Rothman, J. L., P.O. Box 606, Kimberley, C.P.
1948 Woolridge, W. E. L., P.O. Box 24, Harding, Natal.
1947 Williams, J. T., P.O. Box 1617, Pretoria, Tvl.
1946 Wylie, R. J. S., c/o. E.S.C., Rand Undertaking, P.O. Box 103, Germiston, Tvl.
1957 Zeederberg, T. D., Private Bag No. 1, P.O. Pyramid, Northern Transvaal.

1966. THACKWRAY WG. c/o MOUNTBATTEN HOTEL 44 SOPER RD. BEREA JHB.

Affiliates/Geaffileerders:

1959 AEG South Africa (Pty.) Ltd., P.O. Box 10264, Johannesburg, Tvl.
1957 Aberdare Cables (Africa) Ltd., P.O. Box 494, Port Elizabeth.
1957 Adams, Symes & Partners, P.O. Box 1498, Johannesburg.
1957 African Cables Ltd., P.O. Box 9909, Johannesburg.
1959 African Explosives & Chemical Industries, Ltd., P.O. Box 1122, Johannesburg. PO Box 6554, Jhbg.
1962 African Wire Ropes, Ltd., ~~P.O. Box 72, Cleveland, Tvl.~~
1957 Allenwest S.A. (Pty.) Ltd., P.O. Box 6168, Johannesburg.
1957 Alcan Aluminium of S.A. Ltd., P.O. Box 2430, Johannesburg.
1957 Arthur Trevor Williams (Pty.) Ltd., P.O. Box 2873, Johannesburg.
1959 Asea Electric (Pty.) Ltd., P.O. Box 691, Pretoria.
1957 Aycliffe Cables Ltd., Hargreaves Works, Main Road, Eastleigh, Edenvale.
1963 A. E. I. Henley Africa (Pty.) Ltd., P.O. Box 7404, Johannesburg.
1960 African Lamps (Pty.) Ltd., P.O. Box 75, Industria.
1960 Associated Electrical Industries C.A. (Pvt.) Ltd., P.O. Box 1979, Salisbury, Rhodesia.
1960 Associated Electrical Industries (Pty.) Ltd., P.O. Box 7755, Johannesburg.
1965 Ballenden & Robb, P.O. Box 4648, Johannesburg.
1963 Bell, Harold E., (Pty.) Ltd., P.O. Box 6906, Johannesburg.
1957 Babcock & Wilcox of Africa Ltd., P.O. Box 4561, Johannesburg.
1957 Brian Colquhoun O'Donell & Partners (Rhodesia), 10th Floor, Chester House, Speke Ave., Salisbury.
1957 British General Electric Co. of C.A. (Pvt.) Ltd., P.O. Box 845, Salisbury, Rhodesia.
1957 British General Electric Co. Ltd., P.O. Box 2406, Johannesburg.
1959 British Insulated Callender's Cables S.A. Ltd., P.O. Box 2827, Johannesburg.
1936 W. R. Burnett (Pty.) Ltd., P.O. Box 358, Johannesburg.
1954 Cohen, S., Ltd., P.O. Box 215, Windhoek, S.W.A.
1957 Chloride Electrical Storage Co. S.A. (Pty.) Ltd., P.O. Box 7508, Johannesburg.
1957 C.M.B. Engineering Co. (Pty.) Ltd., P.O. Box 55, Denver, Johannesburg.
1959 Construction Electric Co. (Pty.) Ltd., P.O. Box 10100, Johannesburg.
1959 Contractor (Pty.) Ltd., Zuider Paarl, C.P.
1964 Crawford Clinkscales, Maughan-Brown & Partners, P.O. Box 196, Port Elizabeth.
1957 Crompton Parkinson S.A. (Pty.) Ltd., P.O. Box 4236, Johannesburg.
1965 Cullinan Refractories Ltd., P.O. Olifantsfontein, Tvl.
1957 Davidson & Co. (Africa) (Pty.) Ltd., P.O. Box 616, Springs, Tvl.
1957 Dowson & Dobson Ltd., P.O. Box 7764, Johannesburg, Tvl.
1959 Ian Drewett, P.O. Box 35, Johannesburg, Tvl.
1959 Electrical Contractors' Association (South Africa), P.O. Box 5327, Johannesburg.
1957 Enfield Cables (S.A.) Ltd., P.O. Box 5289, Johannesburg, Tvl.
1959 English Electric Co. (C.A.) (Pvt.) Ltd., P.O. Box 2191, Salisbury, Rhodesia.
1957 English Electric Co. S.A. Ltd., P.O. Box 2387, Johannesburg, Tvl.
1961 Farad (Pty.) Ltd., P.O. Box 220, Jeppestown, Tvl.
1957 First Electric Corp. of S.A., P.O. Box 3961, Johannesburg, Tvl.
1957 F. W. J. Electrical Industries Ltd., P.O. Box 58, Alberton, Tvl.
1958 George Kent S.A. (Pty.) Ltd., P.O. Box 7396, Johannesburg, Tvl.
1957 W. T. Glover & Co. Ltd., P.O. Box 1386, Johannesburg, Tvl.
1957 E. Green & Son S.A. (Pty.) Ltd., 406 Barclays Bank Buildings, Kruis Street, Johannesburg.
1957 Heinnemann Electric (S.A.) Ltd., P.O. Box 99, Bramley, Tvl.
1957 Hopkinsons S.A. (Pty.) Ltd., P.O. Box 11029, Johannesburg, Tvl.
1957 James Howden & Safanco (Africa) (Pty.) Ltd., P.O. Box 9501, Johannesburg, Tvl.
1957 Hubert Davies & Co. Ltd., P.O. Box 1386, Johannesburg, Tvl.
1960 Hawker Siddeley Brush (Southern Africa) Ltd., P.O. Box 67, Germiston.
1957 International Combustion Africa Ltd., P.O. Box 5981, Johannesburg, Tvl.

ELECTRICAL PROTECTION CO.
PO Box 570. BENONI.

1962 A. Jackson, P.O. Box 4814, Cape Town, C.P.
1957 John Thompson (S.A.) (Pty.) Ltd., P.O. Box 3570, Johannesburg, Tvl.
1957 Johnson & Phillips S.A. (Pty.) Ltd., P.O. Box 552, Germiston, Tvl.
1957 R. T. Jones, Esq., 43 The Avenue, Orchards, Johannesburg, Tvl.
1957 G. H. Langler & Co. Ltd., P.O. Box 3762, Johannesburg, Tvl.
1961 Lodge-Cottrell (Africa) (Pty.) Ltd., P.O. Box 6070, Johannesburg, Tvl.
1957 Harold Martinusen & Co. (Pty.) Ltd., P.O. Box 469, Johannesburg, Tvl.
1957 L. H. Martinusen Ltd., P.O. Box 25664, Denver, Tvl.
1957 Merz & McLellan, P.O. Box 11578, Johannesburg.
1965 Minnesota Mining and Manufacturing Co. (S.A.) (Pty.) Ltd., P.O. Box 10465, Johannesburg.
1957 Mitchell Engineering Group S.A. (Pty.) Ltd., 63 Harrison Street, Johannesburg, Tvl.
1959 N.V. Nederlandsche Kabelfabrieken Ltd., P.O. Box 3513, Cape Town, C.P.
1965 North and Robertson (Pty.) Ltd., P.O. Box 309, East London.
1957 Oerliken S.A. (Pty.) Ltd., P.O. Box 132, Jeppestown, Tvl.
1957 C. A. Parsons & Co. (S.A.) (Pty.) Ltd., P.O. Box 3425, Johannesburg, Tvl.
1959 Patrick Murray (Pty.) Ltd., P.O. Box 1541, Durban, Natal.
1963 Pratley Manufacturing and Engineering Co. (Pty.) Ltd., P.O. Box 55, Luipaardsvlei, Tvl.
1957 Rhotec Sales (Pvt.) Ltd., P.O. Box 2356, Salisbury.
1957 Reunert & Lenz Ltd., P.O. Box 92, Johannesburg.
1957 A. Reyrolle & Co. Ltd., P.O. Box 9677, Johannesburg, Tvl.
1960 A. Reyrolle & Co. (Rhodesia) Ltd., P.O. Box 1975, Salisbury, Rhodesia.
1957 Rice & Diethelm Ltd., P.O. Box 930, Johannesburg, Tvl.
1963 Rhodesia Congo Border Power Corporation Ltd., P.O. Box 819, Kitwe, Zambia.
1957 Samuel Osborn S.A. (Pty.) Ltd., P.O. Box 25619, Denver, Tvl.
1957 Scottish Cables (S.A.) Ltd., P.O. Box 2882, Johannesburg, Tvl.
1960 Siemens S.A. (Pty.) Ltd., P.O. Box 4583, Johannesburg, Tvl.
1957 Standard Telephones & Cables Ltd., P.O. Box 286, Boksburg, Tvl.
1957 Stamcor (Pty.) Ltd., P.O. Box 6107, Johannesburg.
1957 Stewarts & Lloyds of S.A. Ltd., P.O. Box 1195, Johannesburg, Tvl.
1957 S.A. General Electric Co. Ltd., P.O. Box 1905, Johannesburg, Tvl.
1957 S.A. Philips (Pty.) Ltd., P.O. Box 7703, Johannesburg, Tvl.
1957 Superconcrete Pipes (Pty.) Ltd., P.O. Box 92, Roodepoort, Tvl.
1957 Switchcraft (Pty.) Ltd., P.O. Box 6444, Johannesburg, Tvl.
1960 South Wales Electric (Pty.) Ltd., P.O. Box 2180, Johannesburg, Tvl.
1957 Southern African Cable Makers Association, P.O. Box 2258, Johannesburg, Tvl.
1965 T.P.H. Engineering (Pty.) Ltd., P.O. Box 118, Bramley, Tvl.
1965 G. D. Wiehahn, P.O. Box 664, Bethlehem, O.F.S.
1957 Wilson & Herd (Pty.) Ltd., P.O. Box 3093, Johannesburg, Tvl.
1957 Yarrow & Herd (Pty.) Ltd., 210 Geldenhuys, 33 Jorissen St., Braamfontein, Johannesburg, Tvl.
1959 Yorkshire Transformers (S.A.) (Pty.) Ltd., P.O. Box 43, Bedfordview, Tvl.

LIST OF MEMBERS, COUNCIL MEMBERS AND VISITORS ATTENDING THE 39th ANNUAL CONVENTION OF THE ASSOCIATION OF MUNICIPAL ELECTRICITY UNDERTAKINGS

LYS VAN LEDE, RAADSLEDE EN BESOEKERS — 39ste JAARLIKSE KONVENSIE VAN DIE VERENIGING VAN MUNISIPALE ELEKTRISITEITSONDERNEMINGS.

COUNCIL AND ENGINEER MEMBERS/RAAD EN INGENIEUR-LEDE:

ADELAIDE:
Stott, Cr. H.
de Wit, F.

BARBERTON:
van Meerdervoort, J. K. L. Pompe.

BETHAL:
Kirberger, M. N.

BLOEMFONTEIN:
Theron, Cr. P. J.

BOKSBURG:
Smith, E. L.

BRAKPAN:
Rossouw, Cr. W. J. C.
Vergottini, P. L.

BRANDFORT:
Kok, P. R.

BRITS:
Bodenstein, Cr. J. C.
Potgieter, N. A.

BULAWAYO:
Summers, H. E.

CAPE TOWN:
Frantz, A. C. T.

CARLETONVILLE:
Kriek, Cr. C. J.
de Villiers, E. E.

CRADOCK:
Hyam, Cr. A.
Haig-Smith, D.

DE AAR:
Macques, J. A.

DUNDEE:
Surtees, E. H.

DURBAN:
Jenkins, Cr. Mrs. L. E. G.
Fraser, D. H.

EAST LONDON:
Kipling, Cr. H. G.
Giles, P. A.

EDENVALE:
Heydenrych, Cr. J. N.

ESTCOURT:
Colditz, Cr. P. R. W.
Erikson, J. G. F.

FORT BEAUFORT:
Verschoor, D. R.

GEORGE:
du Toit, A. A.

GERMISTON:
Boneschans, Cr. H
Lombard, C.

GRAHAMSTOWN:
Beard, G. R.

GWELO:
Peters, A. G.

HEIDELBERG:
Greyling, Cr. P. J. J.
van Heerden, W. J. B.

HERMANUS:
Bailey, R. V.

JOHANNESBURG:
Eager, Cr. B. D.
Leishman, R. W.

KEMPTON PARK:
Futcher, L.

KENHARDT:
van Niekerk, Cr. G.
Laas, C. P.

KIMBERLEY:
Matthews, J. A.

KLERKSDORP:
Randles, Cr. T. L.
Gericke, J. M.

KOKSTAD:
Reed, Cr. B. N.
Thackwray, W. G.

KROONSTAD:
Rule, Cr. Ds. P. C.
Rossler, W.

KRUGERSDORP:
Hoffman, Cr. J. J.
van den Berg, A. J.

LADYSMITH:
Killips, Cr. C.
Stevens, F.

LIVINGSTONE:
Beesley, W.

LOUIS RICHARDT:
van den Berg, Cr. C. J.
Lotter, G. A.

LYDENBURG:
Buchanan, E. G.

MAFEKING:
te Brugge, E. J.

MEYERTON:
Miller, Cr. D.
van Wyk, A. A.

MIDDELBURG C.P.:
Edwards, H.

MIDDELBURG TVL.:
Heydenrych, J. E.

MOOI RIVER:
Rush, W.

MOSSEL BAY:
Muller, Cr. J. B.
Phillips, F. W.

NEWCASTLE:
Craig, J. S.

ORKNEY:
Crispin, Cr. F. J.
Rattey, W. P.

OUDTSHOORN:
Barron, Cr. I.
Stanton, R. J. G.

PAARL:
Redelinehuys, W. H.
Dreyer, H. C.

PARYS:
Pretorius, D. R.

PERI-URBAN AREAS HEALTH BOARD:
Lever, Cr. W. T.
van der Merwe, Cr. G. J.
Cronje, W. F.

PIETERSBURG:
Knox, Cr. H. J. U.
Inglis, J. I.

PIETERMARITZBURG:
White-Cooper, Cr. D. H.
Waddy, J. C.

PIET RETIEF:
Devereux-Quicke, Cr. E.
Mocke, T. M.

PORT ALFRED:
Kruger, M. J.

PORT ELIZABETH:
Rademeyer, Cr. N. P.
Murray Nobbs, D.
Dunstan, R. S.

PORT SHEPSTONE:
Halliday, K. W. J.

POTCHEFSTROOM:
de Kock, Cr. C.
Pretorius, E. de C.

PRETORIA:
Smit, Cr. E.
Wilson, J.

QUE QUE:
Smallman, Cr. S. O.
Clarke, J.

RANDFONTEIN:
Kotze, Cr. J. F.
Cherry, J. R.

RIVERSDALE:
Koeslag, H. J.

ROBERTSON:
Spurr, A. J.

ROODEPOORT-MARAISBURG:
Wessels, Cr. J. M.
Botes, P. J.

RUSTENBURG:
Meintjes, P. A.

SALISBURY:
Steer, Cr. W.
Harper, Cr. F. G.
Lynch, E. C.

SASOLBURG:
de Klerk, Cr. H.
Strauss, J. C.

SOMERSET EAST:
Dersley, Cr. J. E.
Clarke, M. M. P.

SOMERSET WEST:
Adams, C. H.

SPRINGS:
Deysel, Cr. F. F.
Thuynsma, Cr. J. C.
von Ahlften, J. K.

STANDERTON:
Smith, Cr. E. J.
Heunis, G. B.

STANGER:
McNeil, J. L.

STELLENBOSCH:
Lategan, J. F.

STILFONTEIN:
van der Merwe, F. J.

THABAZIMBI:
de Jager, M. J.

THE STRAND:
Brown, D. C.

TZANEEN:
Millen, T. J.

UITENHAGE:
Gradwell, Cr. R. D.
Dawson, J.
Boshoff, M. H. L.

UMTALI:
Smart, Cr. W.
urner, H. T.

UMTATA:
Paull, R. A.

VANDERBIJLPARK:
Jomneck, Cr. L.
Theron, G. C.

VEREENIGING:
Oliver, Cr. R. W.
Turnbull, A. F.

VIRGINIA:
Baron, Cr. S. T.
Hobbs, I. L.

VRYHEID:
van Niekerk, G.

WALMER:
Atwell, Cr. A. H.
Simpson, A. C.

WARMBATHS:
Harvey, A. Q.

WELKOM:
Meyer, Cr. W. F.
de Wet, Cr. D. R.
Barton, R. W.

WESTONARIA:
Dreyer, L.

WILLOWMORE:
de Bruyn, C. D.

WITBANK:
Vorster, P. J.

WINDHOEK:
Glenday, Cr. R. P.
Lewis, L.

Retired Membership/Afgetrede Lidmaatskap:

1965 (1933) Campbell, A., P.O. Box 3, Impendhle, Natal.
1965 (1929) Clinton, J. S., P.O. Box 4648, Johannesburg. (Past President).
1965 (1934) Phillips, J. W., P.O. Box 1731, Bulawayo, Rhodesia.

Other Members/Ander Lede:

Bozyczko, W. B., (Associate Member), Johannesburg.
Bradley, D. A., (Honorary Member), Port Elizabeth.
Burton, C. R., (Associate Member), Kimberley.
Campbell, A. R., (Associate Member), Impendhle.
Downey, J. C., (Honorary Member), Springs.
Eastman, H. A., (Honorary Member), Somerset West.
Ford, W. P., (Associate Member), Lusaka.
Kane, R. W., (Honorary Member), Johannesburg.
Magowan, J. M., (Associate Member), Salisbury.
Marchand, B., (Associate Member), Witbank.
Milton, W. H., (Honorary Member), Johannesburg.
Mitchell, J. E., (Honorary Member), Kitwe.
Muller, G. J., (Honorary Member), Bloemfontein.
Muller, H. M. S., (Associate Member), Upington.
Rossler, A., (Associate Member), Pietermaritzburg.

A.M.E.U. Officials/Beampte:

Ewing, R. G., (Representing the Secretaries), East London.
Brewin, Miss E. R., (Representing the Secretaries), Johannesburg.
Lee, Mrs. H. G., (Convention Proceedings Clerk), Johannesburg.

Affiliates/Geaffileerdes:

A.E.I. Henley (Africa) (Pty.) Ltd.,
E. B. Sidney and J. A. Morrison, both of Johannesburg.

Aberdare Cables (Africa) Limited.,
J. C. Sutherland, R. E. Owen, H. A. S. Dunk and S. C. Scott, all of Port Elizabeth.

Aberdare Cables (Africa) Limited.,
C. von Lindern and G. McL. Yuill, both of Johannesburg.

Adams, Symes and Partners,
K. A. H. Adams and W. E. Bruges, both of Johannesburg.

African Cables Limited,
R. W. Lord and W. N. Randell, both of Vereeniging.

African Explosives & Chemical Industries Limited,
W. J. Maxwell, Johannesburg and J. Sole, Germiston.

African Lamps (Pty.) Limited,
E. C. Crole, Johannesburg.

Alcan Aluminium of S. A. Ltd.,
E. B. Martin, Johannesburg.

Arthur Trevor Williams (Pty.) Ltd.,
A. T. Williams and J. A. Barnett, both of Johannesburg and R. A. Scanes, Port Elizabeth.

Asea Electric S.A. (Pty.) Ltd.,
F. Frank, Pretoria.

Associated Electrical Industries S. A. (Pty.) Limited,
S. McCracken and A. J. Crompton, both of Johannesburg and N. C. Smith, Port Elizabeth.
Aycliffe Cables Limited,
C. A. Rist and M. Frankle, both of Johannesburg and P. A. Jones, Port Elizabeth.
Babcock and Wilcox Africa (Pty.) Ltd.,
A. Dietrich, Port Elizabeth.
Ballenden and Robb,
D. A. Robb, Johannesburg.
British Insulated Callender's Cables S.A. (Pty.) Limited,
R. B. Pyman, Johannesburg.
W. R. Burnett (Pty.) Limited,
A. E. Torrance, Johannesburg.
Chloride Electrical Storage Co. S.A. (Pty.) Limited,
N. D. Jones, Johannesburg.
Copperbelt Power Co. Ltd.,
J. E. Mitchell, Kitwe.
Crawford, Clinkscales, Maughan, Brown and Partners.
K. R. Maughan-Brown and W. D. Clinkscales, both of Port Elizabeth.
Cullinan Refactories Limited,
A. H. Cartlidge, Olifantsfontein.
Davidson & Co. (Africa) (Pty.) Ltd.,
F. S. Haig, Springs.
Dowson & Dobson Limited,
C. R. Dalton and T. R. Park, both of Johannesburg.
Ian Drewett & Partners,
I. H. M. Drewett and R. Everatt, both of Johannesburg.
English Electric Corporation of S.A. Limited,
H. Prins and G. L. Jessup, both of Johannesburg.
Farad (Pty.) Limited,
B. van Vliet, Switzerland and G. Gerber, Johannesburg.
F. W. J. Electrical Industries Limited,
G. R. Hain, Johannesburg.
General Electric Co. S.A. Limited,
D. D. Billett, H. Frankle and J. de Wilde, all of Johannesburg.
George Kent S.A. (Pty.) Limited,
G. H. Toop, Johannesburg.
W. T. Glover & Co. Limited,
M. Suthers, Johannesburg.
E. Green & Son S.A. (Pty.) Ltd.,
A. W. Bulless, Johannesburg.
Hawker Siddeley Brush Limited,
P. N. Vickerman and A. R. Royal, both of Germiston.
Heinemann Electric (S.A.) Limited,
W. B. Bozyczko, Johannesburg.
Hopkinsons (S.A.) (Pty.) Limited,
E. C. Enfield, Johannesburg.
Hubert Davies & Co. Limited,
G. H. Boyle and A. Scott, both of Johannesburg.
International Combustion Africa Ltd.,
Q. R. Nothard, Johannesburg.
James Howden & Safanco (Africa) (Pty.) Limited,
R. G. Hons and E. P. Roger, both of Johannesburg.
A. Jackson,
A. Jackson, Cape Town.
John Thompson (Africa) (Pty.) Ltd.,
N. Magasiner, Bellville.
Johnson & Phillips S.A. (Pty.) Ltd.,
N. M. Clatworthy and E. W. Dixon, both of Germiston.
Lodge-Cottrell (Africa) (Pty.) Ltd.,
J. L. Easterbrook, Johannesburg.
Harold Marthinusen & Co. (Pty.) Ltd.,
G. Roeske, Johannesburg.
Merz & McLellan,
T. R. J. Bishop, Johannesburg.
Minnesota Mining & Manufacturing Co. (S.A.) (Pty.) Ltd.,
M. B. Foster, Durban.
North & Robertson (Pty.) Limited,
H. W. Harrington, East London.
N.V. Nederlandsche Kabelfabrieken Limited,
G. H. van Harten, Cape Town.
Oerlikon S.A. (Pty.) Limited,
C. E. Webber, Johannesburg.
C. A. Parsons & Co. (S.A.) (Pty.) Ltd.,
T. R. Strawson, Johannesburg.
Reunert & Lenz Limited,
T. K. Adams and T. C. Marsh, both of Johannesburg.
A. Reyrolle & Co. Limited,
N. Kirshner, Johannesburg.
Samuel Osborn S.A. (Pty.) Ltd.,
D. E. Soper, H. F. Chagnot and K. Mark, all of Johannesburg.
Scottish Cables (S.A.) Limited,
D. G. Sutherland, Pietermaritzburg, A. C. Grant, Johannesburg and J. W. Lockhart, Cape Town.
Siemens S.A. (Pty.) Limited,
A. Biehler, Johannesburg.
Standard Telephones & Cables Ltd.,
J. H. Buss and V. Coetzee, both of Boksburg.
Stamcor (Pty.) Limited,
V. T. Sutcliffe, Johannesburg.
S.A. General Electric Co. Ltd.,
F. W. de Zeeuw and J. W. Allen, both of Johannesburg.
S.A. Phillips (Pty.) Limited,
B. Henegan, Port Elizabeth.
South Wales Electric (Pty.) Ltd.,
C. L. de Beer, Johannesburg, N. L. Adams and F. C. Neethling, both of Port Elizabeth.
Superconcrete Pipes (Pty.) Limited,
A. R. Nel, Roodepoort.
Switchcraft (Pty.) Limited,
G. E. Ludwig, Johannesburg.
T.P.H. Engineering (Pty.) Limited,
S. W. van der Merwe, Johannesburg.
G. D. Wiehahn,
G. D. Wiehahn, Bethlehem.
Wilson & Herd (Pty.) Limited,
R. G. Edwards, Johannesburg.
Yarrow Africa (Pty.) Limited,
I. C. Fraser, Johannesburg.

Visitors/Besoekers:

Aspinall, H. T., Johannesburg.
Ballantyne, S. R., Electrical and Mechanical Engineer, Provincial Administration of Natal, Pietermaritzburg.

Baxter, J. D. C., Northern Cape Regional Electrification Board, Kimberley.
Berry, J., Johannesburg.
Bozzoli, Prof. G. R., University of the Witwatersrand, Johannesburg.
Bradley, Cr. D. A., Port Elizabeth City Council, Port Elizabeth.
Brewer, G. H., Town Clerk, Port Elizabeth.
Burt, Mrs. J. D., President, P.E. Women's Club, Port Elizabeth.
Cassidy, C. S., Basutoland Public Works Department, Maseru.
Chappel, M. J. W., Port Elizabeth Electricity Department, Port Elizabeth.
Collopy, E. J., Port Elizabeth.
Coetzee, B. B. J., Provincial Administration of the Cape of Good Hope, Cape Town.
de Kock, H. C., Senior Inspector of Machinery (Factories), Port Elizabeth.
Driscoll, F. R. V., Port Elizabeth Electricity Department, Port Elizabeth.
Dustan, R., President, Eastern Province Society of Engineers, Port Elizabeth.
Erasmus, Cr. J. C. K., Port Elizabeth City Council, Port Elizabeth.
Gericke, M. R., President, S.A. Institute of Electrical Engineers, Johannesburg.
Groenewald, J. J., Chief Inspector of Factories (Engineering) Dept. of Labour, Pretoria.
Hancock, Cr. R. K., Port Elizabeth City Council, Port Elizabeth.
Harding, G. R. D., Electricity Supply Commission, Johannesburg.
Hastie, Mrs. J. S., Scottish Cables Limited, Scotland.
Heydorn, Prof. A., Electricity Control Board, Pretoria.
Hoare, S. J., System Electrical Engineer S.A. Railways, Port Elizabeth.
Isherwood, J., British Consul, Port Elizabeth.
Karstaedt, Cr. A. J., Port Elizabeth City Council, Port Elizabeth.
Lategan, Dr. P. N., Transvaal Coal Owners Association, Johannesburg.
Liebenberg, S. J., Department of Bantu Administration and Development, Pretoria.
Lineker, A. W., Johannesburg.
Marais, Dr. E. J., Principal, University of Port Elizabeth, Port Elizabeth.
Middlecote, A. A., S.A. Bureau of Standards, Pretoria.
Milton, W. H., Chief Commercial Engineer, Electricity Supply Commission, Johannesburg.
Nel, I. F., S.A. Bureau of Standards, Port Elizabeth.
Pirie, G., Port Elizabeth.
Prins, F. J., S.A. Bureau of Standards, Pretoria.
Prosser, L. N., Port Elizabeth.
Richardson, J. G., Chief Executive Officer, Swaziland Electricity Board, Mbabane.
Schauder, H., Chairman, C.S.I.R. Midland Regional Research Committee, Port Elizabeth.
Shelton, J. E., Port Elizabeth.
Straszacker, Dr. R. L., Electricity Supply Commission, Johannesburg.
Tomlin, A. W., Electricity Supply Commission, East London.
Tweedie, K. H. B., Divisional Engineer, Dept. of Posts and Telegraphs, Port Elizabeth.
Upman, S. D., Port Elizabeth Electricity Department, Port Elizabeth.
van Alphen, J. C., S.A. Bureau of Standards, Pretoria.
van der Spuy, M., Council for Scientific and Industrial Research, Pretoria.
van Wyk, J. D. N., Council for Scientific and Industrial Research, Pretoria.
Wardle, E. B., Port Elizabeth.
Woods, Rev. B., Mayor's Chaplain, Port Elizabeth.
Young, Cr. G. J., His Worship the Mayor of Port Elizabeth.

Ladies/Dames:

Adams, Mrs. C. H., Somerset West.
Adams, Mrs. N. L., Port Elizabeth.
Adams, Mrs. T. K., Johannesburg.
Aspinall, Mrs. H. T., Johannesburg.
Bailey, Miss, Hermanus.
Bailey, Mrs. R. V., Hermanus.
Barnett, Mrs. J. A., Johannesburg.
Baron, Mrs. S. T., Virginia.
Barron, Mrs. I., Oudtshoorn.
Baxter, Mrs. J. D. C., Kimberley.
Beard, Mrs. G. R., Grahamstown.
Bishop, Mrs. T. R. J., Johannesburg.
Bodenstein, Mrs. J. C., Brits.
Boshoff, Mrs. M. H. L., Uitenhage.
Botes, Mrs. P. J., Roodepoort.
Boyle, Mrs. G. H., Johannesburg.
Bozzoli, Mrs. C. R., Johannesburg.
Brewer, Mrs. G. H., Port Elizabeth.
Buchanan, Mrs. E. G., Lydenburg.
Burton, Mrs. C. R., Kimberley.
Campbell, Mrs. A. R., Impendhle.
Chappel, Mrs. M. J. W., Port Elizabeth.
Clarke, Mrs. M. M. P., Somerset East.
Collopy, Mrs. E. J., Port Elizabeth.
Crompton, Mrs. A. J., Johannesburg.
Dawson, Mrs. J. D., Uitenhage.
de Beer, Mrs. C. L., Johannesburg.
de Bruyn, Mrs. C. D., Willowmore.
de Jager, Mrs. M. J., Thabazimbi.
Dersley, Mrs. J. E., Somerset East.
Devereux-Quicke, Mrs. E., Piet Retief.
de Villiers, Mrs. E. E., Carletonville.
de Wet, Mrs. D. R., Welkom.
Dietrich, Mrs. A., Port Elizabeth.
Dixon, Mrs. E. W., Germiston.
Downey, Mrs. J. C., Springs.
Dreyer, Mrs. L., Westonaria.
Driscoll, Mrs. F. R. V., Port Elizabeth.
Dunk, Mrs. H. A. S., Port Elizabeth.
Dunstan, Mrs. R. S., Port Elizabeth.
Eastman, Mrs. H. A., Somerset West.
Edwards, Mrs. H., Middelburg.

Edwards, Mrs. R. G., Johannesburg.
Enfield, Mrs. E. C., Johannesburg.
Erasmus, Mrs. J. C. K., Port Elizabeth.
Erikson, Mrs. J. G. F., Estcourt.
Erikson, Miss, Estcourt.
Ewing, Mrs. R. G., East London.
Ford, Mrs. W. P., Lusaka.
Frantz, Mrs. A. C. T., Cape Town.
Fraser, Mrs. D. H., Durban.
Gericke, Mrs. M. R., Johannesburg.
Gradwell, Mrs. R. D., Uitenhage.
Grant, Mrs. A. C., Johannesburg.
Haig, Mrs. F. S., Springs.
Haig-Smith, Mrs. D., Cradock.
Hain, Mrs. G. R., Alberton.
Halliday, Mrs. K. W. J., Port Shepstone.
Hancock, Mrs. R. K., Port Elizabeth.
Harding, Mrs. G. R. D., Johannesburg.
Harper, Mrs. F. G., Salisbury.
Henegan, Mrs. B., Port Elizabeth.
Heunis, Mrs. G. B., Standerton.
Heydenrych, Mrs. J. E., Middelburg.
Hyam, Mrs. A., Cradock.
Inglis, Mrs. J. I., Pietersburg.
Isherwood, Mrs. J., Port Elizabeth.
Jamneck, Mrs. L., Vanderbijlpark.
Jessup, Mrs. G. L., Port Elizabeth.
Jones, Mrs. N. D., Johannesburg.
Jones, Mrs. P. A., Port Elizabeth.
Karstaedt, Mrs. A.J., Port Elizabeth.
Killips, Mrs. C., Ladysmith.
Kirberger, Mrs. M. N., Bethal.
Kirschner, Mrs. N., Elandsfontein.
Knox, Mrs. H. J. U., Pietersburg.
Koeslag, Mrs. H. J., Riversdale.
Kok, Mrs. P. R., Brandfort.
Kotze, Mrs. J. F., Randfontein.
Kriek, Mrs. C. J., Carletonville.
Kruger, Mrs. M. J. C., Port Alfred.
Lategan, Mrs. J. F., Stellenbosch.
Leishman, Mrs. R. W., Johannesburg.
Lever, Mrs. W. T., Pretoria.
Liebenberg, Mrs. S. J., Pretoria.
Lineker, Mrs. A. W., Johannesburg.
Lockhart, Mrs. J. W., Cape Town.
Lombard, Mrs. C., Germiston.
Lotter, Mrs. G. A., Louis Trichardt.
Ludwig, Mrs. G. E., Johannesburg.
Marais, Mrs. E. J., Port Elizabeth.
Marsh, Mrs. T. C., Johannesburg.
Martin, Mrs. E. B., Johannesburg.
McCracken, Mrs. S., Johannesburg.
Meyer, Mrs. W. F., Welkom.
Millen, Mrs. T. J., Tzaneen.
Miller, Mrs. D., Meyerton.
Milton, Mrs. W. H., Johannesburg.
Mitchell, Mrs. J. E., Kitwe.
Mocke, Mrs. T. M., Piet Retief.
Morrison, Mrs. J. A., Johannesburg.
Muller, Mrs. G. J., Bloemfontein.
Murray Nobbs, Mrs. D., Port Elizabeth.
Neethling, Mrs. F. C., Port Elizabeth.
Nel, Mrs. A. R., Roodepoort.
Nel, Mrs. I. F., Port Elizabeth.
Nothard, Mrs. Q. R., Johannesburg.
Owen, Mrs. R. E., Port Elizabeth.
Paull, Mrs. R. A., Umtata.
Peters, Mrs. A. G., Gwelo.
Phillips, Mrs. F. W., Mossel Bay.
Potgieter, Mrs. N. A., Brits.
Prins, Mrs. F. J., Pretoria.
Prins, Mrs. H., Johannesburg.
Prosser, Mrs. L. N., Port Elizabeth.
Pyman, Mrs. R. B., Johannesburg.
Rademeyer, Mrs. N. P., Port Elizabeth.
Randles, Mrs. T. L., Klerksdorp.
Reed, Mrs. B. N., Kokstad.
Richardson, Mrs. J. G., Mbabane.
Rist, Mrs. C. A., Johannesburg.
Roeske, Mrs. G., Johannesburg.
Rossler, Mrs. A., Pietermaritzburg.
Rossler, Mrs. W., Kroonstad.
Royal, Mrs. A. R., Germiston.
Scanes, Mrs. R. A., Port Elizabeth.
Schauder, Mrs. H., Port Elizabeth.
Scott, Mrs. A., Johannesburg.
Scott, Mrs. S. C., Port Elizabeth.
Shelton, Mrs. J. E., Port Elizabeth.
Smit, Mrs. E., Pretoria.
Smith, Mrs. E. J., Standerton.
Smith, Mrs. N. C., Port Elizabeth.
Soper, Mrs. D. E., Johannesburg.
Spurr, Mrs. A. J., Robertson.
Stanton, Mrs. R. J. G., Oudtshoorn.
Stevens, Mrs. F., Ladysmith.
Straszacker, Mrs. R. L., Johannesburg.
Strawson, Mrs. T. R., Johannesburg.
Summers, Mrs. H. E., Bulawayo.
Sutcliffe, Mrs. V. T., Johannesburg.
Sutherland, Mrs. D. G., Pietermaritzburg.
Sutherland, Mrs. J. C., Port Elizabeth.
Steer, Mrs. W., Salisbury.
Thackwray, Mrs. W. G., Kokstad.
Theron, Mrs. G. C., Vanderbijlpark.
Thuynsma, Mrs. J. C., Springs.
Tomlin, Mrs. A. W., East London.
Toop, Mrs. G. H., Johannesburg.
Torrance, Mrs. A. E., Johannesburg.
van den Berg, Mrs. C. J., Louis Trichardt.
van der Merwe, Mrs. F., Stilfontein.
van Harten, Mrs. G. H., Cape Town.
van Heerden, Mrs. W. J. B., Heidelberg.
van Meerdervoort, Mrs. J. K. L. pompe, Barberton.
van Wyk, Mrs. A. A., Meyerton.
Verschoor, Mrs. D. R., Fort Beaufort.
von Ahlften, Mrs. J. K., Springs.
von Lindern, Mrs. C., Johannesburg.
Waddy, Mrs. J. C., Pietermaritzburg.
Wardle, Mrs. E. B., Port Elizabeth.
Webber, Mrs. C. E., Johannesburg.

Wessels, Mrs. J. M., Roodepoort.
White-Cooper, Mrs. D., Pietermaritzburg.
Williams, Mrs. A. T., Johannesburg.
Wilson, Mrs. J., Pretoria.
Wiehahn, Mrs. G. D., Bethlehem.
Woods, Mrs. B., Port Elizabeth.
Young, Mrs. C. J., Port Elizabeth.

President and Wife Receiving Guests
at 50th Anniversary Banquet.

The Thirty-Ninth Convention of the Association was opened in the Feathermarket Hall, Port Elizabeth, on Tuesday, 11th May, 1965. Attendance at the Convention was as follows:
89 Councils, represented by 51 Councillors and 120 Engineers and Associates; 7 Honorary Members (not representing Councils or Affiliates); 8 Associate Members, 97 representatives of 63 Affiliates; 48 Visitors (representing Government Departments, Public utilities and other organisations); 169 ladies, 3 A.M.E.U. Officials — a total of 503 persons.

Die 39e konvensie van die Vereniging is geopen op Dinsdag 11 Mei 1965 in die Veremarksaal, Port Elizabeth en is deur die volgende bygewoon:
89 stadsrade, verteenwoordig deur 51 raadslede en 120 ingenieurs en ge-assosieerdes; 7 ere-lede (nie verteenwoordigers van stadsrade of ge-affilieerdes nie); 8 verbonde lede; 97 verteenwoordigers van 63 ge-affilieerdes; 48 besoekers (verteenwoordigers van staatsdepartemente, openbare nutsbedrywe en ander organisasies); 169 dames; 3 VMEO-amptenare — 'n totaal van 503 persone.

FIRST DAY/EERSTE DAG

The President greeted those at the Convention and referred to the fact that it marked the 50th Anniversary of the Association. He then called upon the Rev. B. Woods to lead those present in prayer.

The President then introduced the Mayor of Port Elizabeth, Councillor Graham Young who, in officially welcoming the delegates to Port Elizabeth, referred to the importance of the convention to the whole of Southern Africa. Councillor Young continued by referring to the importance of electricity in our lives, a memorandum which the Association had submitted on the Orange River Scheme and the proposals to link the electricity distribution systems of the Western Cape with those of the Transvaal and O.F.S. This latter development would, he said, arouse lively interest in other areas such as Port Elizabeth. The Mayor continued by referring to the great developments which had taken place in Port Elizabeth over recent years but regretted the backlog in the city in respect of cultural activities, amenities for the non-European population and housing. The reason for these was stated to be the restrictive income available to City Councils and in this respect Councillor Young said that the interim reports of the Borckenhagen Commission had produced little to give joy to City Councillors and Treasurers. This being the case, it appeared that Councils would have no option in the future but to seek other sources of income within their own spheres and in this regard, electricity undertakings were one of the few which indicated scope for increased revenue which might be available for general Municipal purposes. In conclusion, the Mayor wished the delegates a pleasant visit to the "Friendly City".

The President next introduced Hr. E. J. Marais, Principal of the University of Port Elizabeth. Dr. Marais referred to the honour and privilege he had in delivering the Official Opening Speech to the Convention, the 50th Anniversary of the Association and the 60th Anniversary of the Port Elizabeth Electricity Undertaking. He referred to the recognition granted by the Association to the establishment of the University of Port Elizabeth by asking him to officially open the

Die President het die konvensiegangers verwelkom en melding gemaak van die feit dat dit die 50e verjaardag van die Vereniging was. Hy versoek daarna eerwaarde B. Woods om voor te gaan in gebed.

Daarna stel die President die burgemeester van Port Elizabeth, raadslid Graham Young, aan die woord wat in sy amptelike verwelkoming van afgevaardigdes na Port Elizabeth melding maak van die belangrikheid van die konvensie vir die gehele Suidelike Afrika. Raadslid Young vervolg met verwysing na die belangrikheid van elektrisiteit in ons lewe, 'n memorandum wat die Vereniging oor die Oranjerivierskema voorgelê het en die voorstelle om die elektrisiteitverspreidingstelsels van Wes-Kaapland met dié van die Transvaal en die OVS te koppel. Laasgenoemde verwikkeling, het hy gesê, sal lewendige belangstelling in ander gebiede, soos Port Elizabeth, gaande maak. Die burgemeester verwys ook na die groot uitbreidings wat in Port Elizabeth gedurende die onlangse jare plaasgevind het maar moes sy spyt uitspreek oor die stad se agterstand ten opsigte van kulturele aktiwiteite, geriewe vir nie-blankes en behuising. Hy skryf dit toe aan die beperkte beskikbare inkomste van stadsrade en in dié opsig, sê raadslid Young, bevat die tussentydse verslae van die Borckenhagen-kommissie weinig tot vreugde van stadsraadslede en stads tesouriers. Synde die geval, blyk dit asof stadsrade geen keuse in die toekoms sal hê nie as om ander interne inkomstebronne te soek en in hierdie opsig is die elektrisiteitsonderneming een van die weiniges wat moontlikhede toon van verhoogde inkomste wat moontlik vir algemene munisipale doeleindes aangewend kan word. Ter afsluiting wens die burgemeester die afgevaardigdes 'n aangename verblyf in die "Vriendelike Stad" toe.

Vervolgens stel die President, dr. E. J. Marais, rektor van die Universiteit van Port Elizabeth, voor. Dr. Marais verwys na die eer en voorreg hom verleen om die amptelike openingsrede te lewer by die konvensie, die 50e verjaardag van die Vereniging en die 60e verjaardag van Port Elizabethse elektrisiteitsonderneming. Hy verwys na die erkenning deur die Vereniging aan die Universiteit van Port Elizabeth betoon deur hom te vra om die konvensie amptelik te open en bedank

Convention and thanked the Association on behalf of his Council as well as personally. In the past, industrial development in South Africa had largely been based on knowledge and experience imported from overseas, but despite the fact that areas, particularly America and Europe, remain foremost in scientific endeavour, "environmental factors" were tending to make it increasingly important for research to be undertaken in our own country. Today research was by no means necessarily non-lucrative in its end result. The following examples were quoted:

"Let us refer to an example with which you are all familiar and one about which I know the details. The Tellurometer (an electronic distance measuring device) and the Racal Radio Receiver discovered through the efforts of one individual in the CSIR, had a turnover in the world market by the end of 1963 of roughly R12 x 10^6. Incidentally, approximately half of this amount was from manufacture in South Africa. Consider yet another example. The research and development work carried out by Bell Labs for pioneering the microwave radio-relay system across America in the late fifties cost the organisation about $15 x 10^6 over 14 years. About 65% was spent on salaries plus overheads and about 35% for direct charges, materials, etc., and about 500 man-years scientific and technical effort were expended on the project. This led to direct sales by one company of $175 x 10^6 in equipment and a total business of $250 x 10^6, if buildings etc. are included."

In the field of power electrical engineering, Dr. Marais said that fundamental research was required in South Africa. There, unversities could perhaps make the biggest contribution and in the field of more applied research including systems engineering, the CSIR, ESCOM and other large organisations should make their contributions. On the question of whether research could be afforded in South Africa, Dr. Marais quoted the following statistical information based on figures available for 1963 of equipment installed throughout the South African Electricity Undertakings:

TABLE I

Equipment	Municipal Undertakings	Escom
Underground Cables*		
High Voltage	7,861 miles	733 miles
Low Voltage	5,613 „	304 „
total	13,474 „	1,037 „
Overhead Mains*		
High Voltage	7,655 miles	17,977 miles
Low Voltage	14,103 „	2,134 „
total	21,758 „	20,110 „
Total Capacity of Generating Sets in MW	2,083	4,175
Total Capacity of Transformers installed in MVA	8,160	20,058
Units sold 1963 in million Kwh	8,600	19,500

*Statutory Definition of High Voltage is voltage above 1,000 volts.

die Vereniging namens sy raad en homself. In die verlede was nywerheidsontwikkeling hoofsaaklik gebaseer op kennis en ondervinding van oorsee maar tenspyte van die feit dat gebiede, veral Amerika en Europa, nog steeds die voortou neem t.o.v. wetenskaplike ywer, word navorsing in ons eie land, as gevolg van „omgewingsfaktore", al hoe dringender. Vandag is die eindresultaat van navorsing nie noodwendig nie-winsgewend nie. Die volgende voorbeelde word aangehaal:

Dr. Marais sê dat op die gebied van elektriese kragingenieurswese basiese navorsing in Suid-Afrika 'n vereiste is. Hier kan die universiteite moontlik die grootste bydrae lewer en op die gebied van meer toegepaste navorsing, insluitend sisteemtegniek, behoort die WNNR, EVKOM en ander groot organisasies hul deel te doen. Oor die vraag of navorsing bekostig kan word in Suid-Afrika haal dr. Marais die volgende statistiese inligting aan wat gebaseer is op die beskikbare syfers vir 1963 van toerusting geïnstalleer in al die Suid-Afrikaanse ondernemings:

TABEL I

Toerusting	Munisipale Ondernemings	Evkom
Ondergrondse kabels*		
Hoogspanning	7,861 myl	733 myl
Laagspanning	5,613 „	304 „
Totaal	13,474 „	1,037 „
Bogrondse Geleidings*		
Hoogspanning	7,655 myl	17,977 myl
Laagspanning	14,103 „	2,134 „
Totaal	21,758 „	20,110 „
Totale vermoë van opwekkers, MW	2,083	4,175
Totale vermoë van Transformators, MW	8,160	20,058
Eenhede verkoop in 1963, Miljoen kWu	8,600	19,500

*Statutêre definisie van „hoogspanning" is spanning bokant 1,000 V.

TABLE II

Gross Capital Expenditure in the generation of Electricity. (Period) I	Total Gross Capital Formation (excluding net change in inventories and transfer costs). (Period) II	I / II x 100% III
R55.4 x 10^6 (1956/57)	R869 x 10^6 (1956)	6.4%
R54.6 x 10^6 (1957/58)	R942 x 10^6 (1957)	5.8%
R59.8 x 10^6 (1958/59)	R1,058 x 10^6 (1958)	5.7%
R58.6 x 10^6 (1959/60)	R1,027 x 10^6 (1959)	5.6%
R62.6 x 10^6 (1960/61)	R1.073 x 10^6 (1960)	5.8%
R61.6 x 10^6 (1961/62)	R1,075 x 10^6 (1961)	5.7%

TABEL II

Bruto kapitaalbesteding in die opwekking van elektrisiteit (Tydperk) I	Totale bruto kapitaalvorming (uitgeslote inventaris-wisselings en oordragkostes) (Tydperk) II	I / II x 100% III
R55.4 x 10^6 (1956/57)	R869 x 10^6 (1956)	6.4%
R54.6 x 10^6 (1957/58)	R942 x 10^6 (1957)	5.8%
R59.8 x 10^6 (1958/59)	R1,058 x 10^6 (1958)	5.7%
R58.6 x 10^6 (1959/60)	R1,027 x 10^6 (1959)	5.6%
R62.6 x 10^6 (1960/61)	R1.073 x 10^6 (1960)	5.8%
R61.6 x 10^6 (1961/62)	R1,075 x 10^6 (1961)	5.7%

Amplifying these tables, Dr. Marais referred to the fact that during 1963 the total units sold in South Africa were 28,100 million kwh and that South Africa ranks eleventh in the world in the amount of electricity generated annually, being some 75% of the output of the whole of Africa. This very large and virile industry represents existing capital investment of nearly 1,000 million Rand and an expansion by ESCOM over the next 10 years was estimated to cost more than 400 million Rand. This, with the municipal sectors of the industry, would give a total of nearly R600 million of expansion over the next 10 years — most certainly a capital investment worthy of thorough investigation and planning. The gross annual capital expenditure in the generation of electricity was stated to be no less than approximately 5.7% of the total annual capital formation in the Republic. Dr. Marais summarised by stating:

"I hope I have drawn attention not only to the known fact that this is one of the largest and most important key industries of the Republic, with its immense opportunities for Industrial development, but have, in addition, focussed attention on the need for thinking in more courageous terms of local technological development and also local manufacture of plant, which in turn brings us to consider local Research and Development and Training facilities."

He called upon South African industries to shed the complex of South Africa still being a "developing country" and to think in more courageous terms of manufacture in fields of bigger sophistication, especially if this is based on such a large and consistently growing industry as that of power generation.

Development in heavy engineering would, he believed, initiate further technological development to take the "local environment" into consideration and, in the long run, would be in the best interests of parent companies overseas. World leaders in Industry appreciated that whilst industry could be established on the basis of "know-how", research and technical

Ter aanvulling van die tabelle verwys dr. Marais na die feit dat in 1963 28,100 miljoen kWu in Suid-Afrika verkoop is en dat Suid-Afrika elfde in die wêreldorde staan t.o.v. jaarlikse opwekking van elektrisiteit, synde ongeveer 75% van die produksie van die hele Afrika. Hierdie baie groot en kragtige nywerheid verteenwoordig 'n bestaande kapitaalbelegging van byna R1,000 miljoen en die koste van alleen Evkom-uitbreidings gedurende die volgende tien jaar word beraam op R400 miljoen. Tesame met die munisipale sektors van dié nywerheid sal die totale koste van uitbreiding gedurende die volgende tien jaar byna R600 miljoen beloop — gewis 'n kapitaalbelegging wat deeglike ondersoek en beplanning verg. Dit is genoem dat die jaarlikse bruto kapitaalbesteding in die opwekking van elektrisiteit nie minder as 5.7% van die totale jaarlikse kapitaalvorming van die Republiek is nie. Dr. Marais som soos volg op:

Hy doen 'n beroep op Suid-Afrikaanse nywerhede om ontslae te raak van die kompleks dat Suid-Afrika nog steeds 'n „ontwikkelende land" is en om 'n moediger denkrigting in te slaan m.b.t. vervaardiging op die gebiede van groter sofisme veral as dit gegrond is op so 'n groot en 'n bestendiggroeinde nywerheid soos kragopwekking.

Hy glo dat uitbreiding op die gebied van swaar ingenieurswese verdere tegnologiese ontwikkeling aan die gang sal sit, wat die „plaaslike omgewing" in aanmerking neem en wat op die lange duur tot die beste voordeel van die oorsese moedermaatskappye sal wees. Wêreldnywerheidsleiers besef dat, hoewel nywerhede tot stand kan kom op 'n vaardigheids-

manpower imported wholly and continuously, healthy local development must be based on a reasonable and increasing local content of these various elements of modern industry, and problems which were worthy of research in South Africa in the electrical field were the high electrical resistance and poor thermal conductivity of our soil, together with the high resistance and isokeraumic levels over large areas of the Republic.

Referring to development in electrical engineering, Dr. Marais mentioned the fact that 500 megawatt generating sets were now becoming common and that ESCOM had already placed orders for units of 200 MW. Digital computors were coming more and more into the picture as control units for machines of this magnitude. Engineering of this calibre called for the application of techniques developed in the **high** current field now applied to power engineering. He called upon the Association, manufacturers and ESCOM to support the work of the Research Group in power engineering established by the CSIR in one of the laboratories for which Dr. Marais had supervisory responsibility. He hoped that the University of Port Elizabeth would play its part in future development in engineering training and research.

In officially opening the Convention and wishing those present success in their deliberations, Dr. Marais referred to the high standard of the papers to be presented to the Convention.

The President thanked Dr. Marais for his very thought-provoking and inspiring address and expressed the gratitude of all to him for giving of his valuable time. He then introduced the next item on the Agenda "the ratification of the actions of the Executive Council". He recalled the fact that at the Windhoek Convention there was a difference of opinion regarding the provincial representation arising from the election of the Executive Council and that he had given an interpretation which was accepted by the Convention on condition, however, that Counsel's opinion was taken. Counsel's opinion was that the interpretation had not been correct and that the Executive Council was accordingly not constituted in terms of the Constitution. To overcome the problem, the full membership of the Association as represented at this Convention was requested to give formal ratification of the actions of the Executive Council during the past year. This ratification was given unanimously on a show of hands.

The President then called upon Mr. Kane of Johannesburg to speak in connection with the induction of the new President. Mr. Kane referred to the election the previous year of the very capable Electrical Engineer of Port Elizabeth, Mr. D. Murray-Nobbs, as Vice-President of the Association. Details of his career were then given and published in the Proceedings of that Convention. The Constitution had been altered during the Windhoek Convention to the extent that the Vice-President had now become the President-elect and hence Mr. Kane and Councillor Rademeyer would be undertaking the new task of asking Bob Barton to induct David Murray-Nobbs into the Presidential office rather than proposing him as President as would have been the case in the old Constitution.

Mr. Kane referred to the fact that Mr. Murray-Nobbs was appointed City Electrical Engineer designate by Port Elizabeth in recognition of his particularly outstanding services rendered in a rather troublesome period of that City's

grondslag, navorsing en tegniese mannekrag wat in sy geheel en aaneen ingevoer word, gesonde plaaslike ontwikkeling gegrond moet wees op 'n redelike en toenemende plaaslike inhoud van hierdie verskeie elemente van die moderne nywerheid, en die probleme wat navorsingswaardig is in Suid-Afrika op die gebied van elektrisiteit is die hoë elektriese weerstand en swak termiese geleidingsvermoë van ons grond, gepaard met die hoë frekwensie van donderstorms in groot gedeeltes van die Republiek.

Met verwysing na die vooruitgang in die elektrotegniese ingenieurswese, noem dr. Marais die feit dat generatorstelle van 500 MW reeds alledaags is en dat EVKOM reeds bestellings geplaas het van 200-MW-eenhede, Syferekenaars kom al hoe meer in die prentjie as beheereenhede vir masjiene van hierdie grootte. Ingenieurs van hierdie kaliber vereis die toepassing van tegnieke en kragingenieurswese wat ontwikkel is op die gebied van swakstroom. Hy doen 'n beroep op die Vereniging, fabrikante en EVKOM om die werk te ondersteun van die WNNR se navorsingsgroep vir kragingenieurswese wat ontstaan het in een van die laboratoria waarin dr. Marais toesighoudende verantwoordelikheid beklee het. Hy hoop dat die Universiteit van Port Elizabeth sy rol sal speel in die toekomstige uitbouing van ingenieursopleiding en -navorsing.

Dr. Marais verklaar die konvensie as amptelik geopen, wens die teenwoordoges sukses toe met hul beraadslagings en verwys terselfdertyd na die hoë gehalte van die referate wat tydens die konvensie gelewer sal word.

Die President bedank dr. Marais vir sy uiters gedagteprikkelende en inspirerende rede en spreek die dank namens almal teenoor hom uit vir sy kosbare tyd wat hy opgeoffer het. Hy stel daarna die volgende besprekingspunt aan die orde, t.w. „Die bekragtiging van die handelinge van die uitvoerende komitee". Hy haal die feit aan dat daar tydens die Windhoekse konvensie verskil van mening was oor provinsiale verteenwoordiging wat voorgespruit het uit die verkiesing van die uitvoerende komitee en dat hy 'n vertolking gegee het wat deur die konvensie aanvaar is, maar op voorwarde dat regsadvies ingewin word. Die regsadvies was dat die vertolking nie korrek was nie en dat die uitvoerende komitee dus onkonstitusioneel saamgestel was. Om hierdie probleem te oorbrug, word die volle lidmaatskap van die Vereniging, soos by hierdie konvensie verteenwoordig, versoek om amptelik die handelinge van die uitvoerende komitee gedurende die afgelope jaar te bekragtig. Dit word hoofdelik en eenparig gedoen.

Die President vra daarna mnr. Kane van Johannesburg om te praat oor die inhuldiging van die nuwe president. Mnr. Kane verwys na die verkiesing die vorige jaar van die uiters bekwame elektrotegniese stadsingenieur van Port Elizabeth, mnr. D. Murray-Nobbs, as onderpresident van die Vereniging. Besonderhede van sy loopbaan is toentertyd verstrek en opgeneem in die verrigtinge van daardie konvensie. Tydens die Windhoekse konvensie is die konstitusie gewysig sodat die onderpresident nou die aangewese president geword het; gevolglik sal mnr. Kane en raadslid Rademeyer die nuwe taak waarneem om Bob Barton te versoek om David Murray-Nobbs te bevestig in die presidensiële amp in plaas van om hom voor te stel as president soos die geval sou gewees het kragtens die ou konstitusie.

history and felt that its citizens had never regretted that decision. He continued by congratulating Mr. Barton on his efforts as President of the Association. He congratulated the President-elect for the obviously outstanding preparations for this Convention and said what a pleasure it was to be with him in his home town and to let him know that the efforts of he and his staff were appreciated and lastly, wished him a very happy year of office which he knew would be efficiently and pleasantly conducted.

Councillor Rademeyer addressed the Convention and referred to the very great honour that he, as Chairman of the Electricity Committee of Port Elizabeth, felt in seeing their City Electrical Engineer become the President of the Association. He expressed appreciation for the work done by Mr. Bob Barton, the outgoing President, and expressed confidence that under the leadership of Mr. David Murray-Nobbs, the Association would grow from strength to strength.

The President-elect, Mr. D. Murray-Nobbs, was thereupon inducted as President of the Association and in declaring him to be the new President, Mr. Barton wished him a very happy and successful year.

Mr. Murray-Nobbs addressed the Convention and stated that in accepting, with all modesty, the honour conferred upon him, he wished to express appreciation to his old friend, Mr. Bobby Kane, and his Chairman, Councillor Piet Rademeyer, for the very kind remarks they had made concerning him.

The President then called for nominations for the office of President-elect for the ensuing year. In proposing Mr. G. C. Theron of Vanderbijlpark as President-elect, Mr. C. G. Lombard, Germiston, referred to "Hawie", as he is known to his friends, as having graduated in electrical engineering at the University of Cape Town and after working in South Africa, proceeding overseas and gaining experience with a leading manufacturing concern. In 1939 he joined the Municipal Service as Electrical Engineer of Hercules and since 1947 had been in the service of Vanderbijlpark, becoming the Town Electrical Engineer to the Municipality on its establishment in 1950. Mr. Lombard continued by detailing some of the outstanding achievements for which Mr. Theron had been responsible and concluded by formally nominating him as President-elect.

In seconding the proposal, Councillor L. Jamneck, Vanderbijlpark, spoke of the work which Mr. Theron had done for the Association on various committees and expressed the opinion that with his assistance the Association could continue to go forward in its endeavours.

There being no further nominations, Mr. Theron was unanimously elected President-elect of the Association for the ensuing year.

Mr. Theron, in expressing thanks for the great honour which had been accorded to Vanderbijlpark in electing him as President-elect of the Association, pledged himself with his town to serve the A.M.E.U. He also personally thanked the Proposer and Seconder of his nomination.

Councillor L. Jamneck spoke on the Venue for the next Convention and proposed that it took place in Lourenco Marques. He referred to the fact that at the moment Vanderbijlpark was not in a position to house the Convention of the Association and stated that in proposing Lourenco Mar-

Mnr. Kane verwys na die saamstelling van mnr. Murray-Nobbs as aangewese elektrotegniese stadsingenieur van Port Elizabeth ter erkenning van sy buitengewone uitstaande diens in 'n nogal lastige tydperk van daardie stad se geskiedenis en voel dat die inwoners nog nooit spyt was oor daardie besluit nie. Voorts wens hy mnr. Barton geluk met sy ywer as president van die Vereniging. Hy wens die aangewese president geluk met die klaarblyklike uitstaande voorbereidings vir hierdie konvensie en sê dat dit 'n plesier is om saam met hom in sy geboortestad te verkeer en hom te verseker dat sy en sy personeel se ywer waardeer word, en, eindelik, om hom 'n baie gelukkige ampstermyn toe te wens. Hy weet dat mnr. Murray-Nobbs sy amp bekwaam en aangenaam sal beklee.

Raadslid Rademeyer spreek die konvensie toe en sê dat dit 'n groot eer vir hom, as voorsitter van die elektrisiteitskomitee van Port Elizabeth, is om te sien dat hul elektrotegniese stadsingenieur die president van die Vereniging word. Hy spreek sy waardering uit teenoor mnr. Bob Barton, die uittredende president, asook die vertroue dat die Vereniging onder die leiding van mnr. David Murray-Nobbs van krag tot krag sal gaan.

Mnr. Murray-Nobbs spreek die konvensie toe en sê dat hy in alle beskiedenheid die eer hom betoon, aanvaar. Hy spreek sy waardering uit teenoor sy ou vriend, mnr. Bobby Kane, en sy voorsitter, Raadslid Piet Rademeyer, vir die baie vriendelike opmerkings wat hulle oor hom gemaak het.

Die President vra daarna nominasies vir die amp van aangewese president vir die daaropvolgende jaar. Mnr. C. G. Lombard, Germiston, stel mnr. G. C. Theron, Vanderbijlpark, voor. Hy meld dat „Hawie", soos hy by sy vriende bekend is, aan die Universiteit van Kaapstad in elektrotegniese ingenieurswese gegradueer en hom daarna oorsee begewe het om ondervinding by 'n leidende fabrikant op te doen. In 1939 het hy die munisipale diens betree as elektrotegniese ingenieur van Hercules; sedert 1947 was hy in diens van Vanderbijlpark alwaar hy die elektrotegniese stadsingenieur geword het van die munisipaliteit met dié se totstandkoming in 1950. Mnr. Lombard verstrek voorts besonderhede van sommige van mnr. Theron se uitstaande prestasies en sluit af deur hom formeel as aangewese president voor te stel.

Raadslid Jamneck, Vanderbijlpark, sekondeer die voorstel en vertel van die werk wat mnr. Theron in verskeie komitees gedoen het en spreek die opinie uit dat, met sy hulp, die Vereniging steeds kan voortgaan met sy strewes.

Aangesien daar geen verdere nominasies was nie, word mnr. Theron eenparig as aangewese president van die Vereniging vir die daaropvolgende jaar verkies.

Mnr. Theron spreek sy dank uit vir die groot eer wat Vanderbijlpark te beurt geval het deur hom as aangewese president te verkies en verbind hom en sy dorp om die VMEO te dien. Hy bedank ook sy voorsteller en sekondant persoonlik.

Raadslid L. Jamneck praat oor die vergaderplek van die volgende konvensie en stel voor dat dit Lourenco Marques sal wees. Hy sê dat Vanderbijlpark op die oomblik nie in staat is om 'n konvensie van die Vereniging te huisves nie en meld dat, met sy voorstel van Lourenco Marques as vergader-plek, hy meen dat dit tot die grootste voordeel kan strek om 'n ontluikende vriendskap met daardie stad en Mosambiek te ontwikkel indien die konvensie daar plaasvind. Hy wys

ques as the venue, he felt that it would be of the greatest value in developing friendship and good relations with that city and Mocambique, if the Convention of the Association were held there. He pointed out that from a travel point of view it was not difficult to reach Lourence Marques from from the greater part of the Republic and Rhodesia.

Councillor F. F. Deysel (Springs), seconded Cr. Jamneck's proposal and spoke of the parallel between this case and that when Springs and Margate had co-operated in a similar manner. Cr. Deysel spoke of the bonds of unity and of friendship existing between not only Rhodesia and the Republic but also with the Portuguese territories. He felt that it was the duty and function of cities of the Republic and Rhodesia to strengthen these bonds with the Portuguese territories and that the holding of the Association's next Convention in Lourenco Marques would assist towards this end.

The proposal was received with acclamation and there being no adverse comments, was carried unanimously.

The following apologies and greetings were next conveyed to the Convention:

Mr. Chris Downie, a Past President whom it was announced was now living in Great Britain.
Mr. Atteridge, Sasolburg.
G. A. Dalton.
Councillor Gluckman, Port Alfred.
Ronald Simpson.
C. F. Hafele.
W. J. Gibbons.
H. J. Gripper.
Johan van der Walt.
J. C. Fraser.
Robert Sibson.
Alan Dalton.
Viljoenskroon Municipality.
Town Council of Odendaalsrus.
Town Council of Alberton.
Town Council of Benoni.
Parow Municipality.
Dewetsdorp Municipality.
Municipality of Stutterheim.
Municipality of Walvis Bay.
Municipality of Bethlehem.
Graaff-Reinet Municipality.
Nelspruit Municipality.
Potgietersrus Municipality.
Borough of Eshowe.
Harrismith Municipality.
Municipality of Matatiele.
Livingstone Municipality.
The English Electric Co. (Central Africa) (Pvt.) Ltd.
Rhotec Sales (Pvt.) Ltd.
The British General Electric Co. of Central Africa (Pvt.) Ltd.
S. Cohen Limited.
Inspector of Factories (Machinery), South West Africa, D. F. Messidat.
President, Port Elizabeth Chamber of Commerce.
Chief Electrical Engineer, Department of Public Works, Pretoria.

daarop dat vanuit 'n reisoogpunt Lourenco Marques maklik bereikbaar is vanaf die grootste deel van die Republiek en Rhodesië.

Raadslid F. F. Deysel (Springs) sekondeer raadslid Jamneck se voorstel en wys op die ooreenkoms tussen hierdie geval en dié toe Springs en Margate insgelyks moes saamwerk. Raadslid Deysel sê dat daar nie slegs eenheidsbande tussen Rhodesië en die Republiek bestaan nie maar ook met die Portuguese gebiede. Hy voel dat dit die plig en funksie van stede in die Republiek en Rhodesië is om hierdie bande met die Portuguese gebiede te verstrek en die hou van die Vereniging se volgende konvensie in Lourenco Marques sal daartoe bydra.

Die voorstel het groot byval gevind en aangesien daar geen ongunstige kommentaar was nie, is dit eenparig aangeneem.

Die volgende verskonings en groete is vervolgens aan die konvensie oorgedra:

Mnre. Chris Downie, 'n oud-president wat, volgens 'n mededeling nou in Brittanje woon.
Atteridge, Sasolburg.
G. A. Dalton.
Raadslid Gluckman, Port Alfred.
Ronald Simpson.
C. F. Hafele.
W. J. Gibbons.
H. J. Gripper.
Johan v. d. Walt.
J. C. Fraser.
Robert Sibson.
Alan Dalton.
Viljoenskroon se munisipaliteit.
Stadsraad van Odendaalsrus.
Stadsraad van Alberton.
Stadsraad van Benoni.
Parow se munisipaliteit.
Dewetsdorp se munisipaliteit.
Stutterheim se munisipaliteit.
Walvisbaai se munisipaliteit.
Bethlehem se munisipaliteit.
Graaff-Reinet se munisipaliteit.
Nelspruit se munisipaliteit.
Potgietersrus se munisipaliteit.
Dorpsgebied van Eshowe.
Harrismith se munisipaliteit.
Matatiele se Munisipaliteit.
Livingstone se munisipaliteit.
The English Electric Co. (Central Africa) (Pvt.) Ltd.
Rhotec Sales (Pvt.) Ltd.
The British General Electric Co. of Central Africa (Pvt.) Ltd.
S. Cohen Limited.
Die Fabrieksinspekteur (Masjienerie), Suidwes-Afrika, D. F. Messidat.
President, Port Elizabeth s Kamr van Handl.
Die Elektrotegniese Hoofingenieur, Departement van Openbare Werke, Pretoria.

The American Consul, Port Elizabeth.
The Regional Secretary, Department of Community Development, P.E.
Escom, Natal Undertaking.
Transvaal Provincial Administration.
C. B. Anderson, President, Transvaal and O.F.S. Chamber of Mines.
The Chairman, Fuel Research Institute of South Africa.
The Chairman, Industrial Development Corporation of S.A.
J. N. Malan, His Honour, The Administrator of the Cape Province.
The Chairman, Central African Power Corporation.
Ministry of Transport and Power, Salisbury.

These were followed by greetings personally conveyed from the floor, as follows:

Mr. Gericke, Johannesburg, on behalf of the S.A. Institute of Electrical Engineers.
S. J. Hoare, Port Elizabeth, on behalf of J. P. Hugo, General Manager, S.A. Railways and
Mr. A. J. Gosling, Chief Electrical Engineer, S.A. Railways.
Mr. T. R. Strawson, Johannesburg, on behalf of The Institution of Mechanical Engineers.
J. L. Easterbrook on behalf of the Institute of Mechanical & Electrical Engineers.
Prof. A. Heydorn, Stellenbosch, on behalf of the Electricity Control Board.
Prof. G. R. Bozzoli, Johannesburg, on behalf of the University of the Witwatersrand.

Obituary notices were conveyed to the meeting by the President and the Convention stood in memory of Messrs. Denbigh Kinsman and John Calley.

Mr. R. W. Barton was next presented with his Past President's certificate and medal. The President conveyed to him congratulations on the manner in which he had carried out his duties during a difficult year of office. Mr. Barton responded to the President's remarks.

The Convention proceeded to elect the incoming Executive Council. The question was raised as to the position in respect of Past Presidents, arising from the resignation of Mr. J. C. Downey. After discussion, it was agreed that the Convention vote for seven members of the Executive Council, with the following remaining in office:

The President (Mr. D. Murray Nobbs), the President-elect (Mr. G. C. Theron), the Immediate Past President (Mr. R. W. Barton) and the Chairmen of the three Regional Branches.

As a result of the ballot, it was in due course declared that the following were elected to the Executive Council:

P. A. Giles, East London.
J. C. Waddy, Pietermaritzburg.
H. T. Turner, Umtali.
E. E. de Villiers, Bloemfontein.
C. G. Lombard, Germiston.
R. W. Leishman, Johannesburg.
L. Lewis, Windhoek.

The President delivered his Presidential Address and during the presentation Mr. Theron took the Chair.

Die Amerikaanse Konsul, Port Elizabeth.
Die Streeksekretaris, Departement van Gemeenskapsbou, P.E.
Provinsiale Administrasie van Transvaal.
C. B. Anderson, President van die Transvaalse en O.V.S. se Kamer van Mynwese.
Die Voorsitter, Brandstofnavorsingsinstituut van Suid-Afrika.
Die Voorsitter, Nywerheidsontwikkelingskorporasie van Suid-Afrika.
J. N. Malan, Sy Edele die Administrateur van Kaapland.
Die Voorsitter, Central African Power Corporation.
Die Ministerie van Transport en Krag, Salisbury.

Daaropvolgende is die volgende groete persoonlik vanuit die vergadering oorgedra:

Mnr. Gericke, Johannesburg, namens die Suid-Afrikaanse Instituut van Elektrotegniese Ingenieurs.
S. J. Hoare, Port Elizabeth, namens mnr. J. P. Hugo, Hoofbestuurder en
Mnr. A. J. Gosling, Elektrotegniese Hoofingenieur van die S.A. Spoorweë.
Mnr. T. R. Strawson, Johannesburg, namens die Instituut van Meganiese Ingenieurs.
J. L. Easterbrook, namens die Instituut van Meganiese en Elektrotegniese Ingenieurs.
Prof. A. Heydorn, Stellenbosch, namens die Elektrisiteitsbeheerraad.
Prof. G. R. Bozzoli, Johannesburg, namens die Witwatersrandse Universiteit.

Die afsterwe is aan die vergadering bekend gemaak en die konvensie het opgestaan ter nagedagtenis van mnre. Denbigh Kinsman en John Calley.

Die oud-presidentsertifikaat en -medalje word vervolgens aan mnr. R. W. Barton oorhandig. Die President wens hom geluk met die wyse waarop hy in 'n moeilike diensjaar sy pligte uitgevoer het. Mnr. Barton antwoord op die President se opmerkings.

Die konvensie gaan voort om die nuwe uitvoerende komitee te verkies. Die vraag omtrent die posisie van oud-presidente, nou dat mnr. J. C. Downey bedank het, word ge-opper. Ná 'n bespreking word dit besluit dat die konvensie vir sewe lede op die uitvoerende komitee sal stem, wat sal dien saam met die volgende sittende lede:

Die President (mnr. D. Murray-Nobbs), die aangewese president (mnr. G. C. Theron), die onmiddelike vorige president (mnr. R. W. Barton) en die voorsitters van die drie streekstakke.

Die uitslag van die stemming was soos volg:

P. A. Giles, Oos-Londen.
J. C. Waddy, Pietermaritzburg.
H. T. Turner, Umtali.
E. E. de Villiers, Bloemfontein.
C. G. Lombard, Germiston.
R. W. Leishman, Johannesburg.
L. Lewis, Windhoek.

Die President lewer sy presidensiële rede en mnr. Theron ageer daartydens as voorsitter.

In proposing a vote of thanks to the Presidential Address, Mr. P. A. Giles referred to the searching comments and logical observations embodied in the Address as also the history of the Port Elizabeth Electricity Department. In referring to the question of relief of rates, Mr. Giles stated that in the year 1962/63, 136 Municipal electricity undertakings provided over 6 million rand towards the relief of rates.

In seconding the proposal, Mr. A. C. T. Frantz, Cape Town, referred to the rapid growth of the Port Elizabeth Undertaking which it appeared would in due course overtake that of Cape Town. Referring to the relief of rates, he mentioned that contributions by the Electricity Department of Cape Town under this heading amounted to approximately one million rand per annum or about 10% of the revenue from electricity. Without this contribution, it seemed unlikely that Cape Town would have been able to finance many of its developments in recent years.

The President responded to the remarks by Messrs. Giles and Frantz.

Mr. A. A. Middlecote, S.A. Bureau of Standards, presented his paper entitled "Transmission and Distribution Line Equipment" which was published with the Agenda of the Convention.

Mr. J. Wilson, Pretoria, in proposing a vote of thanks to Mr. Middlecote for his paper, referred to the many excellent contributions he had made to the Proceedings of the Association. In support of the beneficial effects of standardisation, Mr. Wilson referred to a recent leading article in one of the overseas journals which he quoted as follows:—

"The need to produce a variety of equipment to different standards places an enormous burden on electrical manufacturers. It is a burden which users of electrical equipment should seek to reduce in their own interests. They may believe they are entitled to have the designs and modifications they are prepared to pay for but in conditions of varying demand (and of too many individual manufacturers) the true

---

Mr. Wilson referred to the setting up by the Department of Commerce and Industry of a Central Standards Committee which he felt was a step which warranted support but regretted the tardiness of the formulation and specification modification of some standards which militated against the fuller use thereof. Mr. Wilson then quoted as follows from the comments of one of the Distribution Engineers of Pretoria, Mr. Knobel, and which he had obtained in response to a request:

"Pretoria has been employing wooden poles for transmission line purposes in rural areas since 1930 and there are now some 23,000 on the system, excluding those in rural townships, which for aesthetic and other reasons are being replaced by steel poles.

"Of these some 2,000 are employed on two 33 kv lines. The remaining 21,000 poles are used on 11 kv spur lines and connections on the 11 kv farm supply scheme supplying some 3,000 consumers in an area of some 600 sq. miles, including some areas with a highveld climate south of Pretoria and some with a more semi-tropical climate to the north. The

In sy mosie van dank vir die presidensiële rede verwys mnr. P. A. Giles na die diepgaande en logiese opmerkings daaarin vervat, asook die geskiedenis van die elektrisiteitsafdeling van Port Elizabeth. Met betrekking tot die kwessie van verligting van belastings noem mnr. Giles dat in die jaar 1962/3, 136 munisipale elektrisiteitsondernemings meer as R6 miljoen bygedra het tot die verligting van belastings.

Mnr. A. C. T. Frantz, van Kaapstad, sekondeer die mosie en verwys na die vinnige groei van die Port Elizabethse onderneming wat blykbaar binnekort dié van Kaapstad sal verbysteek. Met betrekking tot die verligting van belastings sê hy dat die bydrae onder hierdie hoof deur die elektrisiteitsafdeling van Kaapstad ongeveer R1 miljoen per jaar beloop, of nagenoeg 10% van die elektrisiteitsinkomste. Sonder hierdie bydrae sou dit vir Kaapstad heelwaarskynlik onmoontlik gewees het om baie van sy uitbreidings in die laaste jare te finansier.

Die President antwoord op die opmerkings van mnre. Giles en Frantz.

Mnr. A. A. Middlecote, S.A. Buro van Standaarde, bied sy referaat onder die hoof „Toerusting vir die Oorbring en Verspreiding van Elektriese Krag", wat in die sakelys van die konvensie verskyn het, aan.

Mnr. J. Wilson, Pretoria, stel 'n mosie van dank aan mnr. Middlecote voor en verwys na die menigvuldige bydraes wat hy reeds tot die verrigtinge van die Vereniging gemaak het. Ter stawing van die heilsame effek van standaardisasie, verwys mnr. Wilson na 'n onlangse hoofartikel in een van die oorsese tydskrifte, waaruit hy soos volg kwoteer:

---

cost of supplying "specials" is rarely charged. Certainly the price does not contain any element to cover the loss of overall loss of efficiency in the industry and in the economy as a whole. Perhaps if it did buyers would be more concerned at the effect of their policies on the price of their own goods and services."

Mnr. Wilson vestig die aandag op die Sentrale Standaardekomitee wat die Departement van Handel en Nywerheid tot stand gebring het en wat, na sy mening, 'n stap in die regte rigting is maar hy betreur die traagheid om sekere standaarde te formuleer of die spesifikasies te wysig wat die wyer aanwending daarvan teenwerk. Mnr. Wilson haal dan die volgende opmerkings van een van die distribusie-ingenieurs van Pretoria, mnr. Knobel, aan wat hy in antwoord op 'n versoek verkry het:

---

main 11 kv lines are built mostly along roads where aesthetic considerations have led to the use of concrete poles.

"All spur lines which constitute by far the greater portion of the 11 kv lines and many of which are some miles in length are, however, built with wood poles to SABS specifications. These lines employ pin insulators mounted on horizontal steel cross arms and are unearthed except at poles where transformers, cables, links or other equipment requiring earthing are connected. No earth wires are used on these spurs.

"It is considered that the chances of direct strikes causing flash over the lines at unearthed poles is economically neg-

ligible, mainly because of the impulse insulation strength of the wood pole and because the consumer density is such that the number of earthed points (for example at transformers), will reduce the number of vulnerable points to economically (negligible) proportions.

"It is also considered that the presence of an earth wire can, under certain circumstances, reduce the pole's immunity to lightning, particularly on a developing network where the earth clearances on lines cannot always be strictly controlled or guaranteed and in areas where high earthing resistances are prevalent, as in our case. This has been proved on some of the older lines which had earth wires and suffered quite a lot of flash-over trouble. Removal of the earth wire has led to subsequent satisfactory operation.

"There are now some 450 miles of 11 kv spur lines on wood poles without earth wires. This method of operation has proved entirely successful, accurate (records kept over) in a period of over 10 years disclosing only negligible cases of flash-over and no cases of a loss of a wood pole due to lightning.

"In our opinion earth wires are not economically effective under our conditions and would only add greatly to the construction and maintenance costs.

"The practice we have adopted, does, however, produce the need for careful application of the correct type of lightning arrestor, to discharge surges and protect apparatus. We feel, nevertheless, that in the case of wood pole transmission lines over greater distances, there could well be a greater tendency to benefit from the use of earth wires.

"In general the question of immunising lines against flash-over resolves itself into something of an insurance problem and no hard and fast rules can be laid down. All factors must be taken into account, including the importance of the line, its characteristics and its locality.

"In regard to mechanical properties we are confident that under Pretoria conditions wood poles treated and used in accordance with SABS specifications will give service for 20 to 30 years or more. The appearance, such as straightness, post treatment, and splitting, spiralling and shrinkage has presented no serious problem in the case of Pretoria."

Mr. J. K. von Ahlften, Springs, seconded the vote of thanks and also spoke in appreciation of Mr. Middlecote's presentation, on many occasions, of valuable contributions to the Proceedings of the Association. Referring to Standards Specifications, Mr. van Ahlften made the following comment:

"I would, however, like to make one point regarding standard specifications. We all know that as from the 1st of July of this year certain domestic and other electrical equipment will have to comply with compulsory standards before they can be used.

"I think most of us present here this afternoon have had the experience that electrical equipment is now becoming available in the Republic which is either of continental or Asian in origin, but it does not comply with our recognised standard specifications. Yet this equipment is of a very sound design. The question now arises whether we are fully justified in refusing to allow the use of such equipment in the absence of such a specification.

"We all agree that the guarantee we get by being covered by standard specifications is of great value, as far as standard practice and quality of design and material is concerned but one wonders what the legal aspect is in refusing to allow the use of equipment in the absence of a specification.

"The author's views on this problem facing us daily will be appreciated notwithstanding the existence of the Approvals Committee for New Commodities of this Association which has to handle these problems on our behalf."

Discussion proceeded on Mr. Middlecote's paper and the following contributed thereto:—

M. H. L. Boshof, Uitenhage.
R. J. G. Stanton, Oudtshoorn.
A. H. Cartledge, Olifantsfontein.
H. T. Turner, Umtali.
D. H. Fraser, Durban.
J. L. McNeill, Stanger.
M. van der Spuy, CSIR.
N. P. P. Clarke, Somerset East.
L. Lewis, Windhoek.
P. J. Botes, Roodepoort.
G. C. Theron, Vanderbijlpark.

Discussion next took place on the curtailment of conferences. Cr. F. S. Deysel, Springs, made the following statement:

„Mnr. die President, die kwessie van die inkorting van konferensies is nie 'n nuwe onderwerp nie. Dit is iets wat al baie jare lank aan die gang is; etlike jare lank is daar die gedagte dat die verskillende munisipale kongresse verminder word met die oog op die vermindering van onkoste. Die onmiddellike oorsprong van die huidige gedagte het in Klerksdorp twee jaar gelede op die kongres van die Transvaalse Munisipale Vereniging ontstaan.

Mnr. J. K. von Ahlften, Springs, sekondeer die mosie van dank en spreek ook sy waardering uit oor mnr. Middlecote se waardevolle bydraes, by menige geleentheid, tot die verrigtinge van die Vereniging. Met betrekking tot standaard spesifikasies, merk mnr. von Ahlften die volgende op:

Die referaat van mnr. Middlecote word deur die volgende bespreek:

M. H. L. Boshof, Uitenhage.
R. J. G. Stanton, Oudtshoorn.
A. H. Cartledge, Olifantsfontein.
H. T. Turner, Umtali.
D. H. Fraser, Durban.
J. L. McNeill, Stanger.
M. v. d. Spuy, WNNR.
M. P. P. Clarke, Somerset-Oos.
L. Lewis, Windhoek.
P. J. Botes, Roodepoort.
G. C. Theron, Vanderbijlpark.

Daarna word die beperking van konferensies bespreek. Rdl. F. S. Deysel, Springs, verklaar soos volg:

„Op daardie kongres is die gedagte uitgespreek dat dit wenslik sou wees dat kongresse van hierdie aard al om die ander jaar gehou moet word. Die Transvaalse Munisipale Vereniging het die saak verwys na die Verenigde Munisipale bestuur en die V.M.B. se slotsom — hulle gevolgtrekking, was dat dit wel wenslik sou wees om munisipale kongresse al om die ander jaar te hou, met twee uitsonderings, nl. die van die T.M.V. en hulle eie.

„Nou is dit so dat enige liggaam of organisasies hulle eie kongres as die belangrikste beskou, en vandaar die dwaling van die V.M.B., dat hulle eie kongres die belangrikste is, en daarom die enigste wat dit regverdig om dit jaarliks te hou maar alle ander liggame moet hulle kongresse al om die ander jaar hou.

„Mnr. die President, ek dink dit was 'n mistating van die V.M.B. en wanneer ek sê dit was 'n mistating dan wil ek dit as volg probeer motiveer die eerste is dat hulle hulle eie take beskou as die belangrikste en daarom nie dieselfde belangstelling het in die sake van enige ander liggaam nie. Vandaar hulle gevolgtrekking dat so lank as wat hulle eie kongres nie ingekort word nie kan die ander organisasies se kongresse wel ingekort word.

„Die tweede gedagte wat ek hier wil uitspreek, Mnr. die President, is die kwessie van jurisdiksie. Die V.M.B. is nie by magte om aan hierdie of enige ander liggaam voor te skryf en reëls meer te lê wat op hulle bindend is nie. Hulle het alleen adviseiende magte; hulle kan alleenlik adviseer.

„Die uiteindelike besluit berus by elke Provinsie — ek praat nou van die Republiek met sy vier provinsies — dit is vir die administrateur van elke provinsie om te besluit en 'n saak soos hierdie kan uit die aard daarvan nie deur een enkele administrateur besluit word nie. Dit sal gedoen word in oorleg met mekaar, en totdat daardie tyd aangebreek het, glo ek dit sal foutief wees vir hierdie liggaam om te besluit om sy kongresse elke tweede jaar te hou.

„As ons dit sou doen dan beteken dit dat ons die administrateurs van die verskillende provinsies onherroeplik bind. Voordat hulle die saak kan ondersoek en voordat hulle tot 'n gevolgtrekking kan kom sou ons dan alreeds besluit het om ons kongresse elke tweede jaar te hou. Met ander woorde ons sou die kar voor die perd span en ons sou die administrateurs in hulle keuse belemmer, en die saak vooruitloop.

„Mnr. die President, ek wil hier vandag voorstel dat hierdie vergadering — dat hierdie kongres van die V.M.E.O. van mening is dat dit in die belang van hierdie vereniging is dat daar elke jaar, net soos in die verlede, voortgegaan moet word met die hou van 'n kongres.

„Indien dit dan later sou blyk dat so 'n besluit nie byval sou vind by die verskillende munisipaliteite — die verskillende stadsrade nie, dan kan die saak altyd weer in hersiening geneem word, maar indien ons sou besluit dat die kongres elke tweede jaar gehou word dan het ons 'n besluit geneem waarop ons nie weer kan teruggaan nie. Met ander woorde, dan is daardie deur toegemaak. Ons moet daardie deur oophou, voortgaan soos in die verlede tot tyd en wyl daar helderheid oor die hele aangeleentheid gekom het.

„Mnr. die President, ek wil hierdie sakie graag verder motiveer en dan wil ek verwys na die lede waaruit hierdie vereniging bestaan, en dan vind ons dat hierde vereniging bestaan uit 62 raadslede in 95 elektrotegniese ingenieurs wat in diens is van plaaslike owerhede dus 'n totaal van 157, maar hier is 'n totaal van 329 afgevaardigdes en nou het ons vandag nog 'n bykomstige lys gekry; dus daar is vandag meer as 350 afgevaardigdes na hierdie kongres waarvan minder as die helfte plaaslike owerhede verteenwoordig, en nou ontstaan die vraag, of die V.M.B. of die T.M.V. of enige ander munisipale liggaam bymagte is om reels neer te lê om die werkverrigtinge van hierdie kongres wat uit 'n minderheid munisipale verteenwoordigers bestaan vir hulle te reël en hulle te bind.

„Ek glo, Mnr. die President, dat dit 'n terugwaartse stap sou wees indien ons so 'n besluit sou neem. Ek wil aansluit by wat u geagte mnr. die President, in u intree-rede gesê het toe u verwys het na die moontlikheid van die inkorting van kongresse. Dit sou 'n terugwaartse stap wees; dit sou nie in belang van hierdie vereniging wees nie, dit sou die ontwikkeling van die wetenskap van elektrisiteit benadeel en ek glo nie dat daar 'n enkele persoon is wat daarna sou strewe nie. Mnr. die President, ek wil hier voorstel dat hierdie vereniging hierdie kongres die mening toegedaan is dat daar net soos in die verlede voortgegaan moet word met die hou van 'n jaarlikse kongres. En dan mnr. die President, wil ek net daar byvoeg dat dit ook die eenparigebeskouing is van die uitvoerende bestuur van hierdie vereniging. Die uitvoerende bestuur het hierdie saak ook bespreek en sonder enige teenstem is daar eenparig besluit om ook so 'n aanbeveling in u midde te lê, naamlik dat ons sal voortgaan met die hou van 'n jaarlikse kongres. Baie dankie."

Mr. J. Inglis, Pietersburg, seconded the proposal by Cr. Deysel that the Conventions of the A.M.E.U. continue annually as heretofore.

Mr. H. M. S. Muller, Upington, and Raadslid W. J. C. Rossouw, Brakpan, also spoke in support of the proposal of Cr. Deysel. There being no further discussion, the proposal that this convention decided to hold Conventions annually as heretofore was carried unanimously.

Mr. Middlecote next replied to the discussion on his paper as follows:

"In reply to Mr. Wilson's query I must agree that the time for drawing up standards must be reduced. Also revisions must be very quickly and effectively brought about, or else all of my arguments fall by the board.

Mnr. J. Inglis, Pietersburg, sekondeer die voorstel van rdl. Deysel dat die konvensies van die VMEO nog steeds jaarliks gehou word soos tevore.

Mnr. H. M. S. Muller, Upington, en raadslid W. J. C. Rossouw, Brakpan, ondersteun ook die voorstel van rdl. Deysel. Aangesien daar geen verdere bespreking van die voorstel is nie, besluit die konvensie eenparig dat konvensies jaarliks gehou word soos tevore.

Vervolgens antwoord mnr. Middlecote op die besprekings van sy referaat soos volg:

"As a matter of fact the Bureau is at present, along with overseas standardising bodies, investigating ways and means of doing this. It is not only this country; many of the overseas standardising bodies who were very enthusiastic

found that it took up to 10 (ten) years to prepare some specifications, and everybody got very worried about it, and even internationally one is trying to reduce these times as much as possible.

"It might be of interest to note that the more effective use of tabular representations has much to offer in this regard.

"Mr Fraser of Durban has also mentioned this point. Pretoria has to be acknowledged as a pioneer in the use of wood poles, and Mr. Wilson's comments in this regard must be accepted as being based on experience. I think the remarks concerning the use of earth wires are very important. There is no doubt about it that there are a lot of people who can produce sound evidence that it is better to run an earth wire on wooden poles, but it is equally evident that there are others who can produce equally good evidence to show that it is better not to run an earth wire.

"I think this is the best proof of what I contended right at the beginning of my paper and that is that we must feed back information and then we must co-ordinate that experience.

"I think it would be a very good idea if your Association could co-operate with the Bureau in forming such correlating committees so as to set out sample record forms and then be able to correlate these records in working groups.

"At this stage my own personal opinion (and it is only a personal opinion, not backed up by strong evidence), is that if you have a flat terrain, where there are not very many koppies or other objects to attract the direct strikes, then it is better to run an earth wire on your wood pole. But, if the terrain is such that the probability of direct strikes to the wood poles are lower, then you would be better off without the earth wire, because most of the direct strikes will go to other objects, and you only have to deal with induced singes and of course by eliminating the earth wire at the top, you still have a higher impulse insulation level of your pole line, so you should come off better.

"I'll just leave that thought, I think there is more to it — a lot will depend upon the resistivity of the soil and other factors, but basically I think it comes down to this, that if you have a high probability of direct strikes on the pole then use an earth wire, if the terrain is such that you may not have such a high probability, then leave the earth wire off.

"It might be of interest incidentally, to note that it is only really on 11 kV lines that induced surges matter, I think by calculation and experience. Above 11 kV induced surges are not of great moment, and one really has only to cater for direct singes. But there is no doubt that on 11 kV you have a situation where induced surges can cause quite a lot of trouble."

„In antwoord op Mnr. von Ahlften moet ek beken; dat ek geen betroubare mening het nie in verband met die verdienste of nadele van klein-hoeveelheid olie stroombrekers.

„By die verpligte elektriese spesifikasies moet ek u aandag daarop vestig dat hierdie spesifikasies net veiligheidsaspekte dek en dat hulle nie onnodig beperkend is nie.

„Ons kry in werklikheid goeie samewerking van die handel en nywerheid. Ek moet weer onderstreep dat ons altyd ons bes sal doen ongelyke tred te hou met internasionale spesifikasies vir bloot selfsugtige nasionale redenering.

„Ons wil dat ons land een van die grootste nywerheidslande in die wêreld sal word, en ons kan geen beperkende invloede duld met betrekking tot ons uiteindelike uitvoerhandel."

"In reply to Mr. Stanton, I would like to state that it will always be better to run an earth wire above the line conductors because this will definitely give better protection against lightning than one underneath the conductor. Records clearly show this to be the case.

"Corrosion can often result from earth leakage currents. One often believes that this can only arise with DC current but I have seen examples of corrosion due to AC earth leakage currents, particularly on cables. I offer no authoritative opinion but suggest that ozone in certain cases, if there is a tendency to spark, or non-linearity caused by salts in the soil might bring this about. It might sound a bit far-fetched, but perhaps you can have a little non-linearity which causes an ultimate corrosion due to AC currents.

"Certainly it is known that the 'creepage' currents, which are virtually leakage currents across the metal work of insulators, do lead to corrosion. We know that quite well. That is usually due to ozone formation because these leakage currents, being at a higher voltage, do tend to spark on occasion.

"I can only suggest that such leakage currents should be prevented, (that is about the best cure), or reduced or hat bonding to eliminate electrode effects be resorted to.

"Mr. Cartledge has put up an excellent case for a reorientation of thought in the design of insulators to evolve a more reliable insulator. He favours the 'langstab' insulator used on the continent, together with other novel features which are being developed to improve pollution performance.

"Regarding the comments made by Mr. Fraser and Mr. Turner and Mr. McNiell, in connection with wood poles, I can only repeat that no trouble should occur if the poles are to specification. I shall certainly take back these complaints to our timber department, but would again like to stress to all of you the need to report all troubles to the Bureau so that we can investigate whether it is a case for a need for revision of the specification or merely a non-compliance. I mean, no one is perfect, and we know that poles go out from manufacturers which are not up to specification. It is our duty to reduce that problem to a minimum and we do do that, but we do expect to hear complaints from all of you, so certainly don't just suffer in silence.

"We want to hear of trouble.

"For instance, if Mr. Turner had sent samples of the poles attacked by the Southern Rhodesian white ant, to us, we would have forwarded them to the Forest Research Institute in Pretoria, for them to verify the reasons for the failure to give good service. It might quite possibly be splitting due to incomplete drying; that is a similar trouble that Mr. Fraser mentioned he had in Durban.

"Feeding back information on mark bearing products is absolutely necessary for the ultimate success of such a scheme."

„In antwoord tot Mnr. Botes, is ek geneig om te sê dat daar geen noodsaaklikheid is vir die installasie van 'n weerligafleier buitekant die substasie waar 'n kabel die krag inbring en vanwaar kabels die krag verder verdeel nie. So 'n stelsel

kan beskou word as vry van steurings. My opmerkings oor stuwings in kabels is ook hier van toepassing.

„Die konstruksies in die substasie self behoort egter deeglik beveilig te wees deur aarddrade ten einde die moontlikheid van direkte inslae te verklein."

"Mr. van der Spuy has covered the intention to undertake a certain amount of research which must be of interest to all of you. He did ask me to say something about cables, but what I will say will be restriced to 11 kV cables, and is really just a repetition of what I have been saying for the last 10 (ten) years, and that is on 11 kV cables, if one eliminates faults due to faulty manufacture, I cannot see that you can ever have an impulse failure on a cable. We have tested and we have found the impulse levels on 11 kV cables are far in excess of the best cable end-boxes in use, and if you have a surge coming into a cable system, and one realises you can't have it caused in the cable system, there must be flashovers on the end-boxes before it could get into the cable itself.

"We get very few reports of these lightning flashovers on cable boxes, so I think one can follow that up with the admission that the probability of impulses causing failure of the electrical cables can be eliminated.

"We do know why people suspected impulse to cause failure in cables — it was because of the failure below the end-box and it was because when you examined the failure you found these nice clean pin holes and everyone thought "Ah, that is the surge shooting through the paper".

"We have shown by tests that this failure is quite definitely due to what is called "ionisation" by some people, or "corona" by others — Internationally there is no agreement. At the I.E.C. Conference last year, I spent at least half an hour with people arguing as to whether this type of failure should be called corona or ionisation, but the Americans insisted on calling it a corona failure and the English and continentals preferred ionisation as the word.

"Anyhow, it is due to arcing in little voids in the insulation which causes the ultimate failure in cables.

"In the Bureau we did a lot of work and we showed that it was mainly due to bad end terminations whereby the air got through the termination and caused this arcing to assume the characteristics leading to pin-holing. We had a lot of argument with some people who wouldn't believe us. One big municipality said it had never had trouble for 20 (twenty) years of using an obviously badly designed end-box. They then changed from 6.6 kV to 11 kV and within a few months we were inundated with reports of failures of their cables due to ionisation. We took samples of end-box terminations and we blew air through this to show that it leaked like a sieve, and I think they are now persuaded.

"We can with authority say that we have never had a failure on a cable (and we have had quite a few lately), where the pin-holing was caused, where we haven't found that the end-box leaked. Either the moisture gap had been left out, or no precautions had been taken to seal the ingres of air into the void.

"It is my firm opinion here, that on 11 kV cables the failure is on the whole due to ionisation; but that is not to say that there can be no effects in practice which might aggravate the effects. I think aggravating effects (I suspect this holds in certain parts of the Reef near steel works) arise, if you have rectifiers or any power near-by you can increase the harmonic content of your supply wave form and you can increase the number of the discharges per cycle, and therefore, you can reduce the time for ultimate failure due to ionisation."

„Mnr. Theron is altyd persoonlik baie hulpvaardig gewees in die werk van my organisasie en was baie vriendelik in sy ondersteunende opmerkings ten opsigte van standaardisasie.

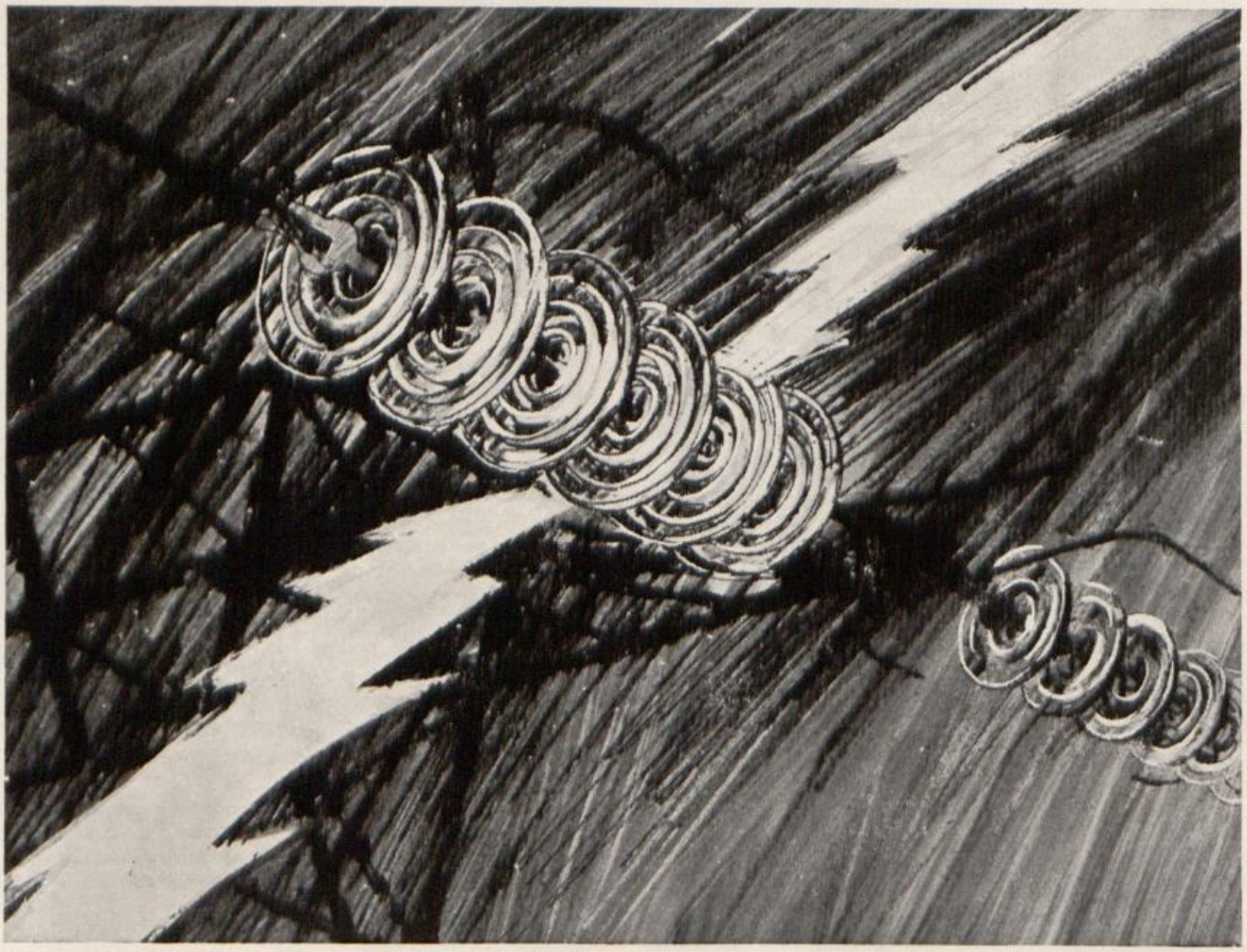
„Hy het sekerlik die spyker op die kop geslaan toe hy verwys het na 'n beter besteding van ingenieurs. Die groot vraagstuk is hoe om dit te verwesenlik.

„Bloot willekeurige salaris-verhoging sal dit nie vêr bring nie. Wat vereis is, is 'n effektiewe algemene gradering van salarisse ten einde die fundamentele wat van vrye onderneming — die oorlewing van die sterkste man — te stimuleer deur sekere poste te vereenselwig met sodanige verantwoording sowel as salaris sodat dit onekonomies word om hooggeplaaste profesionele ingenieurs êrens anders te gebruik as net in hooggeplaaste profesionele poste."

"Mr. President, I hope I have answered all the questions, I have answered all questions I have remembered and which I am in a position to answer, and I would thank you very much for this opportunity of answering them."

'ARMOURLIGHT' HIGH VOLTAGE INSULATORS... *Unpuncturable in Air!*

Wholly manufactured in South Africa *'ARMOURLIGHT' solves the insulator problems of high power transmission for Supply Authorities. And for countless others throughout South Africa. In every type of electrical undertaking, from power lines for industry to railway electrification schemes, 'ARMOURLIGHT' leads the way.*



'ARMOURLIGHT'

TOUGHENED GLASS INSULATORS

Made by Pilkington Brothers (South Africa) (Pty) Ltd., Springs, Transvaal • P.O. Box 111 • Phone 56-5321

'ARMOURLIGHT' is a registered trade name

Enquiries to: Pilkington Brothers (S.A.) (Pty) Limited, Box 8246, Johannesburg. Phone 834-1031 • Ask for our illustrated catalogue with all technical details.

TO THESE SPECIFICATIONS: S.A.B.S. 177 • B.S.S. 137 • B.S.S. 729 • E.S.C.–M1/1-2 • S.A.R. & H.–C.E.E.–T.10.A • S.A.R. & H.–C.E.E.–G.3.A • I.E.C Publication 120.

CH&P 931

SECOND DAY/TWEEDE DAG

Prof. G. R. Bozzoli, Professor of Electrical Engineering, University of the Witwatersrand, presented his paper entitled "Transformer Noise and its Reduction in Situ", which was published with the Agenda of the Convention.

In proposing a vote of thanks to Prof. Bozzoli, Mr. R. W. Leishman, Johannesburg, expressed appreciation for such an authoritative paper. Giving examples of procedure adopted by the Johannesburg Electricity Department to combat noise developed by transformers, Mr. Leishman gave the following information concerning a sub-station near the centre of Johannesburg and diagonally across the street from a leading international hotel:

"This sub-station has 3 - 11 MVA 20/6.6 kV transformers, an 8 circuit-breaker board for each across an L-shaped access passage between. Above the passage is a control room. A false ceiling to the control room solved the problem of an exhaust duct for the hot air from the top of the transformer chambers, the passage below serving as intake from which cooling air is drawn into each chamber by the main centrifugal type fans which are kept below 1,000 r.p.m., and air velocities below 15 ft. per minute. Large decorative grills 12′ x 5′ in size were used at the main air entry and exit points to the street, to exclude birds and other intruders without impeding air flow. Fire detectors serve to operate alarms and trip the cooling fans.

"The transformer chambers have 14" outer brick walls, a 6 inch air gap, (to permit final thorough clearance of rubble), a single course hollow breeze-block wall sand-filled, resting on separate foundations, with its inner face plastered with an acoustic mix. Walls common to other chambers which themselves act as attenuating screens were given no special treatment.

For small distribution transformers in the 500 kVA range, Mr. Leishman stated that cavity wall brick chambers with slate, tile or concrete roofs, normal air brick cross ventilation and wooden doors had proved satisfactory. Rubber mats were utilised in cases where transformers within buildings caused annoyance and these had been found to cure the trouble.

The endeavour in Johannesburg had been to design to avoid raising the night background noise level immediately outside a house more than 4 decibels which (barring open windows) is equivalent to about 2 decibels within a bedroom. This had proved to be an acceptable guide. In the case of large major sub-station transformers in urban areas of the 30 to 45 M.V.A. category with 80 kV primaries, it has been found that

(a) with residences beyond 200 ft. from the units, there have been no complaints.
(b) between 100 and 200 ft. complaints are satisfactorily dealt with by the erection of screen walls;
(c) Closer than 100 ft. enclosure is necessary without roofing and therefore complicated cooling if no

Prof. G. R. Bozzoli, Professor in Elektrotegniese Ingenieurswese aan die Universiteit van Witwatersrand, het sy referaat getiteld „Transformer Noise and its Reduction in Situ", gelewer, wat gepubliseer was in die sakelys van die Konvensie.

Met sy voorstel van 'n mosie van dank aan Professor Bozzoli, het mnr. R. W. Leishman, Johannesburg, sy waardering uitgespreek vir so 'n gesaghebbende referaat.

Onder die voorbeelde wat gevolg word deur Johannesburg Elektrisiteits-departement, om transformator geraas te bekamp, gee Mnr. Leishman die volgende inligting in verband met 'n substasie wat naby die middelpunt van Johannesburg en diagonaal oorkant die straat vanaf 'n toonaangewende internasionale hotel geleë is:

The roof is of reinforced concrete and the transformer stands on an isolated foundation as described in the paper. Pre-stressed concrete beams bridged openings for front installation of transformers and were bricked up after installation; this section is knocked out if required in future.

Professor Bozzoli himself was kind enough to assist us in taking external ambient day and night sound traverses before commissioning (even from 25 ft. above ground level per tower wagon), in order to prepare for several threats of litigation we faced.

Since commissioning our third transformer recently we have rechecked the position and were quite unable to register any transformer noise on instruments sensitive enough to pick up the sound of people talking and of a fan operating in the hotel basement. These tests were taken with the transformers on and also switched out — a fact not detectable on the sound meter. I may assure interested engineers that this type of construction which we have tried at several sub-stations is completely successful."

Vir klein verspreidingstransformatore in die 500 kVA reeks, meld mnr. Leishman dat hol muur steen kamers met dakke van lei, teëls of beton, normale lugsteen kruisventilasie, en hout deure bevredigend is. Rubber matte is gebruik in gevalle waar transformatore in geboue las veroorsaak het, en dit was voldoende om die oorsaak van die moeilikheid op te los.

Die strewe in Johannesburg is om so te ontwerp om 'n verhoging in die nagtelike agtergrond geraas intensiteit onmiddellik aan die buitekant van 'n huis van meer dan 4 desibels te verhoed, wat (oop vensters uitgesluit), ekwivalent is ongeveer 2 desibels binne-in die kamer. Dit is as 'n aanvaarbare leidraad bewys. In die geval van groot hoof-substasie transformatore in stedelike gebiede van die 30 tot 45 M.V.A. klas met 80 kV primêre volttal, is gevind dat—

(a) met wonings wat meer as 200 vt. vanaf die eenhede geleë is, geen klagtes verkry is nie.
(b) Tussen 100 en 200 vt. is die klagtes bevredigend opgelos deur die oprigting van skerm-mure.
(c) Nader as 100 vt. onheining nodig is sonder dak wat die verkoeling gevolglik bemoeilik indien hoë ge-

high buildings adjoin or are likely to do so in the future.

Similar conditions apply to 6 and 11 MVA units with 20 kV primaries.

Seconding the vote of thanks, Mr. A. A. Middlecote, Pretoria, commented as follows:

"Professor Bozzoli is a prominent member of the South African National Committee of the International Standards Organization which hopes to participate actively in this international work and perhaps I could be forgiven if I give a little more detail of the general work being done here which covers broadly three sectors —

(a) Noise rating for hearing conversation.
(b) Noise rating for speech communication.
(c) Noise rating with respect to annoyance.

Professor Bozzoli has indicated that the recommended annoyance NC curve given in the U.S.A. for homes (sleeping areas) is NC 30. The equivalent measure under the ISO is a Noise Rating (NR) value of 20-30. This is the same value as for a hospital while the value of a large office is 30-40, a restaurant 40-50, and a typing office 50-60.

One reaches the Noise Rating level for hearing conservation (namely, a value, if, which exceeded, could lead to loss of hearing) with continuous noise of value 85 dB. It might interest everyone to know that such levels have been measured here in South Africa in boiler rooms (91 dB(A), at a Ball Mill 100 dB(A), and even in textile factories 85 dB(A).

Further examples of interest are that some window type air-conditioners can give levels of 60 dB(A) and even fluorescent lighting ballasts 32 dB(A). Perhaps these examples may illustrate to those unfamiliar with noise measurements what such measures might mean.

Generally as far as annoyance problems are concerned if the actual Noise Rating is exceeded the following can be expected:

0 - 10 dB excess — sporadic complaints
5 - 15 dB excess — widespread complaints
10 - 20 dB excess — threats of community action.

Professor Bozzoli has purposely not covered in detail the improvements of transformers due to design and construction since this is in the main the concern of designers and not operating engineers. At the same time it would be foolhardy for the latter never to query the design and I feel it is one of the functions of inpection to check those points as far as possible in construction which might lead to excessive noise generation. This is particularly the case with smaller transformers which frequently have to be pole mounted. It has been reported that closer attention to clamping and other constructional details can lead to a reduction of as much as 30 dB on some small transformers. Possible variations between similar transformers can be as high as 10 dB. It must be appreciated that attention to clamping does not necessarily mean just tight clamping. Tight clamping usually tends to increase the higher frequency generation while slacker clamping increases the lower frequency generation. However, the overall result as measured by a sound level meter is usually the same. Core clamping should be studied carefully to avoid resonance and unsupported ends of laminations. But Professor Bozzoli is quite right in pointing out that there is a limit to what can be done economically through design and therefore, reduction of noise in situ is the most practicable method.

In connection with the section on anti-vibration mountings while these matters are generally implied I would like to stress the value of assessing the subsoil as regards propagation and also to underline the condemnation of the practice of mounting transformers on wheels and rails. I should also like to mention that the siting of transformers in a cell with one side open can often lead to amplification of noise due to resonance and reflection. Such cases have in fact been mentioned at C.I.G.R.E.

It would of course be very interesting if more detail could be given regarding typical values of noise generated by transformers. From the example quoted by the author it would appear that the rating of the transformer was about 1 M.V.A. Typical values would appear to be 85 dB for a 125 M.V.A. and 60 dB for a 1.5 M.V.A. transformer but more typical values for the range 250 - 1,000 k.V.A. range would I am sure be appreciated by the majority here. In this connection a little elucidation on the exact level of noise to be tolerated from a transformer would be appreciated. Under "Planning for Low Noise" it is said that "Appropriate measures for reducing the noise to the desired level can then be planned". What is the case where the ambient noise is already at the recommended level? I ask this simple question because it is sure to to be encountered many times in Practice. I have understood that transformer noise should generally be so controlled as not to increase the ambient noise by more than 3-5 dB and would very much appreciate Professor Bozzoli's comments on this matter."

Discussion proceeded on Prof. Bozzoli's paper and the following contributed thereto:—

P. J. Botes, Roodepoort.
D. H. Fraser, Durban.
L. Lewis, Windhoek.
J. J. Groenewald, Department of Labour.
J. E. Mitchell, Hon. Member.
J. L. McNeill, Stanger.

boue langsaan opgerig is, of moontlik opgerig gaan word in die toekoms.

Dieselfde voorwaaardes geld vir 6 tot 11 mVA eenhede met 20 kV primêre volttal.

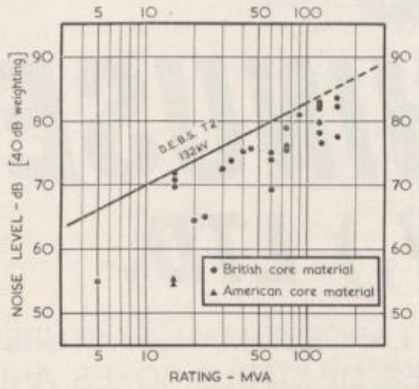
Mnr. A. A. Middlecote, Pretoria, wat die voorstel gesekondeer het, het as volg kommentaar gelewer:—

Bespreking van Professor Bozzoli se referaat is voortgesit en die volgende het bydraes daartoe gelewer:—

P. J. Botes, Roodepoort.
D. H. Fraser, Durban.
L. Lewis, Windhoek.
J. J. Groenewald, Departement van Arbeid.
J. E. Mitchell, Ere Lid.
J. L. McNeill, Stanger.

During discussion, the following diagram which shows the noise level against transformer capacity with British and American core material utilised was referred to by Mr. Botes.

Gedurende die bespreking, is die volgende diagram, wat die geraas intensiteit teenoor transformator-kapasiteit aantoon vir eenhede waarin Britse en Amerikaanse staal materiaal gebruik van gemaak is, na verwy deur mnr. Botes.



It was disclosed that the Department of Labour was taking an increased interest in the investigation of noises.

Prof. Bozzoli replied to the discussion as follows:

Daar is ook onthul dat die Departement van Arbeid 'n toenemende belangstelling toon in die ondersoek na geraas.

Professor Bozzoli antwoord as volg op die bespreking:

"Mr. President, ladies and gentlemen: Thank you for the opportunity you have given me of replying to the discussion.

"Mr. Leishman has given us some very interesting details about the experience of the Johannesburg City Council in enclosing transformers in a double walled transformer chamber with very excellent results indeed. To me it would seem this has probably been the peak of good practice in regard to the reduction of transformer noise.

"Mr. Leishman relates an experience which he had with hedge growing for reducing noise. This is an interesting matter and many people have been deluded into believing that a thick hedge can make a large difference to the amount of noise being propagated. It is true that a hedge can reduce the noise but from measurements and the available literature, it appears that the maximum reduction achievable with a hedge of possibly 4 to 5 feet thick and very dense growth is 4 dB under the best conditions. Furthermore, hedges tend to grow less thickly near the base and a good deal of the noise propagation takes place along the ground where the leaves do not grow very well.

"Reference was made by another speaker to trees. Trees can be far more effective if they are placed fairly close together when they form a dense mass of growth through which one cannot see. Under those conditions the attenuation of sound can be very high indeed; but this means a close plantation and this is rather a difficult thing to achieve in a reasonable time.

"I must thank Mr. Leishman very deeply for his remarks.

"Mr. Middlecote has added a number of very important points to the paper, for which I am very grateful and I thank him too for his remarks.

"He asks a question about the situation where the ambient noise, is already at the level to which the total noise must be reduced, so that any transformer which is placed there is liable to increase the noise level and he suggests an increase of 5 dB's.

"Now one of the odd things about decibels is that they never give you the answer you expect. For example, if there were a situation where the ambient noise was 50 dB's and the transformer was generating 50 dB's then they would both be generating equal noise power. The total noise power is therefore multiplied by two and the number of additional decibels is therefore 10 times the logarithm of 2 — which is 3 dB's. So two fifty dB sources at the same point give a resultant noise of 53 dB's.

"To suggest that the transformers should be allowed to add as much as 5 dB's means that the transformer noise is much greater than the environment will ultimately ever allow. The point, therefore, is that the transformer must add less than 2 dB's to the total if ultimately the noise is to be reduced to the required level, by tackling the ambient noise from some other aspect.

"I would say that the maximum one should allow in a case like this would be 2 dB's — that is the minimum discernable difference in sound which the ear can detect.

"Mr. Botes of Roodepoort: Mnr. Botes se bydrae beklemtoon die belangrikheid van die vermindering van geraas aan die bron, naamlik, deur die gebruik van kern materiale met 'n laer magneto striksie effek.

"Mr. McNeill of Stanger: I am not quite sure that I know what Mr. McNeill's trouble is — but he did say that when a fuse blew the noise became louder. I can only surmise that due to unbalance in the fluxes in a 3-phase transformer, for example, if one fuse blew, unbalanced fluxes might result, one-phase might be overloaded and a good deal of leakage flux be established that was not there before. In that case I would imagine that the leakage flux could cause vibration of parts which otherwise were not greatly affected by the normal flux conditions. But without further information I'm afraid I cannot answer his question.

"Mr. Mitchell of Zambia asks two questions. He referred to the fact that, as far as he was concerned, he would experience a pain if the noise disappeared. I would say that if the noise is there it gives you a pain in the ear, but if the noise disappears you get a pain in the neck!

"He also asked a question about air blast circuit-breaker noise. I would say this ought to be associated with such noises as the sonic boom and a dynamite explosion. The only answer to this is to blast the circuit breakers!

"Mr. Groenewald, Department of Labour. It is very interesting indeed to know that the Department is taking up the matter of industrial noise; I do hope, very sincerely, that the Department is collaborating fully with the S.A. Bureau of Standards, for the laying down of standards of industrial noise and for the technique of measurement of noise and interpretation of the readings.

"The Bureau has done a great deal of study already in this direction, and it would be unfortunate if the two bodies worked independently.

"Mr. Groenewald asks whether it is the monotony of noise that upsets people, or whether it is the loudness. The monotony or the single frequency aspect of it has a great deal to do with annoyance, and in fact in assessing the noise level which should be allowed in a certain area the nature of the noise is taken into account, and if the noise has a predominantly single frequency and if it continues throughout the day and night then one must add 5 dB's to the annoyance value, which shows that the monotony has a good deal to do with the annoyance.

"Mr. Lewis of Windhoek refers to transformers in flats and the fact that they may be mounted on floors other than the ground floor. I sincerely hope that Mr. Lewis will see to it that no transformers are mounted on slabs in multi-storey buildings but that they are confined to the basement or to the ground floor on solid foundations.

"Mr. Fraser also refers to the question of hedges, and I must repeat what I said before, in reply to Mr. Leishman that the most he can expect from a hedge is about 4 dB's.

"I am very glad indeed of the point he raised about anti-vibration pads. This is an important point to emphasise, but it is no good applying only one of the measures. They must all be applied at the same time. As he said, it is no good applying anti-vibration pads if the transformer is not going to be enclosed, but both pads or anti-vibration mounting of some kind, and an enclosure are necessary for proper reduction of noise. Thank you."

Die aand-sessie van die Konvensie wat gewys was aan die Lede Forum, was bo verwagting goed bygewoon. Die volgende is 'n opsomming van die vraesteller oor die verrigtinge:—

The evening session of the Convention devoted to the Members' Forum was exceptionally well attended. The following is the Quizmaster's summary of the proceedings:—

MEMBERS' FORUM

QUIZMASTER : P. A. GILES, EAST LONDON.

QUIZMASTER: I don't know if anybody has any special preferences, or if you are prepared to leave the choice to me to make a selection of the questions. If anybody particularly wishes to discuss a matter tonight, I'll give him the opportunity to go to the microphone and raise it.

In order to get the discussion away, I think we could have a question on overhead lines. Is anybody prepared to talk about overhead lines? I know there has been a paper before the Association, so you should all have a lot to say about overhead lines. May I direct your attention to Question No. 9

> QUESTION No. 9: Due to some cause, an overhead conductor breaks and falls to the ground. What effective means could be applied to automatically disconnect the supply to the line, keeping in mind that:
>
> (a) Such a conductor may fall on dry ground, concrete or tarmac, thus providing high resistance to earth fault current.
>
> (b) Under the Code of Practice for overhead lines issued by the S.A. Institute of Electrical Engineers in 1949, earth bows are not considered to be effective method of protection.

You can put Question 10 in with this, of course.

Mr. H. E. SUMMERS (Bulawayo) stated that the question was ambiguous, and therefore to answer it, it was necessary to assume that due consideration had been given to the mechanical design of the line to ensure that it was not over-tensioned; the correct type of insulated clamps employed; and that vibration dampers had been provided where necessary.

Similarly with respect to the electrical design, it must be assumed that the correct cross-section of conductor had been selected with due regard to fault currents in total clearance time, and that similar consideration had been given to the short-time rating of tension and non-tension joints.

With regard to the actual electrical protective equipment to be provided to guard against conditions which arose following the breakage of an overhead line conductor, he would mention that with an arc suppression coil earth system, or with an insulated neutral system, a simple form of neutral displacement relay energised by residual volts would effectively clear the circuit, as the operation of this relay was virtually independent of fault resistance.

With an earthed neutral system, however, experience in Africa and the United Kingdom had shown that a broken line conductor may lie on the ground without operating conventional forms of earth fault protective equipment, but the following measures may be implemented for the stated alternative earth fault conditions:

(1) Where the supply side of the broken conductor was in contact with the ground, a current operated earth fault relay having a sensitivity of 2% may be installed with the normal form of earth fault protection. It would be appreciated, however, that transient stability would not be achieved so the relay must be associated with a time delay relay which should be set to discriminate with the normal orthodox earth fault protection. Any further reduction in sensitivity is liable to be unstable under steady state conditions due to circuit asymmetry with regard to capacitance or leakage resistance.

(2) When the load side of the broken conductor is in contact with the ground and the system neutral is earthed at the source of supply, a five limb or 3 single phase voltage transformers connected in star open delta may be installed at the remote end of the feeder to energise a neutral displacement relay which in turn should be connected to trip the supply switch by an inter-trip channel or to actuate at the remote point a 3 phase fault throwing switch.

The recommendations made in regard to the earth neutral system were probably only applicable to 6.6 and 11 kV systems, since it was doubtful whether a sensitive earth fault relay would operate satisfactorily on say a 2.2 kV system, but on the other hand, with system voltages of 33 kV and over orthodox forms of earth fault protection were adequate.

The final conclusion, therefore, has a trend towards Question 11, entitled Earthing of High Tension Systems, which may be summarised as follows:

QUESTION No. 11:

(1) What are the reasons for and against earthing high tension systems?

(2) What considerations have to be taken into account in deciding on whether a system should be solidly earthed or earthed through a current limiting device?

(3) If a system is to be earthed through a current limiting device, what considerations have to be taken into account in deciding on the type and rating of the system earthing device?

2.2 and 3.3 kV systems: These systems are normally limited in extent and therefore they may be earthed by means of an arc suppression coil or operated with an insulated neutral.

6.6 and 11 kV systems: These systems may, in some instances be operated as recommended for the 2.2 kV system, i.e. an arc suppression coil or insulated neutral, or alternatively they may be operated with an earth neutral, in which case circuit breakers supplying overhead lines and feeders should be equipped with sensitive back-up earth fault relays, 2% relays, and if necessary the remote ends of such systems equipped with neutral displacement relays.

Systems operating at 33 kV and above: These systems may be effectively earthed or earthed through a neutral earthingresister, and conventional forms of earth fault protection having a sensitivity of 10 to 20% may be employed. Transformer feeders on single point earthed neutral systems would require neutral displacement relay as described in the first part of the comment.

In conclusion, he said that he had only referred to the breaking of phase conductors, and although very little published work was available in regard to earth wires which, if too small in cross section, may be burnt by a direct lightning stroke, it would appear, from experience in America, that irrespective of the materials used, an earth wire was not likely to be burnt if it was greater than 3/8" in diameter. Experience in Rhodesia supported this statement, since he had known 7/14 gauge earth wires to be burnt, whereas no trouble had been experienced with 7/12 gauge earth wires. QUIZMASTER asked if anyone else would be prepared to say something about Question No. 9.

Mr. H. PRINS (Johannesburg) said he wished to make a few remarks about a sensitive earth fault relay.

On high voltage lines, say 11 kV, an earth fault setting of about 4 to 8 amps was considered suitable. With lower settings the natural leakage across insulators unbalanced, capacity currents, etc. could cause a relay to operate. It had not been possible in the past to obtain low earth fault settings in terms of primary current due to the relatively high burden of the induction type relays used for earth fault protection. An earth fault relay for protection of overhead lines, was normally connected in the residual circuit of three star connected C.T.'s. Under earth fault conditions, the fault current flowed in one of the CT primary windings, and this primary current must magnetise the cores of the three current transformers, in addition to supplying current to the earth fault relay, i.e. only a portion of the primary current was available in the secondary for operating the relay.

A normal induction type relay required roughly 3 milliamps to operate it, e.g. for a .5 amp setting current 10% of 5 amps, 6 volts must be developed by the CT to drive this current through the relay. If the current setting was reduced, the voltage which must be developed by the current transformer was increased. The VA burden at operation was constant. This meant that the greater proportion of the primary current was required to magnetise the CT core; reducing the current setting of the relay did not result in a less effective setting in terms of primary current.

The only way to reduce the primary setting was to use a more sensitive relay, That was one that required a smaller input VA for operation. The CMU relay had a burden of .007 VA at setting in comparison with 3 VA for a CDG type relay and consequently the magnetising current required by the CT's operating this relay was negligible, and the effect of primary setting was very nearly proportional to the secondary current setting of the relay, i.e. 2% primary setting can easily be achieved.

A relay used to detect very low earth fault currents must also be able to withstand very high earth fault currents for its operating time when solid earth faults occur for instance. This relay has an internal saturating CT which limited the output of the relay above a certain fault level and consequently the relay could withstand very high earth fault currents.

Mr. K. ADAMS (Johannesburg) said that it was possible to detect these low earth fault currents by using an enlarged version of the domestic sensitive earth leakage protection system. Large core balance current transformers were required, and amplifiers were necessary, these requiring a source of power

for operating. Dry batteries should be satisfactory where no suitable AC supply was available.

The sensitivities which could be achieved were measured in terms of milliamps, even if one had to go to the extent of making a current transformer of sufficient diameter to accommodate the conductors of an overhead line. The normal restriction of 2% does not apply when you use a single current transformer to detect the earth fault current.

QUIZMASTER said that the Forum was of the opinion that both types of earth leakage sensitive relays were required.

QUESTION No. 14: Is sufficient advantage taken of the inherent short time over-load capacity of smaller distribution transformers?

Mr. L. VAN DER WESTHUIZEN (Port Elizabeth) said that in general the answer to that question was 'No'. Manufacturers made transformers asked for by consumers and it was felt that they do not use the inherent overload capacity of the transformers.

In Britain, transformer manufacturers give a 5 kVA transformer a rating of 7½ kVA continuously, a 10 kVA four hours from cold, or for 2 hours after a full load run, all without injurious heating. They fail to specify what is meant by injurious heating, but usually it is that the hot spot in the winding will not be higher than 105°C. A small distribution transformer is assumed to be 50 kVA and below.

British Standards state that the transformer design should be on a forty degree maximum at any instant — a 30° average per day in a year, and a 20°C average over the whole year. Inland in South Africa the ambient temperatures are not 30° for a whole day; at the coast they would be 20° to 30°.

The transformer tank area should be sufficient to get rid of the heat in the oil — the top oil temperature should not get to 50° above ambient; i.e. the hot spot in the winding. This means that the transformer has a longer time constant and one can overload it for a little longer before the hot spot gets up to 105 or 110°C.

There is one thing against overloading a small transformer, which has a higher inherent regulation. A big transformer will have a regulation of 5% but the smaller ones go up to 8%. If one overloads a transformer too much, one finds increased volts drop.

QUIZMASTER said the Forum is of opinion that not sufficient advantage is being taken of the inherent short time overload capacity of the smaller distribution transformers.

QUESTION No. 8: The responsible authorities in the United Kingdom have apparently come to the conclusion that conservators are not necessary on distribution transformers up to 1,000 kVA in rating, and make extensive use of transformers without conservators in accordance with their standard specification B.E.S. No. T1. Would members state their views on the need for conservators on 11,000 volt distribution transformers up to 10,000 kVA rating in Southern Africa?

QUIZMASTER asked whether it was thought that manufacturers put conservators on transformers so as to make buyers pay for them, or were they really required.

Mr. L. LEWIS (Windhoek) said that he was reluctant to consider a transformer above 50 kVA without a conservator. He had a number of 200/300 kVA transformers installed in Windhoek and they are working perfectly well without conservators, so his own view was that up to 200 kVA one can do without a conservator.

Mr. Lewis said he would like to draw the attention of the previous speaker to his remarks about the temperature not going up to 30°C for the whole day; in Windhoek it probably does. It could be close to 30° during the hot summer months for the whole day.

Mr. C. ADAMS (Port Elizabeth) stated that the essential feature about the use of conservators was oil preservation. Much depended on first of all the duty cycle of the transformer. The second point is the degree of reliability placed on the transformer and thirdly climatic conditions.

If a transformer is working in a very good environment from the point of view of maintenance — i.e. a big city which has regular maintenance schedules where samples of oil are taken once a year at least and tested, and if necessary the oil filtered — then it is perfectly safe to operate the transformer without a conservator. If, on the other hand, the transformer is working, as in South Africa in a remote town, a failure might be quite disastrous; maintenance might not be as good as it should be, and therefore that is a fact that has to be considered.

The question was really comparing British practice with South African practice. The British T.1 spec. which has been fully operative for the last 9 or 10 years, provides a transformer of every possible luxury. The essential feature of the T.1 spec. is low first cost consistant with reliability and economic operation so that those who have visited the big transformer factories in England have been surprised that the British transformer tank is lightly constructed relative to those in South Africa. Transformers are made in bulk, bought in bulk stocked in bulk and to an extent, therefore, are expendable. If one should fail, it is pulled out and another put in quickly. A distribution transformer, operating in a residential area, has a load cycle which is similar in Manchester and Cardiff to the cycle in Port Elizabeth.

Climatic conditions must be considered. Mr. Adams raised this question with Mr. Williams of the Port Elizabeth Meterological Office, who had functioned in Cardiff where the parent company is, and he said that relative humidity conditions in Port Elizabeth were similar to those in Cardiff, but he stressed the point relative **humidity;** average temperature conditions in South Africa are higher than in Britain.

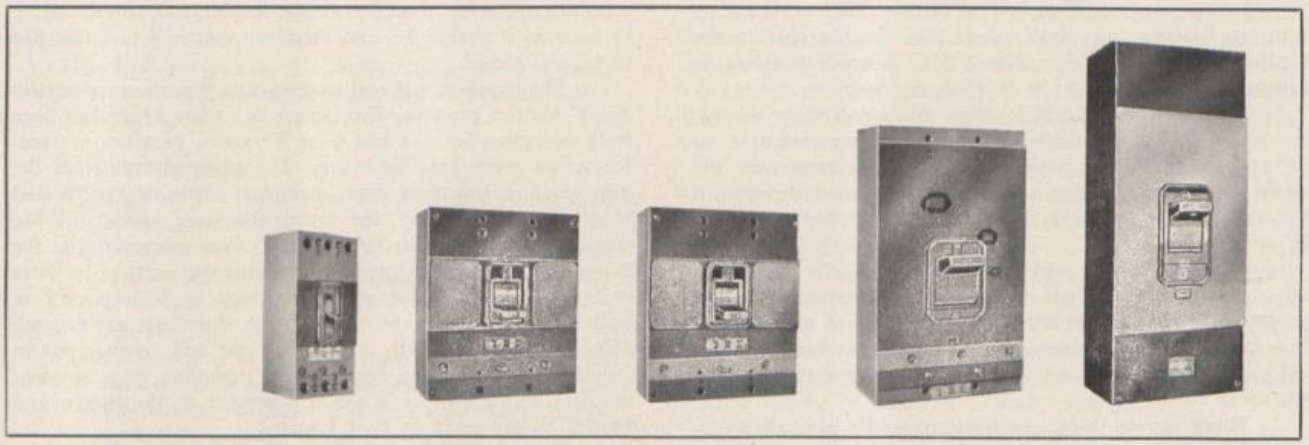
Thus, given the same relative humidity, with higher temperatures, a given volume of air will hold more moisture than it does in Britain. A transformer breathing in Port Elizabeth on the same duty cycle as in Cardiff would, during the course of the year, take in a lot more moisture than in Cardiff, because of the higher ambient temperature. The basic reason for having a conservator is to keep the oil which is in contact with air relatively cool so that sludge is retarded. Sludging is oxidisation. Moisture is a factor that one must consider — if great amounts of moisture are drawn in, it is better to keep it in a conservator and not in the transformer tank where the moisture can condense on the tank sides and pollute the oil. In coastal conditions, there is a case for being particular about the use of conservators.

I-T-E *Modular* moulded case circuit breakers produced in South Africa

- All frame sizes have easily adjustable instantaneous Trip Points
- All frame sizes, except FJ and JJ have interchangeable Trip Units
- 1½" Pole Centres provide greater electrical clearance and allow for easier installation.

NEW

- Undervoltage coils for 380 to 600 V A.C. 50 c.p.s.
- Shunt trips for 380 to 600 V A.C. 50 c.p.s.
- Auxiliary switches.
- Alarm switches.



FRAME	FJ	JJ *	JKL	KM	MP *
Ampere Rating	100-225 Amps	250-400 Amps	100-400 Amps	450-800 Amps	1000 Amps
Voltage Rating	600-V AC-250-V DC	600-V AC-250-V DC	600-V AC-250-V DC	600-V AC-250-V DC	600-V AC-250-V DC
Rupturing Capacities	240 V, AC 25,000 A	240 V, AC 50,000 A	240 V, AC 50,000 A	240 V, AC 50,000 A	240 V, AC 50,000 A
(Nema)	480 V, AC 20,000 A	480 V, AC 35,000 A	480 V, AC 35,000 A	480 V, AC 35,000 A	480 V, AC 35,000 A
	600 V, AC 15,000 A	600 V, AC 25,000 A	600 V, AC 25,000 A	600 V, AC 25,000 A	600 V, AC 25,000 A
	250 V, DC 10,000 A	250 V, DC 10,000 A	250 V, DC 20,000 A	250 V, DC 20,000 A	250 V, DC 20,000 A
Height	10"	11"	11"	15½"	22"
Width	4½"	9"	9"	9"	9"
Depth	4 1/16"	4 5/16"	4 5/16"	4 1/16"	5¾"

*NEW

HEINEMANN

ELECTRIC (S.A.) LTD

46 Eleventh Road, Kew, Johannesburg, S.A.
P.O. Box 133, Bramley, Tvl. Phone 40-6491

Mr. R. S. DUNSTAN (Port Elizabeth) said Mr. Adams had made a good point — the object of the conservator is the preservation of the oil.

The conservator is designed to limit the area of oil in contact with the air (oil is capable of oxidising and of absorbing moisture) and to confine the products produced by the oxidation to the conservator. If one is prepared to open up a transformer every year, drain the oil, dry it out and clean it, one can do without a conservator, but one cannot in any circumstances stop a normal transformer with a bolted on lid and a soft gasket and no conservator, from breathing. It will breathe through the gasket, moisture will be absorbed and corrosion will set in. Transformers are expendable, particularly in the smaller sizes, say 50 kVA down.

The more modern development is to seal the transformer completely. If one welds the lid on a transformer, no conservator is necessary. It is sealed absolutely hermetically. No moisture can get in, no oxidation, no sludge, and one will get no corrosion. That is the crux of the matter. If an engineer is prepared to pay for a hermetically sealed transformer, one can forget the conservator.

QUIZMASTER said he was intrigued with Mr. Dunstan's idea of sealing up the transformer and asked if anyone could say what happens to oil when it is sealed up in a transformer in the presence of heat.

Mr. R. W. LEISHMAN (Johannesburg) said that in Johannesburg we have had several lines of thought on the question of sealing transformers or otherwise. It is not a question of relative humidity at all but of dew point. In Johannesburg during autumn, winter and spring a motor car left out during a cinema performance is completely dew covered on the roof with moisture. This moisture goes into transformers and in the old days Johannesburg used to have the very elegant idea of a U pipe from the top of the cover of 500 kVA transformers breathing to atmosphere. It was the finest absorbent of moisture we have ever invented. Moisture and oxygen used to get into the windings. Lightning surges came in on a low volt mains overhead and quite a few lightning failures were due to moisture.

Tank lids were so badly corroded with acid that the bushings fell into the tanks. Some 15 years ago, experiments were undertaken in the workshops. The lid of a 500 kVA transformer was welded down cold and the transformer run at full load. It was found that the maximum pressure rise was 5 lbs. per sq inch and that it was easy for the construction of the tank to sustain this pressure. Therefore hermetically sealed transformers were specified. It put all the manufacturers at that time into quite a lot of embarrassment. We had all sorts of ideas, one being the creation in the base of the tank of an air chamber so that the oil had a bit of resilience and a breathing capacity. Later on a small air space under the lid of the tank was filled with nitrogen and that is the kind of transformer bought today. A nitrogen topped transformer completed with welded lid tank is recommended as it keeps out the oxygen and the moisture.

We did another series of experiments two years ago. In service were 22kV/6.6kV, 7,000 kVA transformers, a three single phase bank of 20 MVA per bank. It was arranged for good heaters to be inserted into the oil, to put the job on short circuit and to cook them up to full permitted B.S.S. temperature. Twenty-two inch vacuum was put on the tank which it withstood. As the transformers were cooked up, the extract was condensed and the 22,000/6,600 volt transformers of about 7 MVA eoch yeilded respectively 2, 3, and 4 gallons of water.

Paper insulation comprises a lot of fibres, which are hollow tubes. These hollow tubes have an extraordinary capacity for absorption of moisture, even on a few minutes of exposure to atmosphere.

Some manufacturers are so fussy about exposing a transformer on site (i.e. the old practice of lifting a winding out of its tank to see whether the Railways have smashed it up) that they say it is less dangerous for the Railways to smash it up than for buyers to look at it on site and leave it out of its tank for two or three days. They insist that the transformer be left tanked and commissioned after it has been dried.

Transformers are extraordinarily hygroscopic entities and must not be allowed to breathe except where it is unavoidable. It is not proposed to refuse to allow 11 kVA transformers to breathe, but transformers of 5, 6, or 700 kVA capacity can be satisfactorily allowed not to breathe provided one is prepared to allow a couple of inches of nitrogen on the top. Oxygen means acid; moisture may mean, in a big transformer, as much as four gallons of water in service conditions without breaking down.

Mr. J. F. LATEGAN (Stellenbosch) considering the history of humidity and temperatures, said that in the Cape in winter when the transformer temperatures are highest, the cable trenches are filled up to 2 feet in water, so the two balance. In summer their ambient temperature is very high, up to 100, and the humidity to -0, although in parts of the town there is more moisture. Therefore, in summer there is again the perfect balance.

Since 1928 when the change-over to .3 kV took place, there were some 100 kVA's which had never been opened up and oil tested. These were sold and there have been no failures. Three 500 kVA indoor transformers standing outside in the rain for 3 years were bought and they have been operating perfectly. One engineer bought a 640 kVA transformer step up step down 3.3 o 11 KV at R1 per kVA and had asked for the core to be removed. The only water found was about 6 inches on the lower laminations. It was taken away and during the past three years no damage has been reported.

QUIZMASTER said the Forum was of opinion that the fitting of conservators on transformers was optional.

QUESTION No. 30: Does job evaluation have any practical value in determining salary scales?

QUIZMASTER said that there had been a spate of job evaluations and salary determinations throughout the Republic in the past 18 months and asked for some information on the subject.

Mr. K. ADAMS (Johannesburg) said that job evaluation does not have much value in determining salary scales; in fact it could do more harm than good. It extensive application in the public service, for example, has resulted in a personnel shortage unprecedented in the history of the Republic. It is not a scientific approach; the difficulties at each step are enormous and the range of possible errors exceeds anything allowable in scientific work. The specification of requirements

for a position is quite arbitrary and there is tremendous room for error.

One has then to measure the attributes on an arithmetic scale. These are difficult to measure accurately in any event, and the choice of arithmetic is itself of doubtful wisdom. Next one has to combine the measurements to get a single overall figure. Most persons add the figures together, but why are they not multiplied, as this would be more logical.

The difficulty can be seen more clearly if one attempts to evaluate the comparative weather in Port Elizabeth or Piet Retief. The quantities involved are measurable, and nevertheless the overall figure of weather evaluation would be completely meaningless if ever applied.

The process also puts the cart before the horse, for it is a salary pattern or an organisation which determines the attributes of persons which grow there. The exponents of job evaluation are thinking in reverse. The growth of personnel and their attributes is a function of what is termed the income gradient, which really measures the financial progress in an occupation. In one large municipality last year, the income gradient was increased to half the optimum value. This single move did more good than all the other moves in the previous 15 years, all of those being based on thoughts which are akin to job evaluation.

QUIZMASTER said insufficient discussion had taken place to determine the practical value of job evaluation.

QUESTION No. 28: It appears to be the standard practice in this country to use one value for soil thermal resistivity (g = 120) for determining the permissable current rating of cables laid direct in the ground. In view of the increasing tendency to operate cables at or near the maximum limit of temperature is the value of g = 120 a safe value?

Mr. F. J. PRINS (Pretoria) said the E.R.A. started with a figure of 'g' = 120. Subsequently, a better figure for Britain was found to be 'g' = 90. Temperature changes in the soil with a cable carrying continuous steady loads are caused by changes in the moisture content or the ambient soil temperature. The changes in the ambient soil temperature are caused by hot sun or cold weather, but changes in moisture content can be attributed to three main causes:

(a) Climatic conditions during the year;

(b) The drying out of he soil due to the load carried by the cable;

(c) The effect of roots and plants absorbing the moisture.

The Bureau of Standards have undertaken thermal resistivity determinations in different parts of the country over the past three years and correlated roughly the particular types of soil and the moisture content expressed as a percentage of the dry weight of the soil.

Fine clay	average	moisture	content	18%	'g'	average	75.
Clay mixed with sand	„	„	„	32%	„	„	59.
Clay, sand and gravel mixed	„	„	„	12%	„	„	55.
Course sand and gravel, very compact	„	„	„	8%	„	„	56.
Humus or organic soil with clay underlayer	„	„	„	16%	„	„	65.
Fine sand	„	„	„	11%	„	„	68.
Silt and gravel mixed	„	„	„	21%	„	„	73.
Fine sand and gravel	„	„	„	16%	„	„	85.
Made up soil, building rubble	„	„	„	8%	„	„	127.
					'g' maximum		182.
Sifted excavated backfill	„	„	„	13%	'g' average		264.
					'g' maximum		330.
Chalk strata, Durban area	moisture content			71%	'g' equals		145.

Tests have been run since November, 1963 in conjunction with the Pretoria Municipality on a new inter-connected cable joining Rooiwal Power Station to the existing station. Probes were buried at the time the cable was laid. Regular checks have been taken. Consolidation of the backfill and variation of the moisture content has occurred. Moisture content varied from 14% to 6%, variations of 'g' from 48 to 98. The value of 'g' has varied up and down but has increased steadily over the period of test: original figure of 58 is now 98.

Spot measurements are subject to variation depending on the structure of the soil. Normally 'g' is measured in undisturbed soil. Where probes are used, a hole 2 feet deep is dug and the probes are driven in to measure at a level of 3 feet. Medium to fine sand under power cable conditions results in 'g' rising. When power was switched off and checked, it has been found that the cable which had been completely dry initially was still dry. Moisture had not entered the cable trench. Tests are still being carried out by the E.R.A.

Mr. M. VAN DER SPUY (C.S.I.R.) said that the question of soil resistivity has become a large problem in England which was not expected with the high moisture content which is prevalent there.

One solution to hot cables is to run water pipes with the cables and so maintain the moisture content. Another method is the use of a prepared backfill which has a low 'g'. In Los Angeles, a computer is used to measure the quantity of backfill required. 'g' varies, in some spots in South Africa the figure is as high as 330. The C.S.I.R. have found figures of 250 where an anticipated value would be 120.

The C.S.I.R. are developing new types of probes. An instrument has been designed which allows measurements to be taken with a standard avometer. A universal type of this instrument could be made available to municipal engineers to take values of 'g'.

Following on the work done by the Bureau of Standards, the C.S.I.R. are carrying out a survey of 'g' throughout the Republic. A chart being drawn up is to be made available to municipal engineers. 'g' bears a strong relation to the

moisture content of the soil at the particular time the reading is taken.

QUIZMASTER said the Forum is of opinion that the value of 'g' should be checked to find safe values.

QUESTION No. 32: Do arcing horns on transformer and circuit breaker bushings serve any useful purpose?

Mr. A. A. MIDDLECOTE (Pretoria) said that this was a contentious matter. On the Continent the feeling was that an arcing horn on its own is a danger in as much as it chops the wave. If a surge arrives at a transformer and a flashover does occur at the arcing horn, there is a sharp rate of change of current, and this will strain the internals of a transformer severely.

On the other hand, if one has a diverter, a correct type of lightning arrestor, before the arcing horn and merely look upon the arcing horn as a back-up, the condition is not as bad, because the only surges that one can expect the arcing horns to have to deal with are low enough — even with a chopped wave, the transformer windings are not strained to any large degree.

Mr. Middlecote admitted he thought that arcing horns do not serve a real useful purpose and that it would be better to invest the money in a good lightning arrestor. There had been a recent E.R.A. report, however, based on research in England on statistical values, and they did show that there was not a high incidence of failures of transformers that were protected with arcing horns, so it might be that this sphere has been exaggerated.

If arcing horns are fitted, one must make certain there is a good lightning arrestor ahead of the arcing horn.

Mr. H. E. SUMMERS (Bulawayo) said Mr. Middlecote's comments were not strictly correct as the practice in the United Kingdom is not to use arcing horns on transformers, but co-ordinating gaps. The co-ordinating gaps are set to flash-over in two micro-seconds at the basic impulse level. This, on the 1 32 kV system has proved very satisfactory, since the inception of the grid scheme. At that time transformers were obviously not impulse tested, and it was only with the survey made in the early years of the war that we had any idea of what the probable impulse vaule was — this was 5 to 550 kV.

Arcing horns should not be used at all. An arcing horn is a horn put across the major insulation contrary to a co-ordinating gap and it is influenced by the electro-static field set up by the insulator, which may be quite nebulous, i.e. if one calibrates the gaps on one 1 32 kV insulator, one person may use 38 inches, another 42, and another 36. The practical engineer needs a yardstick, which can be used at random, and by use of the co-ordinating gap, at least one knows where one stands. Secondly, why put an arcing horn on a valuable piece of insulation like a condenser bushing or barrier bushing and promote flash-over. If one does want a flash-over for amplitude chopping, it must be done on the co-ordinating gap where one cannot do any damage.

In France, surge diverters are only used on single radial lines; where lines are duplicated or triplicated surge diverters are not used; they use co-ordinating gaps at the entry to each sub-station. British practice is slightly different, in that co-ordinating gaps are only used at the transformer terminals. Thirty years ago we were worried about special 60 kVA transformers which were looked upon as being very large ones. We put surge diverters on them at Barking. There is a very heavy overhead line over the Thames and we had no spares. The diverters were put in and the transformers were lost because the diverters blew up and punctured the transformer tank and the oil ran out. This was the only failure we had. Co-ordinating gaps proved most satisfactory.

I've met the isokeraunic level in the U.K. which is relatively low, about 8, possibly 10, whereas in the territory where I am living now, it is about 80. There, on all primary transformers we use co-ordinating gaps that are set to discriminate with surge diverters which are placed remote from the transformers at the entry to the station — provided the surge impedance to the bus is high. If the surge impedance to the bus is low, then we do away with surge diverters, even at a high isokeraunic level and so far a transformer has not been lost. We have had complete discrimination between co-ordinating gaps set again at the basic impulse level to flash-over in two micro-seconds with surge diverters placed at the entry to the station. There is a certain amount of reflection but allowance is taken for this. I am postulating the rate of rise of about 300 kV per micro second.

Mr. Summers wished to stress the point that if one wants voltage relief, put on an arcing horn where it is safe. Do not invest money in valuable insulation such as condenser bushings without putting voltage relief across them.

QUIZMASTER said the Forum appears to favour the use of arcing horns provided the other co-ordinated equipment is also used.

QUESTION No. 1: Re Regulation C.64 of the Factories, Machinery and Building Work Act 1941 as amended: In regard to supports of this lattice type which are used to carry overhead conductors, what does the Forum consider an adequate form of protection to prevent any unauthorised person from coming into dangerous proximity of the conductors by climbing such supports.

QUIZMASTER said that the question had been on the papers for the last four years and as no one seemed to know the answer, he suggested it be deleted. This was agreed.

QUESTION No. 2: Regarding the "suitable premises" for which Regulation 21 of the Wireman's Act No. 20/1939 requires assessment, what yardstick is considered relevant to the quality of service which a contractor renders to his clients?

QUIZMASTER asked what the yardstick was with which one should measure the quality of service.

Mr. R. S. DUNSTAN (Port Elizabeth) said that South Africa had in many ways been a leader in the world in legislation. Twenty years ago, the Electrical Wireman's Registration Act was introduced with the specific object of preventing and making it illegal for anyone but certain persons to interfere with the wiring of an installation. This Act is considerably ahead of most other countries in the World. In South Africa, it has been the normal practice of all Undertakings to inspect the installation before it is connected to the mains. This is a compulsory inspection. In England, even today inspection of installations is not compulsory.

The Electrical Wireman's Registration Act serves a very useful purpose. The Act is intended to improve the safety of the installation and of electricity. The Act also introduced the registration of electrical contractors. The two ideas are entirely separate. First of all, the Act provides for the registration of Electrical Wiremen, who are the men who actually put the wires in the house and this is a very fine provision. It also provides for the registration of the electrical contractor, who is the firm who employs the wiremen.

The Act established the Electrical Wiremen's Registration Board. This Board issues licences to the electrical wiremen and has disciplinary powers over them. The Board can remove a wireman's licence and thereby remove his livelihood. With regard to the registration or licensing of contractors, there are no powers granted to the Electrical Wiremen's Registration Board and therefore no disciplinary measures. Therefore, the introduction of this licensing of contractors was a mistake as it does not help in any way.

The Act has been amended and it has been made compulsory for all supply authorities to licence electrical contractors. It has introduced to the supply authorities the necessity to control the trading activities of businessmen in the town. Most towns have licensing of businesses, which is handled by licence inspectors, not by the electricity supply authority, and thus a new job has been created.

The requirements for a licence for electrical contractor are completely farcical. The Act requires him to have suitable premises; it requires him to have certain equipment. In this town we have contractors who hire a piece of floor area from a wholesale supplier of electrical wiring material, who charges rent. He puts on that piece of floor a bench, the contractor puts on the bench his megger and testers and whatever he is supposed to have and the premises and instruments are inspected and he is issued with a contractor's licence. The Contractor then packs everything up and goes to where his workshop really is — i.e. the house that he is actually wiring. The contractor or the electrical wiremen's place of business is the premises he is wiring.

There is great difference of opinion over what the premises should be. Certain engineers in this part of the country maintain that the premises should consist of a workshop in which the man has machine tools to enable him to construct metal clad switchboards of all kinds. This is not right.

The whole idea of the Electrical Wiremen's Act was to improve the safety of installations in houses, and the safer use of electricity.

It is time a move was made to have the clauses dealing with the licensing of electrical contractors removed from the Act. We have all the power required to see that the installations are safe by dealing with the wiremen. The wireman is the one on whom disciplinary action is to be placed. One can go to the registration board and have his licence cancelled, but with the contractor one can do nothing.

In this town, there is for instance the O.K. Bazaars, who are registered as contractors, not because they do general wiring work, but merely to comply with the Act, because they install stoves and refrigerators and washing machines in premises and employ their own electrician to do this. There are firms in this town who employ an electrician for their factory maintenance; in terms of the Act they have to be registered as Contractors. This answers Question 36.

QUESTION No. 36 : Should the licensing of electrical contractors be discontinued?

Mr. Dunstan said that he had dealt with Question No. 2 — "suitable premises". There was a great difference of opinion and no one could decide what should be asked for.

QUESTION No. 3 : Ought not the administration of section 21 (and relevant sections) of the Wiremen and Contractors Act be the function of the State?

In this regard, Mr. Dunstan said he thought the licensing of contractors should be cut right out.

Mr. J. F. LATEGAN (Stellenbosch) said he wished to bring to the notice of the Forum the exemptions in the Act. I have a specific case of a lad who has a wiring licence and was building his own house. He asked me if he should get a wiring contractor to do the wiring. I gave him written permission to do his own wiring.

Another instance was the case of a man who was registered in Brakpan or Benoni. He is now in a religious institution and for the love of the institution was doing all their re-wiring and alterations and additions. Permission was also given him to do this and inspections of the work have been made.

The P.W.D. say in their specifications that they do their own inspections, but the Province do not. They ask the municipalities to do inspections.

There is another problem. The university have wiremen who are registered wiremen. They are not contracting in the true sense of the word. They have their own workshop but are a semi-government institution. They are on a R for R basis paid by the Government: for all money received in subscriptions, the Government gives an equal amount. They are exempt, but in their case when we get people who tender for their work, we step in and do the inspections.

Mr. W. R. MILTON (Honorary Member) said in connection with Mr. Dunstan's criticism, that the origin of the licensing of contractors arose from the first efforts of this Association in the direction of the protection of the public in connection with wiring installation work.

The instigator was Mr. George Swingler of Cape Town, and the Association arranged for the formation of a Committee to draw up standard wiring regulations for the wiring of premises, and standard supply regulations. The supply regulations were so fraught with difficulty in getting harmonious agreement that they were dropped. One point that the late George Swingler insisted on was the provision for the licensing of wiring contractors. His continuous plea was that he wanted something to give him power to deal with the carpetbaggers.

In this connection the licensing of the wiring contractor was requested, so that the person employing a wiring contractor would have some safeguard and some comeback in the event of the work turning out to be defective and requiring to be re-done. It was suggested, therefore, that the people who understood wiring work should have sufficient financial stability to be sued in order that the owner of the premises could have the wiring work re-done effectively at no cost to himself.

Mr. C. LOMBARD (Germiston) referring to Mr. Dunstan's remark that the position had become farcical said that in regard to the electrical contractor's premises, the local authority only has itself to blame. They have the powers to lay down the requirements and cannot the Act for this.

The other point is if one has a factory employing their own wiremen there is no necessity in terms of the Act for that factory to be licensed as a contractor. The O.K. Bazaars have their own wiremen to do wiring and maintenance work on wiring installations on their own premises. There is no necessity for them to be licensed, but if they work outside they must be licensed.

QUIZMASTER said that the Forum had heard two versions of Question 3 and he thought they would now hear a third version.

Mr. R. W. KANE (Ex Wiremen's Board) said that there was a terrific amount of misunderstanding in the application of the Wiremen's Act. The licensing of wiremen is totally unnecessary. The unlicensed wiremen have been driven behind the scenes and there has been a lot of shoddy work done quietly and no supply authority will catch up with all of it.

When it comes to contractors, one does have a better control. In the United Kingdom they have been recently testing in accordance with the overseas institute requirements, but they merely tell the consumer that this is not in accordance with the requirements and it is up to the consumer to put it in order. There is a powerful Contractors' Association in the U.K. that operates a testing system of their own against each other and against the members of their own association. The intention is to maintain the standards that a reputable contractor should maintain and if they find a contractor is quietly doing what should not be done, he is liable to lose membership of his Association.

Registration of wiremen by the municipalities has existed in the Transvaal since 1915. The Cape had registration of contractors prior to Act 20 of 1939, which is the Wiremen's Act. The Act had been in operation for over 20 years and the Board felt that it was time the whole country was determined as far as the registration was concerned.

There has been lots of trouble and misconception about what is required by "equipment" and who is a contractor. If a licensed wireman wanted to wire his own premises, he does not have to be a contractor to do so: he is not contracting. The O.K. Bazaars, who have a chain of stores with licensed electricians, can operate anywhere on O.K. premises as they are not contracting. If the O.K. Bazaars are going to sell a washing machine and have to put in a socket outlet in private premises, then they have to become contractors.

Mr. Kane said that in his experience, with the complete licensing of contractors one had a better control over the trade because invariably a contractor is a man who batters the wireman into evading the wiring regulations. It had happened in Johannesburg. There has seldom been legal action against a wireman because he couldn't be caught, or if he did do it, he did not have a licence in any case. Generally, the contractor is the one who can be made to suffer. One has proper control. Over the years, the majority of legal prosecutions have been against the contractor and he deserved it.

Referring to premises and equipment, this had been wished on the country mainly as an attempt to have complete uniformity throughout the country, which we do not have even in the wiring regulations. When one is considering equipment or premises generally, one should be fairly tolerant despite what the big contractor thinks. He is trying to use you to operate a closed shop against the small man who is fairly good. One ought to be able to get into contact with the contractor. He has to have the equipment, but it does not have to be in his workshop. The bulk of his equipment should be on the job. The important point is to be able to contact the contractor at least once a day and he must have a decent address, or a reasonable place. Sometimes he is permitted to operate in a garage in his back yard, but this depends on the town's town planning by-laws. The majority would not permit it. If he has been allowed to operate in the past, surely he can carry on until he wishes to move elsewhere.

Mr. Kane said he hoped he had put a few more cats among the pigeons! The main trouble in the country is that you have all had something wished on you which you as an Association asked for and the contractors asked for, and you don't like the idea of a little bit of extra work.

QUIZMASTER said that the Forum was of opinion that the licensing of electrical contractors should be continued and that the administration of the Contractors' Act should remain with the local authorities.

QUIZMASTER thanked all for their contributions and hoped they had enjoyed the discussions as much as he had.

THIRD DAY/DERDE DAG

The Convention was advised that the joint Consultative Committee of Electric Cable Manufacturers had pointed out that their members found the time allowed by member undertakings to submit tenders inadequate under modern conditions. They suggested that where possible, they be allowed a week or two weeks more than they had been allowed in recent months. The President appealed to members of the Association to assist the cable manufacturers in this connection.

The Convention was also informed that a communication had been received from the President of the S.A. Institute of Electrical Engineers regarding the advertisements which appear in the press from time to time for vacancies occurring in Municipal Undertakings. He had pointed out that these advertisements invariably called for membership of the London Institute of Electrical Engineers and he considered that preference should be granted to the S.A. Institute when inviting applications for vacant posts. The Convention was advised that the Executive Council had considered this matter and were of the opinion that member undertakings should grant equal rights to the local qualification and to the London qualification.

In regard to the composition of the Executive Council, the Convention was advised that the Council had considered it in the interests of the Association to co-opt the town of Springs and the City of Cape Town to the Executive. This announcement was greeted with acclamation.

The following Annual Reports, all of which were published with the Agenda of the Convention, were dealt with:

1. Annual report of the S.A.I.E.E. Committee to Revise the Code of Practice for Overhead Lines for Conditions prevailing in South Africa. Adopted without discussion.
2. Report of the Recommendations Committee for new Electrical Commidities. Adopted without discussion.
3. Report of the Electrical Wiremen's Registration Board. Adopted without discussion. It was noted that the Chief Inspector of Factories, Mr. Groenewald, had resigned from his position to take up another appointment and would accordingly not be attending Conventions in the future.

Die Konvensie is meegedeel dat die gesamentlike Adviserende Komitee van die Elektriese Kabel Vervaardigers daarop gewys het dat hulle lede die tydperke wat toegelaat word vir die indiening van tenders deur lede-ondernemings, onvoldoende onder moderne toestande vind. Hulle het voorgestel dat waar dit moontlik is, aan hulle 'n week of twee weke meer gegun moet word dan die tydperke wat toegestaan is in onlangse maande.

Die President het lede van die Vereniging versoek om die kabel-vervaardigers in hierdie geval tegemoet te kom.

Die Konvensie was ook meegedeel dat 'n skrywe verkry is van die President van die S.A. Instituut van Elektrotegniese Ingenieurs aangaande advertensies wat van tyd tot tyd in die koerante verskyn insake vakatures in Munisipale ondernemings. Hy het daarop gewys dat advertensies sonder uitsondering aanvra vir lidmaatskap van die Londonse Instituut van Elektrotegniese Ingenieurs wanneer daar aansoeke aangevra word vir vakante betrekkings. Die Konvensie is meegedeel dat die Uitvoerende Raad hierdie saak bespreek het en van mening is dat lede-ondernemings gelyke regte moet toeken aan die lokale en die Londonse kwalifikasie.

Insake die samestelling van die Uitvoerende Raad, was die Konvensie meegedeel dat die Raad dit in belang van die Vereniging goedgevind het om die Stadsraad van Springs en die Stadsraad van Kaapstad te koöpteer op die Raad. Hierdie aankondiging was met luide toejuiging ontvang.

Die volgende jaarlikse verslae, waarvan almal in die sakelys van die Konvensie gepubliseer was, is behandel:

1. Jaarlikse verslag van die Komitee van die S.A.I.E.I. oor die hersiening van die Gebruiks-kode vir Bogrondse Geleidings vir heersende toestande in Suid-Afrika. Aanvaar sonder bespreking.
2. Verslag van die Komitee belas met aanbevelings oor nuwe elektriese handels-artikels. Aanvaar sonder bespreking.
3. Verslag van die Registrasieraad vir Elektrotegniese Draadwerkers. Aanvaar sonder bespreking. Kennis is geneem van die feit dat die Hoof Inspekteur van Fabrieke, Mnr. Groenewald, bedank het as lid om 'n ander betrekking te aanvaar en gevolglik sal hy nie die Konvensie in die toekoms bywoon nie. Waardering vir die werk wat deur Mnr.

Appreciation for the work of Mr. Groenewald in the past was expressed as also best wishes to him in his new sphere of work.

4. Report of the S.A. Bureau of Standards. Mr. G. C. Theron added the following comment:—

„Mnr. die President, die verslag is voor u gelê. Ek wil net graag byvoeg dat met die snelle industriële ontwikkeling in die land was die sub-komitee van die Buro vir Standaarde geweldig besig in die afgelope jaar met die hersiening van bestaande spesifikasies sowel as die opstel van nuwes. Dit het heelwat tyd in beslag geneem van die ingenieurs en derhalwe wil ek graag die ingenieurs wat my hierin behulpsaam was, sowel as die rade wat hulle tyd afgegee het om die verskillende sub-komitee vergaderings by te woon, baie bedank vir hul ondersteuning in die opsig.

Mr. A. A. Middlecote commented as follows:

"Mr. President I should just like to thank all the members of the A.M.E.U. for the very useful work they have done and for the great help they have given us.

"I would just like, by way of interest, to mention to members (seeing they were the real instigators of the compulsory safety specifications, which will become operative from July), that the commerce and industry of the Republic

The report was then adopted.

5. Report of Hot Dip Galvanised Zinc Coatings. Mr. Giles added the following comment:

"Mr. President this hot-dip galvanising committee has met on at least seven (7) occasions, and we are greatly indebted to our friends in Escom who formulated a hot-dip galvanising specification which has stood them in good stead for many years, and they passed the benefits of their experience on to this particular committee.

"Mr. Middlecote has mentioned in his paper some details of it to members that are interested. Now the main

The report was then adopted.

6. Orange River Hydro-Electric Sub-Committee Auunal Report. Mr. G. J. Muller added the following comment:

"Mr. President, I am not aware of any reply from the United Municipal Executive, and I have nothing more to add to the report as tabled.

"I can perhaps add that I understand that some action

The report was then adopted.

7. Annual Report of the Secretaries. Mr. P. J. Botes, Roodepoort, commented as follows:

„Mnr. die President, ek wil net graag verwys na 'n brief van die Stadsraad van Roodepoort aan die Uitvoerende

Groenewald in die verlede gedoen is, asook goeie wense aan hom in sy nuwe betrekking, is uitgespreek.

4. Verslag van die S.A. Buro van Standaarde. Mnr. G. C. Theron het as volg kommentaar gelewer:—

„Dan wil ek net graag noem dat die spesifikasies van die Buro van Standaarde nooit staties is nie. Daar is gedurig ontwikkeling in die land aan die gang; ontwikkeling op tegniese sowel as op ander gebiede en derhalwe wil ek 'n beroep doen op die ingenieurs om vir ons asseblief behulpsaam te wees om die spesifikasies op datum te hou deur die Vereniging te voorsien van alle moontlike inligting en probleme wat hulle mag ondervind in die toepassing van die spesifikasies. Dit sal vir ons van besonder baie hulp wees."

Mnr. A. A. Middlecote lewer kommentaar as volg:—

has been most responsive. Since they learnt of this they have done their best to make sure that they will not be transgressing the law, and we have had wonderful co-operation from them. I thought I would just like to mention that to members here, who have always been so very interested in having these safety specifications made compulsory."

Die verslag is aanvaar.

5. Verslag van Warm-gedompelde Gegalvaniseerde Sink-lae. Mnr. Giles lewer as volg verslag:—

composition of this organisation, drawn up by the Bureau of Standards, consisted of four types of people. There, of course, were the galvanisers, the designers, the fabricators and the users, and one can imagine — it is a very large committee, and the Bureau of Standards are doing a very fine job.

"Unfortunately we have not yet finished our work and there is still a little more to be done, mainly on the galvanising of wire."

Die verslag is aanvaar.

6. Jaarlikse verslag van die Oranje Rivier Hidro-Elektriese Onder-komitee. Mnr. G. J. Muller lewer die volgende kommentaar:—

has been taken by the United Municipal Executive as a result of the interim report which, of course, we cannot discuss at this stage."

Die verslag is aanvaar.

7. Jaarlikse verslag van die Sekretarisse. Mnr. P. J. Botes, Roodepoort, het die volgende kommentaar gelewer:—

Bestuur vir twee of drie jaar gelede wat as volg lees:

"My Council holds the view that your Institution does not ensure that the official languages are accorded equal recognition in the papers presented at its annual conferences. The Council, therefore, feels that if this state of affairs is allowed to continue, contrary to the provisions of the South Africa Act 1909 now repealed and the provisions of the Republic of South Africa Constitution 1961, the Council could hardly be expected to lend further support to these Conventions as the non-compliance with the principle of equal recognition and status of both official languages cannot be justified and a departure from that principle would indeed be a retrogressive step."

„Vergun my ook mnr. die President om aan te haal uit die verrigtinge van die 1964 Konvensie te Windhoek, van 'n voorstel van Raadslid Dr. Heyns van Potchefstroom, gesekondeer deur Mnr. Percy Giles van Oos Londen en wat eenparig aanvaar is deur die Vereniging, naamlik,—

„Die Konvensie versoek die Uitvoerende Raad om oorweging te skenk aan die moontlikheid om alle rapporte en referate in beide amptelike tale in die Konvensie se Agenda in te sluit. Dit is die Konvensie se oorwoë mening dat sodanige prosedure lede in staat sal stel om stukke beter te bestudeer, te waardeer en te assimileer."

„Die referaat van Mnr. Middlecote is baie interessant maar is in Engels met 'n beknopte opsomming in Afrikaans. Die van Dr. Bozzoli in Engels, ook met 'n beknopte opsomming. Die van Mnr. Chappel in Engels met 'n vertaling beskikbaar by die inligtings-buro. Die van mnr. Milton in Engels met 'n paar aantekeninge in Afrikaans.

„Mnr. die President, ek is seker daar is 'n verskoning voor, naamlik, dat óf die referate laat verkry is óf dat die koste verbonde daaraan om dit in twee tale te publiseer, hoog is, of iets dergeliks. Ek wil ook u aandag vestig op die beperkte aantal besprekings van die referate op Woensdag se Agenda. Die huidige Agenda het ek twee of drie weke voor die kongres ontvang, wat dit vir my feitlik onmoontlik maak om stof te versamel en aan die verrigtinge deel te neem.

„In hierdie tyd van ekonomies groei, is die ingenieurs besig met hulle probleme en het tyd nodig om die referate deur te lees. Die Agenda kom veels te laat uit.

„Om egter terug te keer tot die punt wil ek meld dat dit nie verwag word van die persoon wat die referaat lewer, om dit in beide tale te skryf nie; die idee is dat die referate deur die Sekretaris vertaal word, om sodoende die referaat beskikbaar te hê in beide landstale.

„Dit is nie so gestel in die bewoording van die voorstel van Dr. Heyns nie, maar dit is die logiese gevolgtrekking van die strekking van die voorstel. Die huidige agenda voldoen nie aan die vereistes van die voorstel van Dr. Heyns nie, indien die Uitvoerende Bestuur dit wel so aanvaar het. Soos ek reeds gesê het sal die verskoning wees „beperkte tyd". Hierdie verskoning Mnr. die President is vir my onaanvaarbaar.

„Verder Mnr. die President, ek het tydens die 1963 Konvensie op Margate gewag gemaak van die feit dat die verrigtinge van die vorige Konvensie so laat ontvang is. Aan my is toe gesê dat dit die gevolg van 'n „typographical error" is, dat die druk van die verrigtinge vertraag is.

„Dit blyk nou Mnr. die Voorsitter dat die „Typographical error" al erger en erger word want die verrigtinge word al later en later verkry.

„Ek het ondersoek ingestel en gevind dat die verrigtinge van ander munisipale institute of verenigings binne drie tot ses maande na die kongresse beskikbaar is: waarom is ons dan so vertraag? 'n Mens wil graag opvolg en weer lees oor 'n referaat en belangrike gegewens daarin opsoek maar die waarde van die verrigtinge wat 'n mens eers 'n jaar later ontvang is nietig.

„Mnr. die President, ek wil graag weet waarom nie aan Dr. Heyns se voorstel voldoen is nie, waarom die Agenda so laat uitgestuur is asook die verrigtinge van die 1964 kongres? Indien daar gesê sal word dat probleme verkry is met die drukkers Mnr. die President, moet u net 'n ander een soek en indien daar nie een in Johannesburg is nie, is ek seker sal een in Roodepoort verkry kan word. Ek wil net verder meld dat ek geen verskoning kan sien vir die eentaligheid van die Agenda, en die vertraagde publikasies van die Agenda en verrigtinge nie, ek wil my verstout om te sê dat die fout moontlik by die Sekretaris lê. Dankie Mnr. die President."

Mr. R. W. Kane, Hon. Member, commented as follows:

"I am rather surprised. I understood the normal procedure was for somebody to propose the adoption of the report and have it seconded; I take it that is not happening today.

"From what I understand from the previous speaker there has been a plea to increase the general expenses of the the Association - and probably quite justifiably.

"But something that has been concerning me for a number of years, ever since we started to pay for our executive expenses, travelling expenses and things like that, the rate at which our general expenses have been increasing throughout the years. Prior to that, 10 years ago, our expenses were in the region of about R1,600. Last year it was well over R4,000, and I think, if we are going to make claims like the previous claim, we should give some serious thought to some other method of reducing our expenses.

"One of these I would suggest (and I am not making a proposal, and I am not going to support any proposal but I am leaving this thought with you) . . . you have an Executive that was formed some years ago on the basis of provincial representation. Subsequent to that you introduced branches, and the chairmen of those branches are on the Executive. You have an executive in bodies of 20 elected people or office bearers, and at least 3 additional branches, and you may have further branches in future. I sincerely think that your Executive should give consideration to a reduction in the size of the Executive.

"There was a proposal some time ago that consideration should be given to reducing the number of immediate past presidents. I would also suggest that serious thought should be given to any form of co-option. That should take place, as it did last year, for the specific reason of an individual for a specific purpose,and I would just leave the thought (and I

Mnr. R. W. Kane, Ere-Lid, lewer as volg kommentaar:

---

think I am fairly right in expressing this) . . . there has been a feeling this year that we wonder why we worry to have an election."

Mr. G. C. Theron (Vanderbijlpark) replied to the speeches as follows:

„Mnr. die President, dames en here: In verband met Mnr. Botes se voorstel wil ek graag aan u verduidelik en uitwys dat die briewe warna verwys is n.l. die van Roodepoort en die voorstel van Potchefstroom verlede jaar gekom het, behandel was deur die uitvoerende raad in die loop van die afgelope jaar, en toe is die beeld wat daar reeds gestel was so ver dit heirdie vereniging aangaan, weer bekragtig nl. dat albei landstale gelyke erkenning sal geniet. In dié verband het die uitvoerende bestuur eenparig besluit dat alle amptelike stukke in albei tale sal verskyn en so ver dit referate aangaan dit aan die skrywers oorgelaat word om dit op te stel in die taal wat hulle verkies met 'n beknopte samevatting in die ander landstaal.

Mr. E. E. de Villiers, Carletonville, commented as follows:

„Mnr. die President, net 'n paar woorde miskien tot byvoeging wat ons Vise-President nou bespreek het. Ek kan u net daarop wys dat ek persoonlik ook gedien het op 'n sub-komitee wat op die saak ingegaan het van tweetaligheid, veral wat betref publikasies. Dit is korrek dat ons so besluit het soos Mnr. Theron gesê het, maar ek wil u daarop wys, soos blyk uit die staat van inkomste en uitgawe, het ons 'n klein profyt van R160 gewys vir die afgelope jaar. Ek het ongelukkig nie op die oomblik die syfers beskikbaar nie (dié kan die sekretaris vir u gee as u dit verlang) maar indien ons sou ingegaan het vir 'n volle tweetalige publikasie van die referate, asook alle ander stukke van hierdie kongres sou dit etlike duisende rande beloop het.

„Ek dink weer ook aan 'n versoek dit was genoem gewees by 'n vorige kongres, dat daar moontlik fasiliteite daar gestel word om 'n lopende vertaling van alle besprekings hier te weergee. Dis saak is ook op ingegaan en dit is gevind dat dit 'n onekonomiese proposisie vir ons sou wees.

„Mnr. die President, eintlik kom dit dan daarop neer dat ons die beginsel van tweetaligheid aanvaar het en ons leef dit uit binne die vermoeë van ons finansies. Ek kan net byvoeg ook wat die Uitvoerende Komitee betref, is daar in die afgelope jaar alle stukke aan lede uitgestuur in albei landstale, insluitende die notule van alle vergaderings, wat ook 'n goeie voorwaartse stap is.

„U kan gerus wees dat hierdie saak terdeë aandag geniet en dat die Uitvoerende Komitee in daardie opsig ook in die toekoms sy plig sal nakom."

In reply to these comments, Mr. P. J. Botes, Roodepoort, expressed thanks for the answers which he had received to his questions and moved that the Report of the Secretaries be accepted with thanks.

In moving a vote of thanks to the Secretaries, Mr. P. A. Giles, East London, congratulated Mr. Dick Ewing and his staff for handling the work of the Association with despatch and remarked that members of the Executive Committee knew how difficult it was to keep the affairs of the Association in running order and in full trim. In regard to increased expenditure, Mr. Giles mentioned the decrease in the value of money over the past 10 years and congratulated the Executive Committee on the fact that the year's operations had produced an excess of income over expenditure. He appealed to affiliates to continue to support the Association by advertising in the Proceedings.

In seconding the vote of thanks, Cr. H. Boneschans, Germiston, addressed the Convention as follows:

„Mnr. die President, dames en here, net 'n paar gedagtes voordat ek Mnr. Giles se mosie van dank en Mnr. Botes se voorstel vir die aanname sekondeer, die aanname van die sekretariële verslag en rekeninge.

Mnr. G. C. Theron (Vanderbijlpark) lewer as volg kommentaar:

„Nou Mnr. die President, dit kom daarop neer dat as daar referate in Afrikaans sal kom wat ons baie sal verwelkom dan sal die referate in Afrikaans verskyn met 'n beknopte samevatting in Engels, en derhalwe maak ons, 'n beroep op die ingenieurs om asseblief in daardie opsig te vore te kom en behulpsaam te wees.

„Wat die verrigtinge aangaan het ek persoonlik ondersoek ingestel waarom dit so laat is, en die posisie is daar dat die drukkers ondervind ook die arbeidsprobleme wat ek dink al die ingenieurs dwarsdeur die land vandag ondervind, nl. 'n tekort aan arbeidskragte. Alles word gedoen om hierdie saak te verbeter wat ongelukkig in die afgelope jaar opgeduik het."

Mnr. E. E. de Villiers, Carletonville, lewer as volg kommentaar:

In antwoord op hierdie kommentaar het Mnr. P. J. Botes, Roodepoort, dank uitgespreek vir die antwoorde wat hy op sy vraag ontvang het en het voorstel dat die verslag van die Sekretarisse met dank aanvaar word.

Met 'n voorstel van dank aan die Sekretarisse, het Mnr. P. A. Giles, Oos Londen, Mnr. Dick Ewing en sy personeel geluk gewens met die wyse waarop hulle die vereniging se werksaamhede behartig het en meld dat lede van die Uitvoerende Komitee bewus is hoe moeilik dit gaan om die sake van die vereniging vlot te laat verloop. In verband met verhoogde uitgawes het Mnr. Giles verwys na die vermindering in die waarde van geld oor die afgelope 10 jaar en het die Uitvoerende Komitee geluk gewens met die feit dat die jaar se werksaamhede 'n oorskoot oor die uitgawes aangetoon het. Hy het 'n versoek tot die ge-affilieerde lede gerig om die vereniging te ondersteun deur advertensies in die verigtinge te plaas.

Rdl. H. Boneschans het die voorstel gesekondeer en die Konvensie as volg toegespreek:—

„'n Sekretaris-Rekeningmeester van so 'n groot organisasie soos die V.M.E.O. het te doen met baie organisasie probleme. Vir 'n amptenaar is probleme nie iets buitengewoons nie, maar die vraag is wat om altyd met al die probleme aan te vang. 'n Amptenaar in die stad wat ek verteenwoordig het as volg daarmee te werk gegaan soos hy homself in die volgende gediggie ontboesem. Mnr. die President, dit is met verlof aan die „Die Bok se Klok".

(DIE BOK SE KLOK)
EK WERK BY DIE OFFIES

My naam is ou Paultjie, ek isse die klerk,
Ek hette hom daar by die offies gawerk,
Nou die lêers hoopop as ek 'n bietjie lui,
En ek kan hom nie my werk by die datum kry,
Nou die Chief hy't gakom, hy het hom gakyk,
Hy't banja gawonner why die werk hom so lyk,
Hy hette gapraat, ek het hom gahoor,
Hy gasê, „Jy sal hom djou djob verloor."
Nou ek het hom gawonner, dit is ook nie mooi,
Wie het die werk by die tafoel gagooi?
Ek het toe gadink en ek het toe gasê,
Die werk hulle kan nie by die hoop hiersô lê.
Wie het hom gagooi, wie het hom gagooi,
Wie het hom die werk by my tafoel gagooi?
Nou ek battle hom banja, ek sokkel hom baai,
What for hy isse my werk dan so kwaai?
Nou ek het hom gamaka die bul van die plan —
Ek isse mos darem al amper 'n man,
Ek isse mos nie vondagga se tjend,
Ek het hom toe al daarie lêers gapênd.

"What it means Mr. President is, he tied all the files and he just forgot about the job.

„ ‚Nou Ek werk by die offies' is 'n voorbeeld van hoe dit somtyds kan gaan met probleme, m.a.w. die kerel het sy probleme wat hy so versamel wat so opgehoop het gaan liaseer en hom gaan verbeel dat die sake daarmee afgehandel is.

„Maar, Mnr. die President, ons sekretaris Mnr. Ewing is nie van daardie soort mense nie; anders sou hy nie hier vir 10 jaar kon dien nie, en ek dink dit is nou heel gepas om op hierdie 50 jarige verjaarsdag van hierdie organisasie te dink aan 10 jaar van goeie diens gelewer deur Mnr. Ewing en sy medewerkers; op 7 Mei 1956 het Mnr. Ewing se eerste sekretariele en finansiele verslag gelewer te Salisbury, het die firma Arthur Tingley, Ewing & Co. oorgeneem van, ek dink, Mnr. R. C. Taylor. Die destydse president Mnr. Mitchell, ook hier teenwoordig, tans van Kenneth Kaunda se Kitwe in Zambia het toe reeds na 'n jaar se werk hulde gebring aan Mnr. Ewing vir sy uitstaande diens te gelewer en destydse Raadslid Young van Pietermaritzburg het sy vertrous uitgespreek in die ‚handsome young man'.

„Ek wil vandag konstateer dat hy die vertroue wat in hom as persoon gestel is en wel in die gees van die volgende gedig van John Lonsdale. "Do It Now".

DO IT NOW

If with pleasure you are viewing any work a man is doing,
If you like him, or you love him tell him now;
Don't withhold your approbation till the parson makes oration,
As he lies with lilies o'er his brow.
For no matter how you shout it, he won't really care about it,
He won't know how many teardrops you shed;
If you think some praise is due to him,
Now's the time to slip it to him,
For he cannot read his tombstone when he's dead.
More than fame and more than money is the comment, kind and sunny,
And the heart's warm approval of a friend,
For it gives to life a savour, and it makes you stronger, braver,
And it gives you heart and spirit to the end.
If he earns his praise — bestow it, if you like him let him know it,
Let the words of true encouragement be said;
Do not wait until life is over and he's underneath the clover,
For he cannot read his tombstone when he's dead.

—John Lonsdale.

„Mnr. die President ek dink dit is die gees waarin ons hier met waardering kan spreek van dienste gelewere deur die Sekretaris. Hy is 'n man was nie die lêers liaseer nie — hy gaan aan met die werk en hy verstaan die kuns om hierdie finansiele jaar verslae so mooi kompak saamgevat.

"He knows the art of reducing and condensing these reports to an essence, and not to lose the meaning of it all.

„Ons sê, Baie Dankie aan ons sekretarisse en ons hoop dat hulle nog lang diensbaar sal wees in hierdie organisasie, betref, is ek oortuig dat hulle hulle bes sal doen om aan die wense van die kongres te voldoen.

"It now gives me great pleasure, Mr. President, to second the adoption, and the vote of thanks, of this Report."

The report was thereupon adopted.

Die verslag is daarna aangeneem.

It was unanimously agreed that Messrs. Savory, Brink, Cremer & Co. be reappointed Auditors of the Association for the ensuing year.

Daar is eenparig besluit dat Mnre. Savory, Brink, Cremer en Kie weer as ouditeure van die vereniging vir die komende jaar aangestel word.

The proposed Amendments to the Constitution as set out in the Agenda of the Convention were next dealt with.

Die voorgestelde wysigings van die konstitusie soos uiteengesit in die Agenda van die konvensie is daarna behan-

It was pointed out that there was a typographical error and that No. 1(3) in the English version should be 1(4) in Afrikaans.

Proposing the adoption of the Amendments, Mr. G. C. Theron, Vanderbijlpark, made the following remarks:

„Ten tye van die Konvensie wat gehou was in Windhoek 1965 het dit duidelik geword dat daar sekere wysigings aan die konstitusie van die vereniging sal aangebring moet word.

„U uitvoerende bestuur het derhalwe 'n subkomitee aangestel om voorstelle in te wag, hierdie voorstelle na te gaan en geskikte wysigings aan die konstitusie aan die vereniging voor te le vir oorweging vandag.

"Mr. President these proposed amendments have been

In seconding the proposal, Cr. W. F. Meyer, Welkom, commented as follows:

„Mnr. die President, dit doen my groot genoeë aan om die rapport wat voorgestel is deur Mnr. Theron die Vise-President te sekondeer. Die sub-komitee het gepoog om die wysigings van die Konstitusie aan te bring wat nodig was. Mnr. Kane het die voorbereidings werk gedoen, en Mnr. Theron, Mnr. Ewing en myself het toe die wysigings aangebring; ons wil net meld dat die woord „Suid-Rhodesia" gebruik is omdat dit sower ons kennis trek nog die offisiele benaming is.

"I would like to repeat that we used the word "South-

There being no further discussion, the following Amendments to the Constitution were then formally and unanimously adopted:

AMENDMENTS TO CONSTITUTION

Rule 1(iii) :

At the end of the paragraph delete the semicolon and add "such representative shall be White".

Rule 6 (1) :

After "natural persons" delete full-stop and add "who are White and who are situated or living in the Republic of South Africa, Rhodesia or any bordering territory".

Rule 9 (3) :

In the scale of contributions alter the word "Guineas" to "Rand" and the amounts from "6, 8, 10, 12, 14, 16, 20, 25, 30" to " 15, 17, 21, 25, 30, 35, 45, 55, 65".

Rule 9 (4) :

Alter the words "two guineas" to "R4.50", and delete the words "as defined in clause 7 (2) (iii) (a)" and all the words from "and" to "contribution" at the end of the paragraph.

Rule 11 (2) :

Between "Honorary Members" and "have" add "and Associate Members".

Rule 14 (2) :

In list of Territories substitute "Rhodesia" for "Federation of Rhodesia and Nyasaland".

Rule 22 (5) :

Substitute "three" of "five" the second time it occurs in this paragraph.

del. Daar is uitgewys dat daar 'n druk fout was en dat No. 1(3) in die Engels teks No. 1(4) in die Afrikaans teks moet wees.

Met die voorspel dat die wysigings aanvaar word het Mnr. G. C. Theron, Vanderbijlpark, die volgende opmerkings gemaak:—

---

circulated in terms of Clause 24 and are now placed before the Convention for consideration, and I propose that they be accepted as they have been circulated.

"In this connection, there is just one small change to be made which I propose here, en dit is in Artikel 6(1) soos gedruk moet lees „Rhodesie" en nie „Suid-Rhodesie" nie. Ook dieselfde in Artikel in 14(2) moet lees „Rhodesie" — die „Suid" moet geskrap word."

Rdl. W. F. Meyer, Welkom, sekondeer die voorstel op en lewer die volgende kommentaar:—

---

ern Rhodesia" in the amendments because that, as far as we know, is still the official name of Rhodesia, and it might be necessary, as some of the Rhodesian members feel firm on this point, to change Southern Rhodesia to Rhodesia eventually. As far as we know Southern Rhodesia is still the official name, and that is why we have given it that name.

"We trust that the amendments will be acceptable and I would like to second the proposal made by Mr. Theron, the Vice President."

Aangesien daar geen verder besprekings was nie is die volgende wysigings tot die konstitusie eenparig aangeneem:

WYSIGINGS AAN GRONDWET

Artikel 1 (iv) :

Aan die einde van die paragraaf skrap die kommapunt en voeg in „en sodanige verteenwoordiger sal 'n blanke persoon wees".

Artikel 6 (1) :

Na „natuurlike persoon" skrap die punt en voeg in „wat blanke is en wat gevestig is of woonagtig is in die Republiek van Suid-Afrika, Rhodesie of enige aangrensende gebied".

Artikel 9 (3) :

In die skaal van bydraes verander die woord „Ghienies" na „Rand" en die bedrae van „6, 8, 10, 12, 14, 16, 20, 25, 30" na „15, 17, 21, 25, 30, 35, 45, 55, 65".

Artikel 9 (4) :

Verander woorde „twee ghienies" na „R4.50", en skrap die woorde „soos omskrywe in Klousule 7 (2) (iii) (a)" en al die woorde van „en" tot „betaal" op die einde van die paragraaf.

Artikel 11 (2) :

Tussen „ere-lede", en „stemreg" voeg in „Verbonde lede".

Artikel 14 (2) :

In lys van Gebiede vervang „Federasie van Rhodesie en Nyasaland" met „Rhodesie".

Artikel 22 (5) :

Vervang „vyf" met „drie" die tweede keer wat dit in hierdie paragraaf voorkom.

Mr. W. Milton, Honorary Member, then presented his paper entitled "Some Notes On Tariffs" which was published with the Agenda of the Convention. In conclusion, Mr. Milton referred to this being the last occasion on which he would probably officially represent ESCOM at a Convention of the Association as he would be retiring during the year. He also expressed appreciation to those gentlemen of the Electricity Supply Authorities of the countries he had visited who had given him so much of their valuable time in discussing their problems and also so much confidential information.

In proposing a vote of thanks to Mr. Milton for his paper, Mr. G. C. Theron addressed the Convention as follows:

„Mnr. die President, dit is inderdaad 'n voorreg om 'n mosie van dank voor te stel op Mnr. Milton se baie interessante referaat oor tariewe.

„Oor die jare heen het Mnr. Milton vir ons leiding gegee wanneer die kwessie van tariewe soms warm besprekings in kongresse uitgelok het en alhoewel ons soms met hom verskil het, het baie van ons tog huistoe gegaan en na nadenke gewonder of hy tog nie na alles reg is nie.

„Dit is nie vir elkeen van ons moontlik om 'n oorsese reis te onderneem om tariewe te bestudeer nie en mnr. Milton se referaat waardeur hy ons laat deel in die voordeel van sy studies, word derhalwe des te meer op prys gestel.

„My eerste reaksie by die lees van die referaat was om my seëninge te tel deur in hierdie land te woon. Ons het al vantevore gehoor van hoe ingewikkeld die lewe in Europa kan wees maar nooit besef dat selfs die elektrisiteitstariewe so omslagtig kan wees nie en dit onder de dekmantel dat dit maklik deur die verbruikers verstaanbaar moet wees. Ek wil nog die gemiddelde verbruiker sien wie in sulke ingewikkelde triewe belang stel. Dan liewer verpligte vragbeheer tot voordeel van al die verbruikers as tariewe waaruit alleenlik 'n paar deskundiges nut sal trek.

„In paragraaf 2.28 en 2.29 maak die skrywer melding van eenheids-triewe wat wissel met die seisoen van die jaar en ure van die dag. Sulke tariewe wat veronderstel is om maklik verstaanbaar te wees maak metertelling voorwaar ingewikkeld, opstelling omslagtig en instandhouding duur.

„Maarselfs hier te lande is daar nog ondernemings wat driefase aansluitings voorsien vir huishoudelike verbruikers sonder werk sal wees nie.

„Daar is min aangeleenthede in die elektrisiteitsvoorsieningsbedryf wat verbruikers meer omkrap en die lewe vir

---

In seconding the vote of thanks, Mr. J. C. Waddy, Pietermaritzburg, referred to the fact that the design of tariffs is a specialised art embodying knowledge of electricity supply economics and accountancy as well as the ability to withstand adverse comment. He referred to the ability of Mr. Milton in the field of tariff design and to the surprising fact which had been brought to light in the paper that in overseas countries complexity in tariffs is apparently not considered to be objectionable.

Discussion proceeded on Mr. Milton's paper and the following contributed thereto:

Mnr. W. Milton, Ere-lid, het daaraan sy referaat „Some Notes On Tariffs" gelewer wat in die Agenda van die Konvensie gepubliseer was. In afsluiting het Mnr. Milton gemeld dat dit moontlik die laaste geleentheid sou wees waarby hy amptelik EVKOM by die konvensie sou verteenwoordig doen hy gedurende die jaar sou aftree. Hy het ook sy waardering uitgespreek teenoor die persone van die elektrisiteitsvoorsieningsowerhede van daardie lande wat hy besoek het wat waardevolle tyd afgetoon het om probleme met hom te bespreek en vir die vertroulike inligting wat verskaf is.

Met sy voorstel van dank aan Mnr. Milton vir die referaat het Mnr. G. C. Theron die kommentaar as volg toegespreek:—

---

van 5 tot 6 k.w. of twe meters installeer, een vir waterverwarmers en 'n tweede vir die res van die woning.

„Is die bykomstige uitgawes aan meters, voorsieningstoerusting, boekhouding ens., onder teenwoordige omstandighede met beperkte en duur arbeid, regtig geregverdig deur die teoretiese oorwgings?

„In paragraaf 2.32 sê die skrywer dat geredeneer word dat die verbruiker wye teuels moet hê in sy keuse van die tipe van energie. Maar is **dit** altyd in nasionale belang. Die skrywer self het 'n paar jaar gelede beweer dat 'n Stadsraad se besluit om vragbeheer in te stel alhoewel tot voordeel van die plaaslike gemeenskap, nie altyd in nasionale belang is nie.

„Dit skyn asof die oorweging om elke verbruiker net sy regmatige deel te laat betaal tot die punt van belaglikheid gevoer kan word en saam met mnr. Milton het ek ook my bedenkinge oor die waarde daarvan.

„Een ding is gewis, die Europese tariefformuleerders maak seker dat hulle 'n lewenstaak het en vir baie jare nie Raadslede bemoeilik as'n voortdurende getorring aan die tariewe. Stabiliteit in hierdie rigting is sterk aan te beveel maar nêrens in die referaat word melding gemaak van 'n spesiale fonds om dit te bewerkstelling nie. Die Transvaalse Ordonnansie op plaaslike besture maak nie spesifiek voorsiening vir 'n tariewe-gelykstellingsfonds nie en tans word self hernuwingsfondse afgekeur, maar 'n mens wonder tog of die voorbeeld van die Suid-Afrikaanse Spoorweë Administrasie in dié opsig nie navolgingswaardig is nie. Ek verneem graag die skrywer se mening in die verband.

„Met hierdie paar woorde van kommentaar uitgelok deur 'n baie interessante en prikkelende referaat, stel ek formeel 'n mosie van dank namens die hele vergadering aan mnr. Milton voor."

Mnr. J. C. Waddy, Pietermaritzburg, het die bedanking gesekondeer en verwys na die feit dat die ontwerp van tariewe gespesialiseerd is wat in kennis van elektrisiteitsvoorsiening ekonomie en rekenkunde vereis asook die vermoë om afbrekende kritiek te weerstaan. Hy verwys na die vermoë van mnr. Milton op die gebied van tarief ontwerp en die verbasende feit wat in die referaat aan die lig gekm het naamlik dat in oorsese se lande ingewikkelde tariewe skynbaar nie as ongewens beskou word nie.

Verdere bespreking vind plaas i.v.m. mnr. Milton se referaat en die volgende persone het bydraes gelewer:—

H. C. Dreyer, Paarl.
P. A. Giles, East London.
Dr. J. N. Aldington, England.
C. G. Lombard, Germiston.
N. M. P. Clarke, Somerset East.
J. D. N. van Wyk, CSIR, Pretoria.
R. J. G. Stanton, Oudtshoorn.
J. Berry, Johannesburg.

Appended to these Proceedings is an extract, being paragraphs 5, 8, 9 and 22 of the Report of the Committee on Gold Mining Taxation, dated 19th December, 1945, which were referred to by Mr. Berry under his following comment:

"I would suggest that Councillor members who wish to appreciate this aspect should ask their Town Councils to obtain for them a copy of the Government's Gold Mining Taxation Report, published at the end of 1945, and read paragraphs 5, 8, 9 and 22. These paragraphs explain in a very clear way why it is dangerous in South Africa to burden costs, and to the extent that your charges for electric power to industry particularly are greater than they need be, that report explains to you how you are damaging this country's future because you are limiting the life of the gold-mining industry".

EXTRACTS FROM THE REPORT OF THE COMMITTEE ON GOLD MINING TAXATION, dated 19/12/45.

Paragraph 5.

In view of the large proportion of its natural endowment in the form of minerals and the relative poverty of the surface, a correct policy in regard to the development of mineral resources is of greater importance to the Union of South Africa than to any other country in the whole world. A wrong policy — a policy which fails to make the most economic use of mineral resources — can be more fatal to the long-range interests of the Union than of any other country. In following such a policy the Union can dissipate its patrimony, much as a spendthrift son lives on the hard-earned capital bequeathed to him by a frugal father, till none is left.

Paragraph 8.

We would, however, emphasise as strongly as we can that any action which depresses gold deposits below the pay limit deprives the country of part of its natural assets, reduces its capacity for employment and has the same effect as living on capital. In our opinion not sufficient attention has been devoted in the past to this valuable measuring rod of the soundness of policy. The very existence of this fairly accurate index is an asset; an asset for the guiding of public affairs which few other countries possess.

Mr. Milton replied to the discussion as follows:

"Mr. President, Ladies and Gentlemen, I am very grateful to Mr. Theron who proposed the vote of thanks and to Mr. Waddy who seconded the vote of thanks, for the very kind remarks which they passed while doing so. I agree with Mr. Theron when he expressed the view that I was fortunate to have had the opportunity of studying tariffs during my recent visit overseas.

"As questions were asked, I feel I should proceed to endeavour to furnish the answers expected of me.

H. C. Dreyer, Paarl.
P. A. Giles, Oos-Londen.
Dr. J. N. Aldington, Engeland.
C. G. Lombard, Germiston.
N. M. P. Clarke, Somerset-Oos.
J. D. N. van Wyk, WNNR, Pretoria.
R. J. G. Stanton, Oudtshoorn.
J. Berry, Johannesburg.

Aanheg by hierdie verrigtinge is 'n uitreksel van paragrawe 5, 8, 9 en 22 van die verslag van die komitee i.v.m. die belasting van Goud en Mynwese gedateer 19 Desember 1945, waarna verwys word deur mnr. Berry in sy volgende kommentaar:—

Paragraph 9.

We are therefore of opinion —

(a) that, wherever possible, taxes which increase costs should be repealed and where it is necessary to recover the same amount of revenue, this should be raised from taxes falling on profits;

(b) that in considering other matters of public policy where there is a free choice between burdening costs and achieving the desired result by other means, the Government should bear in mind that every increase in cost is tantamount to throwing away part of the country's patrimony;

(c) that inasmuch as the working of marginal ore calls for a very fine balancing of income and cost a permanent feature of the fiscal policy should be that the full value of the product is paid to the mines.

Paragraph 22.

All expenses entering into the cost of producing gold have therefore an exceptional public importance in South Africa. To the extent that they are necessary and unavoidable costs, they must be accepted as the price of the product. One cannot make an omelette without breaking eggs. To the extent that they are avoidable and are imposed as a matter of policy, they harm the broader national interest.

Mnr. Milton het as volg op die bespreking geantwoord:—

„Mnr. Theron het gesê sy eerste reaksie toe hy die referaat gelees het, was om sy seëninge te tel om in hierdie land te kan woon. Dit is my reaksie ook.

„Ons kan ons gelukkig ag omdat ons elektrisiteitsondernemings eintlik nog betreklik jonk is as ons dit met dié in die buiteland vergelyk, en ons kon dus hulle moeilikhede vermy wat voortgespruit het uit historiese beslissings wat onvermydelike presedente geskep het.

„As foutiewe tariewe eers een maal ingestel is en geruime tyd toegepas is, lei die regstelling van die foutiewe

tariewe onvermydelik daartoe dat sommiges benadeel en andere weer bevoordeel word. Diegene wat benadeel word, sal die verandering teenstaan, terwyl dié wat bevoordeel word, dikwels meen dat hulle geen reg het om op die verandering aan te dring nie. Die verlangde regstelling kan dus dikwels eers na 'n lank ruk bewerkstelling word, en in die loop daarvan, word daar dikwels gevind dat daar 'n menigte tariewe ontstaan.

„Ek stem ook saam dat dit moeilik is om te aanvaar dat al die verbruikers die verskil moet begryp tussen die tariewe wat aan hulle beskikbaar gestel word sodat hulle sonder leiding in die nasionale belang die mees ekonomiese keuse kan doen. Indien die tariewe beskikbaar en die saak kan aansienlike belang is, kan die verbruiker aan die ander kant deur die voorsieningsowerheid gelei word wat sy keuse betref, ten einde te verseker dat hy ten volle op hoogte is van wat hy kies. Die meeste verbruikers verstaan rede (indien nie almal nie) en die mikpunt van die beskikbare tariewe kan dus prakties verwesenlik word as die mikpunt van realistiese belang is.

„Wat betref die beskikbaarheid van tariewe wat wissel met die seisoene van die jaar en ure van die dag, is die uitwerking daarvan op die meet-, boekhou-, en onderhoudskoste nie so groot as wat mens aanvanklik sou dink nie.

Uit die oogpunt van seisoensvariasie kan dieselfde meter dwarsdeur die jaar gebruik word want die verbruik word net teen 'n ander tarief aangeslaan. Wanneer rekenmasjiene gebruik word, hoef net die faktor wat toegepas word op die meterleesverskille wat deurlopend vanaf dieselfde meter verkry word, verander te word.

„Die koste styg egter wanneer die tarief gedurende die dag verander word, want dan moet afsonderlike skywe gebruik word om die integrasie van eenhede te registreer, of anders afsonderlike aanvraagregistreerders indien die aanvraagtarief verander word. Dit lei onvermydelik daartoe dat die meet-, boekhou-, en onderhoudskoste styg. Die stygings is egter gering in verhouding tot die voordeel wat dit vir die verbruiker sowel as die voorsieningsowerheid inhou om ekonomiese groei aan te moedig.

„Mnr. Theron het melding gemaak van driefasige toevoer vir klein diensaansluitings soos dié van 5 tot 6 kilowatt of die gebruik van twee meters in 'n installasie, een vir waterverwarming en die ander vir algemene voorsiening. Hierdie praktyke moet betreur word omdat dit so oorbodig lyk. Dit is interessant om daarop te let dat, toe driefasige installasies vir huishoudelike verbruik bepleit is — gewoonlik wanneer die huishoudelike installasie 'n waterverwarmer en 'n elektriese stoof ingesluit het — dit daarop gemik was om die belasting oor die kragnetstelsel te probeer balanseer. Hierdie aanbeveling het gespruit uit die moeilikheid om 'n geskikte balans te verkry in 'n distribusiestelsel met drie fases en vier drade wanneer afsonderlike woonhuise met slegs een fase aangesluit word. Terwyl balans verkry kan word na sorgvuldige ondersoek van die belastingoorsprong in elke fase en 'n gevolglike herrangskikking van die diensaansluiting, word 'n ongebalanseerde toestand sonder twyfel betrekilk gou geskep duerdat die verbruikskarakteristiek van die afsonderlike verbruikers met verloop van tyd verander. Daar is dus gemeen dat, indien die belasting van die afsonderlike gebruikers op 'n gebalanseerde wyse oor die drie fases versprei word, die verandering van afsonderlike verbruikers se gebruike die gebalanseerde belasting minder sal versteur. In die praktyk is daar gevind dat hierdie idee nie steek hou nie, en eenfasige aansluitings word nou vir indiwiduele belastings van hoër as tien kilowatt verkies. Die mate van onbalans op substasieaansluitings as gevolg van hierdie groot eenfasige toevoer is nie ernstig nie.

„Wanneer daar besluit moet word of dit wenslik is of nie om stappe te doen soos die toepassings van die verskillende tariewe vir die periodes gedurende die dag wanneer daar krag gebruik word, moet die totale voordele vir die voorsieningsowerheid sowel as die verbruiker natuurlik noodwendig in ag geneem word. Tensy dit in geheel voordelig is, sal hierdie stappe nie raadsaam wees nie. Met ander woorde, die bykomende koste van uitrusting, boekhouding en onderhoudswerk in die lig van boonop nog 'n personeeltekort moet alles in aanmerking geneem word ten einde vas te stel of dit in geheel voordelig is. Die tekort aan arbeiders is nie tot ons eie land beperk nie, en die feit dat dit raadsaam gevind is om stappe te doen wat meer arbeid en boekhouwerk meebring, wys duidelik daarop dat die bykomende werk in gepaste omstandighede wel die moeite werd is; die groter gemeenskapsvoordeel het naamlik die groter moeilikhede gebillik.

„Mnr. Theron het my opmerkings, wat beheer oor spitsbelasting betref, uit verband aangehaal en gevolglik 'n verkeerde indruk gewek. Op die konferensie waarna hy verwys, het ek gesê dat 'n verbruiker se beheer oor spitsbelasting nie heilsaam is kort nadat die voorsieningsowerheid bykomende ontwikkeluitrusting moes installeer ten einde in die verbruiker se verklaarde toekomsbehoeftes te voorsien nie. Ek het voorts daarop gewys dat, indien die verbruiker meld dat hy voornemens is om sy spitsverbruik te beheer en dus die belastingsvoorspellings wat die voorsieningsowerheid moet nakom, sal verminder, bykomende uitrusting dan uitgestel kan word tot algemene voordeel van die voorsieningsowerheid en die verbruiker. Die beheer van spitsbelasting wat tot 'n hoë belastingsfaktor kan lei, bied ongetwyfeld 'n laer gemiddelde koste per eenheid tot voordeel van die verbruiker. Indien die verbruiker probeer om sy spitsbelasting te verminder op 'n tydstip wanneer daar voldoende ontwikkeluitrusting geïnstalleer is, is die voordeel gering omdat dit die voorsieningsowerheid oor die algemeen bloot kan help om die gebruik van ondoeltreffende uitrusting vir spitsaanvraag tydelik uit te skakel. Die vernaamste koste sal egter in hierdie geval voortspruit uit die kapitaalkoste wat saamval met die installering van te veel ontwikkeluitrusting. Met ander woorde, optrede gebaseer op misleidende inligting, is nie inmiddellik in die nasionale belang nie, maar sal met verloop van tyd nasionale voordeel inhou. Ek was onder die indruk dat ek hierdie saak duidelik gestel het op die konferensie waarna mnr. Theron verwys.

„Mnr. Theron het melding gemaak van tariefvereffeningsfondse of iets dergeliks en my gevra wat ek daarvan dink.

„Tariefstabiliteit is ongetwyfeld baie belangrik omdat die gebruiker dikwels vir taamlike lang tydperke vooruit moet beplan wanneer hy besluite neem.

„Aansienlike stabiliteit word in die praktyk bereik, en ek het gevind dat dit moontlik is om stabiele tydperke van minstens 5 jaar en dikwels veel langer te handhaaf. Ek moet hierdie stelling egter kwalifiseer en daarop wys dat ek my kan herinner dat koste gedurende korter tydperke gevarieer het as gevolg van steenkoolkoste wat verander het.

„Wanneer 'n mens nader daarop ingaan, blyk dit egter dat nyweraars terselfdertyd met hierdie variasie op ander gebiede rekening moes hou. Die variasie in steenkoolkoste het nog altyd voortgespruit uit 'n toegewing deur die Pryskontroleur tot hoër steenkoolpryse of uit die Minister se optrede om spoortariewe te verhoog.

„Wanneer spoortariewe verhoog word, geld 'n algemene styging in koste vanaf die datum waarop die Minister sy verklaring uitreik. Met ander woorde, 'n verandering in die prys van elektrisiteit gaan terselfdertyd gepaard met veranderings in die ander koste van verbruikers, en sulke veranderings van elektrisiteitspryse kan myns insiens nie as onstabiliteit beskou word nie.

„Die stigting van 'n tariefvereffeningsfonds is blykbaar ten volle geregverdig, maar dit is natuurlik 'n saak wat die leweransiers van elektrisiteit self moet oorweeg en in hierdie groep plaas ek die lede van die Vereniging wat elektrisiteit by die groot maat koop sowel as dié wat self elektrisiteit ontwikkel.

"Coming now to Mr. Waddy's remarks, it was very pleasing for me to hear that he hoped that I would still have contributions to submit in future in my capacity as an honorary member. In such circumstances, I hope that I will be able to attend conferences and take part in discussions when I feel I have something of interest to say.

"Mr. Waddy has asked how it is that overseas countries obtain appreciation of complex tariffs by consumers when making their choice. As I have pointed out to Mr. Theron, this is done by explaining to consumers how the costs are affected by their proposed methods of use of electricity and care is taken in explaining to important individuals what these effects amount to and how savings may be achieved by a consumer if he is careful in taking certain precautions.

"In addition, leaflets and booklets are published by the supply authorities which set out simple explanations of the applications of alternative tariffs and actually advise the reader under what circumstances a particular tariff is more beneficial than another tariff. These publications are available on application and are often sent to persons applying for a supply and asking on what terms the supply will be furnished.

"Mr. Waddy has appreciated the concept of the marginal cost theory which, I am sure, will play an ever increasing role in establishing tariff forms as time passes. Mr. Waddy has asked whether Escom is likely to adopt that theory because he evidently has the opinion that its effect could probably be very important, even if it were gradually applied over a long period, as it affects Escom's bulk supply consumers in particular.

"It may be reassuring for Mr. Waddy to learn that the adoption of that theory and its actual application by Escom would not have very much effect under present-day conditions because Ecom's tariffs actually very closely approach the requirements of that theory at the present time.

"As time passes, and Escom's Undertakings develop, there may be changes resulting from the application of the theory but those changes should be beneficial and not present any hardship.

"As time passes, I feel that there will develop, in the Republic, a totally interconnected system which will form a grid. That grid will, of course, not be exactly similar to those found in Europe or the United States because it will probably take a very long time before we have similar concentrations of load. Another difference will also result from the concentrated location of our coal fields though, if atomic generation is adopted, a greater distribution of power stations having very similar generating cost characteristics, will result. Until we have a sufficiency of generating plant to be able to analyse the costs of generation on very clearly defined differences in the cost of operating peak load plant and more efficient plant at other times, the effect of applying the marginal cost theory is not appreciable although the small difference does exist even today. When I say small, I of course mean from a point of view of relative values.

„Mnr. Dreyer het ook verskeie sake geopper en om nadere inligting gevra.

„Hy het die mening uitgespreek dat, indien ons oor uitrusting geskik waarvoor ons nog bedrae moet betaal in die vorm van rente en aflossing — met ander woorde uitrusting wat nog nie afbetaal is nie — dan moet dié uitrusting benut word, al is dit ook minder doeltreffend.

„Dit is 'n verkeerde benadering van die probleem, want die antwoord op die vraag of die uitrusting heeltemal afbetaal is en daar geen vorderings vir rente en aflossing oorbly nie, bied geen maatstaf nie. Die werklike besluit moet gebaseer wees op die vraag of die koop van bykomende uitrusting, gepaar met die bedryfskoste van die nuwe uitrusting, sal lei tot 'n laer gemiddelde koste per eenheid ontwikkel, as wat die voortgesette gebruik van ou en ondoeltreffende uitrusting (of dit afbetaal is of nie) sal oplewer. Indien nuwe uitrusting gekoop kan word en eenhede teen 'n laer koste ontwikkel kan word nadat die bykomende kapitaalkoste in aanmerking geneem is, as die koste om die ou uitrusting in gebruik te hou, dan moet die ou uitrusting in belang van algemene besparing laat vaar word.

„Hoër onderhoudskoste en ook die feit dat dit soms uiters moeilik is om vervangdele in die hande te kry, gaan gewoonlik hand aan hand met die gebruik van ou uitrusting. Dit kan byvoorbeeld goedkoper wees om 'n gasturbine vir die aandryf van ontwikkeluitrusting te koop, te installeer en te gebruik as om met ou ketels en stoomturbines, ens., te probeer voortgaan. As dit die geval is, sal die kragontwikkelingsowerheid verstandig handel deur die gasturbine-uitrusting te koop en te installeer.

„Weliswaar is ou en ondoeltreffende uitrusting in talle gevalle klaar afbetaal en bring dit geen kapitaalkoste mee nie. Dit raak egter nie die kwessie of die regte antwoord op die probleem nie.

„Mnr. Dreyer het my opmerkings aangaande onbillike mededeling wat met tariewe gepaard gaan, vertolk asof die onbillike mededeling verband hou met die keuse tussen beskikbare elektrisiteitstariewe van die een leweransier. Dit was egter nie waaroor my opmerking gegaan het nie. Mnr. Dreyer het egter die aandag op die feit gevestig dat verbruikers op sy grens dieselfde tariewe moet betaal as wat hy vir voorsiening by die groot maat moet betaal. Hy spreek voorts die mening uit dat hy dit as onbillikemedeginging beskou.

„Hy opper in werklikheid 'n ou argument dat die voorsieningsowerheid sy tariewe moet opstel met die oog op die uiteindelike gebruik van elektrisiteit. Wat 'n generator en

transmissielyne betref, maak dit aan hulle geen verskil of die krag gelewer word vir verdere verspreiding, of vir gebruik in 'n staalfabriek, of in 'n visfabriek, of trouens vir gebruik deur enige tipe gebruiker nie, tensy die besondere tipe gebruiker sy elektrisiteit so benut dat dit 'n groter koste per kVA van die belasting meebring, ter nakoming van sy aanvraag, of ander gebruikers ontrief.

„Enkelfasige belastings verg byvoorbeeld ontwikkeluitrusting en transmissiestelsels met 'n groter vermoë om in hulle belastingbehoeftes te kan voorsien as die belasting van 'n goedgebalanseerde driefasige motorbelasting wat dieselfde aanvraag registreer.

„Met ander woorde, waar die tipe gebruik ten opsigte van gebalanseerde belasting en algemene karakteristiek dieselfde bly, is die tipe uiteindelike gebruik uit 'n koste-oogpunt onbeduidend.

„Die faktore wat die koste beïnvloed wanneer 'n groot aantal gebruikers dit deel, spruit hoofsaaklik uit die verskeidenheid van die gebruik voort.

„Oor die algemeen tref die gevolglike koste wanneer 'n aantal gebruikers van krag voorsien word, elkeen van dié verbruikers minder as wanneer 'n enkele gebruiker die hele toevoer neem. Dit is die geval omdat die spitsgebruik van individuele verbruikers sodanig verskil dat die maksimum aanvraag wat deur die hele groep geskep word, minder is as die totaal van die aanvrae van die individuele verbruikers. Verskeidenheid speel m.a.w. 'n belangrike rol om 'n aanvraagtarief te skep ten einde die koste van die ontwikkelde aanvraag die hoof te kan bied.

„Tensy 'n mens bereid is om 'n aanvraagtarief te skep wat gebaseer is op die werklike bydrae van individuele verbruikers tot die maksimum belasting op die ontwikkeluitrustingself, wat 'n verskillende aanvraagtarief vir elke individuele verbruiker sal beteken of die toewysing van koste tussen die verbruikers op grond van hulle werklike bydrae tot die aanvraag wat uit die ontwikkeluitrusting die hoof gebied word, kan die verbruikers by die algemene verskeidenheid baat, of hulle nou eweredig tot die verskeidenheid bydra of nie.

„Teoretici — soos dié wat Mnr. Theron in sy kommentaar vermeld het — het van tyd tot tyd voorstelle aan die hand gedoen wat oor die algemeen nie prakties toegepas kan word nie. Hierdie teorieë is egter waardevol omdat daaruit luidelik blyk hoe sommige gebruikers ten koste van ander bevoordeel word vanweë die praktiese moeilikheid om hierdie toestand te vermy.

„'n Voorbeeld van 'n dorp wat in sy eie kragbehoeftes voorsien, kan hierdie posisie moontlik illustreer. So 'n dorp kan sy eie krag begin ontwikkel en etlike jare so voortgaan om hoofsaaklik in sy huishoudelike behoeftes te voorsien, met 'n baie duidelike en aansienlike aandspits waarvoor daar voldoende ontwikkeluitrusting geïnstalleer moet word. In dié dorp kan daar dalk heel weinig dagbelasting en selfs nog minder nagbelasting wees. Die huishoudelike verbruikers sal dus — pro rata volgens hulle geraamde maksimum aanvrae — feitlik al die koste van die ontwikkeluitrusting moet dra. Hoewel die aanvraag van elke huishoudelike verbruiker nogal aansienlik kan wees, kan die totale maksimum aanvraag per maand van elke huishoudelike verbruiker met die oog op die uiteenlopende verbruikstye, bes moontlik twee of drie keer soveel wees as die werklike vermoë van die ontwikkeluitrusting om in die behoeftes van die gemeenskap te voorsien. Met ander woorde, die koste per eenheid van aanvraag van elke individuele huishoudelike verbruiker, uitgedruk as 'n heffing per eenheid van aanvraag, sal die helfde of 'n derde van dié koste wees wanneer dit uitgedruk word volgens eenheid van belasting van die ontwikkelvermoë wat verskaf word.

„Indien 'n klein nywerheidsverbruiker sy fabriek in dié dorp moet oprig en sy aanvraag sodanig is dat die ontwikkeluitrusting heeltemal voldone is om in die behoeftes van die dorp te voorsien gedurende die ure wat hy krag gebruik, ontstaan die vraag of die nyweraar net moet betaal vir sy voorsieningskoste sonder dat daar 'n heffing ten opsigte van aanvraag van hom verlang word.

„'n Mens sal inderdaad geneig wees om hom op hierdie wyse aan te moedig, maar dit kan ook uiters gevaarlik wees, want met so 'n lae vordering vir die krag wat aan nyweraars voorsien word, kan die nywerheidsbelasting dermate toeneem dat ontwikkeltoerusting spesifiek daarvoor nodig word om die bykomende aanvraag die hoof te bied; die kragvoorsiening sal dan onekonomies wees en 'n las word vir die ander verbruikers. Om hierdie rede word daar gewoonlik 'n bedrag vir maksimum aanvraag gevorder gebaseer op die totaal van die belasting gelewer, of dit nou regstreeks tot die spitsbelasting bydra of nie. Dit lei tot stabiliteit en skakel die kwessie van beperkte voorkeur uit. Voorkeur in die voorbeeld wat verstrek is, sal beperk word tot die nyweraars wat eerste op die toneel verskyn en wie se totale aanvraag nog nie bykomende ontwikkeluitrusting verg ten einde in hulle besondere behoeftes te voorsien nie.

„Die ander alternatief wat ek genoem het, is dat die individuele verbruikers moet betaal vir hulle werklike bydrae tot die spitsbelasting op die tydstip wanneer die spits werklik plaasvind. Dit is feitlik dieselfde as wat ek in die geval van die dorp genoem het — maar verskil tog in 'n belangrike opsig. So 'n vorderingsmetode sou 'n deurlopende opgawe meebring van al die maksimum aanvrae van verbruikers wat op 'n voorgestelde halfuurlikse grondslag gemeet word, sowel as 'n opgawe van die werklike tydstip van die maksimum belasting op die kragstasies wat daarin voorsien. Sodra die tydstip van die maksimum belasting op die kragstasie in enige maand eenmaal vasgetel is, sou die opgawes van individuele verbruikersbelastings op dié tydstip dan nagegaan kon word en die bruto bedrag uit die verlangde aanvraagvorderings op dié grondslag dan verdeel word onder die individuele verbruikers. Dit sal beteken dat geen verbruiker op enige tydstip sal weet wat sy toevoer hom gaan kos ten opsigte van sy aanvraag nie; dit sou nutteloos wees om die ontwikkelingstoestande te probeer manipuleer ten einde 'n groot bydrae tot die spitsbelasting op die kragstasie te probeer vermy, want al die verbruikers sal dit probeer manipuleer en niemand sal tot aan die einde van die maand weet waarop dit gaan uitloop nie.

„Om terug te keer tot my eerste voorbeeld van die dorp, kan 'n mens jou voorstel watter noodlottige uitwerking 'n bykomende nyweraar op die bestaande nyweraars sal hê indien hy saam met die ander die maksimum aanvraag per maand skep sonder om by te dra tot die ontwikkelkoste; die nyweraars sal dan feitlik al die ontwikkelkoste moet betaal terwyl die huishoudelike verbruikers feitlik heeltemal van dié koste onthef word en net tot die spitsbelasting in die dag moet bydra.

„Ek het dit uitvoerig bespreek ten einde daarop te wys dat dit in die praktyk verkieslik is om die aanvraagtarief te baseer op die moontlike spitsverantwoordelikheid van verbruikersbelasting en, met die oog op die moontlike spits, die tydperk so te beskou dat dit die normale verbruiksure van al die verbruikers dek, tensy 'n tarief ingestel word vir gebruik gedurende 'n sekere tyd van die dag waarvolgens byvoorbeeld tussen nag- en dagure onderskei word, en in dié geval kan die nagspits van die gemiddelde aanvraagkoste vrygestel word.

„Evkom het tot hiertoe die instelling van spesiale tariewe vir toepassing tydens slaptye vermy, en sy tariewe op die totale spitsaanvrae van al die verbruikers gebaseer.

„Dit beteken natuurlik dat 'n verbruiker met 'n lasfaktor van 100% voordeel trek uit die verskeidenheid wat die gebruikers met 'n lae lasfaktor skep, maar dit is onvermydelik tensy die verbruikers onderverdeel word in klasse met betrekking tot hulle lasfaktor en bydraes tot die totale verskeidenheid. As hulle in sulke klasse onderverdeel word, kan die tariewe gebaseer word op die belastingverskeidenheid, en dit sal meebring dat 'n hoë bedrag van verbruikers met 'n hoë lasfaktor gevorder word en 'n laer bedrag van verbruikers met 'n lae lasfaktor.

„Myns insiens is so 'n onderverdeling tans nie geregverdig nie.

„Verskeidenheid het 'n belangrike uitwerking op die prysberekening van elektrisiteit, want dit raak transmissie sowel as kragontwikkeling. Ten einde die uitwerking van hierdie koste te begryp, moet die kostestruktuur baie sorgvuldig ontleed word en, nie te lank gelede nie, is ek versoek om op hierdie kwessie in te gaan met betrekking tot die koste van kragontwikkeling in een van ons Ondernemings vergeleke met die koste van die oorgebrengde kragtoevoer waarvoor die standaardtariewe ontwerp is. Daarmee moes vasgestel word of 'n spitsverbruiker wat regstreeks van die kragstasie voorsien word, minder koste per kVA van sy maksimum aanvraag meegebring het as gebruikers wat teen standaardtariewe met die transmissiestelsel voorsien word. Daar het toe aan die lig gekom dat die koste van kragontwikkeling, ten einde in die behoeftes van so 'n verbruiker te voorsien, hoër was as die standaardtarief. Met ander woorde, so 'n verbruiker met 'n hoë lasfaktor was hoegenaamd nie op spesiale pryse geregtig as enige ander verbruiker nie, hoewel daar aangevoer kon word dat verbruikers met 'n soortgelyke lasfaktor aan wie die krag oorgebring is, meer moes betaal het as wat hulle toe in werklikheid betaal het!

„Met hierdie ontleding wou daar aangetoon word dat sekere verbruikers te min betaal het terwyl daar van ander gebruikers te veel gevorder is, maar groepsgewyse was die vorderings billik.

„Die belangrikste aspek wat hier aan die lig kom, is dat die koste van transmissie en distribusie deur verskeidenheid gedek kon word.

„As mnr. Dreyer die totaal van die maksimum aanvraag waarin hy voorsien, ontleed en die maksimum aanvrae van sy huishoudelike verbruikers daarby in aanmerking neem, is ek daarvan oortuig dat hy waarskynlik sal vind dat hy elektrisiteit sal kan verkoop teen 'n vordering vir die maksimum aanvraag wat minde is as die vordering vir sy vooorsiening by die groot maat. As daar winste verkry word, kan dit natuurlik in hierdie omstandighede nie ten volle verkry word nie, want die grootmaatvoorsiening word op die grondslag van koste en dus sonder 'n winsgrens gelewer.

„Ek kan mnr. Dreyer verseker dat ek by die ontleding van 'n aantal munisipale voorsieningsondernemings op hierdie grondslag tot die gevolgtrekking gekom het dat 'n nyweraar in 'n munisipale gebied stellig krag teen 'n laer tarief kan ontvang as dié wat die kragowerheid vir grootmaatvoorsiening verg, indien die munisipaliteit hierdie metode wil gebruik. Krag sal op hierdie wyse sonder verlies gelewer word.

„U moet asseblief nie dink dat ek so 'n prosedure bepleit nie, want myns insiens sou dit onverstandig wees, en ek wil ook nie te kenne gee dat 'n munisipale owerheid nie moet probeer om 'n wins af te werp nie. Ek wil nie graag hier kommentaar lewer op die kwessie van winste en hulle verdeling soos munisipale elektrisiteitsondernemings dit doen nie, want dit val eintlik buite die bestek van my referaat en hierdie antwoorde.

„Mnr. Dreyer se opmerkings oor die gebruik van tariewe vir ander doeleindes is interessant. Uit my oogpunt egter lewer ek geen kommentaar nie, want myns insiens is tariewe daarop gemik om koste so gelyk moontlik onder gebruikers van elektrisiteit te verdeel, ten einde die gebruik van elektrisiteit soveel moontlik aan te moedig en sorg te dra dat dit die lewensduurte en produksiekoste so laag moontlik hou.

"The next contributor to the discussions was Mr. Giles.

"In this connection, I owe Mr. Giles an apology because the microphone which he was using was not a good one and, in consequence, I misinterpreted some of his remarks when I offered a brief comment before the end of the conference on one aspect of what I thought he had said.

"In point of fact, Mr. Giles has mentioned that he is in agreement with me in considering that the charges for electricity should be made as reasonable as possible to all consumers in order that the industry may develop soundly on commercial lines. Those commercial lines naturally involve an attempt to develop as much as possible on sound economic lines.

"As regards the marginal cost theory, intensive study is necessary before it has any real significance and very considerable data must be collected by the supply authority before the theory can be applied in practice.

"In order to avoid any misunderstanding, I would point out that it does not mean the cost to the community of supplying an additional consumer and that this corresponds to the cost of the new plant which must be provided for this purpose. It goes far beyond that, because it takes into account progressive increments with the passage of time in order to establish the general trend and to ensure that the charges decided upon will not prove inadequate as time passes.

"The analysis must also be made in respect of the subdivision of the day and of the year into suitable periods in order to determine the difference in the different marginal costs as they apply to the subdivided periods and their relative significance. This analysis will disclose whether there is justification for introducing differences in tariff rates on a seasonal basis and/or on a time-of-day basis.

"If the differences resulting from the analysis are sufficiently appreciable they indicate clearly that there is justi-

fication for special steps being taken to encourage a change in the pattern of loading.

"The theory goes even further, because it is necessary to establish the effect on the conclusions of the analysis which would result from deviations from the estimated pattern of load development with the passage of time. If deviations which may be considered reasonable, considerably alter the results of the analysis, then it is necesary to take into account the possibility of those variations occurring in order to determine whether or not it is necessary to base the charges on the assumption that those changes will probably take place. This is necessary to avoid difficulty in continued application of prices if there is an actual change in the pattern first assumed.

"The claims made by the theorists responsible are that, if the theory is applied properly, then the greatest possible incentive is provided for encouraging economic development and also that disastrous results may not arise from encouraging development to a stage where it becomes uneconomic to continue the development, or even to continue supply to the existing users whose loading would require to be frozen for the application of ruling prices.

"I was very grateful for the remarks passed by Dr. J. N. Aldington, our visitor from England.

"As he pointed out, the aim at sound economic competition between the various sources of energy was an established fact but that this went far beyond what appeared to be a safety measure in the National interest.

"As a result of this attitude, there had been great strides in the economic development of both production and utilisation of the various sources of energy. He pointed out that there had been considerable development in the design of electrical appliances and that the gas industry of Great Britain, which had appeared to be in a serious decline, had applied itself to the problem and made a tremendous come-back both in the production of gas in its admixture with other gases from other sources apart from coal gas and in the development of gas-using appliances in both design and efficiency. It is this incentive to provide greater facilities for use and more economic use as well that has encouraged technical personnel in making progress to the benefit of the national economy.

"For example, there is little difference between the thermostatically controlled electrical space heating appliance for domestic use and the thermostatically controlled gas appliance. The latter is switched on and lights automatically and actually has the advantage of continuous variation of heat output compared with the stepped control of the electrical appliance (as distinct from thermal storage appliances).

"The development of thermal storage space-heating equipment may well be associated with the incentive of fair competition. Units have been developed which are quite suitable for meeting the requirements of individual rooms in domestic establishments and this form of heating must not be regarded as having application only to large premises or complete premises served by one system.

"In the case of the small units, for a relatively small additional cost, thermostatically controlled heat emission can be obtained, for example, by the inclusion of a thermostatically controlled fan which can be used to assist convection past the hot body.

"In other words, realistic and fair competition is producing developments in all directions which are sound and in the interests of community development itself. Dr. Aldington referred to a technical war — I would have preferred reference to sound technical advancements resulting from technical competition. Undoubtedly, the consumer must always have complete freedom of choice and I have never advocated measures which restrict that freedom. I have always maintained that the consumer should be free to do as he pleases but have always added the rider — provided he meets the cost of exercising that freedom, and so avoids being a burden on others.

"Mr. Lombard was the next contributor who raised a number of points for discussion.

"He has drawn the conclusion that a bulk supply purchaser cannot make use of the marginal cost theory because that theory will have been applied by the generating authority which would leave the bulk supply purchaser no scope. In this, he is not correct because the marginal cost theory applies not only to generation, to transmission and distribution, but to the distribution and reticulation of electricity in a reticulated network such as that operated by a municipal authority purchasing its requirements in bulk. Naturally, the theory applied by the municipality would be in respect of its own costs. If the supply authority has designed its tariffs on the basis of the theory, then those tariffs will be known to the purchaser as being stable and they can be extended for application in the reticulated network.

"Mr. Lombard has also questioned the reason for applying a lower tariff to furnace loads in one country when it is a well known fact that the cost of supplying this type of load exceeds the cost of supplying the normal type of load involving rotating machinery etc. I was unable to obtain a statement from my informant but it was apparent that this was done at Government request in order to sponsor this form of production in the particular country concerned. As the State virtually financed electricity supply, this was clearly a State directive given in the interests of the State. I mentioned this particular case because it was definitely the exception in comparison with the attitude of other countries.

"Mr. Clarke of Somerset West dealt, at some length, with the problem of improving load factor, and justifiably so.

"In the past I have mentioned the manner in which the domestic load has been allowed to develop on the basis of tariffs which were designed originally to deal with the load distribution resulting from a lighting load. The adjustment of those tariffs in the direction of coping with the additional cost involved in furnishing supply to the all-electric house has not been based on a thorough analysis to determine the correct allocation between consumers.

"There has been considerable argument on this problem, but so far without a satisfactory solution being agreed. Divergent views are expressed among economists and also among engineers so that it is not a question of the one group disagreeing with the other. In these circumstances, uniformity of tariffs cannot be expected.

"In paragraphs 4.21 to 4.25, inclusive, I have dealt with the varying attitudes adopted towards the costing of the domestic load, to which Mr. Clarke makes special reference.

"I found that the views expressed were inconsistent because it is quite clear that, on the basis of the analysises

which they have undertaken, the supply authorities are satisfied that the domestic class of consumer is responsible for a substantial peak demand involving specific demand costs. On the other hand, they feel that it is inequitable to allocate those costs between the consumers on the basis of individual measured maximum demands because each specific individual does not contribute at all times a pro-rata portion of his demand to the domestic consumer class monthly, daily, or annual peak. His contribution towards that peak varies considerably from time to time although he may have a consistent monthly demand. This is due to the fact that an individual domestic consumer does not create his peak at a consistent time during the day or during a consistent day of the week, when the domestic peak load occurs. Publications have been issued endeavouring to show how close the relationship is between actual contributions to the peak on a demand basis and the charging of a high unit rate and for an assessed maximum demand based on rooms, floor area, or assessed demand, which in turn takes into account installed appliances. That there is objecion to raising a charge based on measured demand seems strange when measured demand is accepted as a satisfactory basis for industrial and bulk supplies.

"In my own view, it is not possible to charge individual industrialists on their actual contributions to the system peak load of the electricity supply system involved. This attitude then results in an average demand charge being applied whether a specific consumer's peak demand is an on-peak demand or whether that consumer merely contributes a portion of his load to the peak demand (some lower demand than his actual maximum demand which may occur at some other time). In other words, the industrial consumer is charged on the basis of his potential contribution to the peak demand of the industrial class — and this is considered fair, with which I agree.

"If this decision is considered logical in its application to the industrial class, I cannot see why it is not equally logical in the case of the domestic type of consumer. Admittedly, such a consumer may, sometimes, establish his peak demand at the time of the domestic class system peak or even at the time of the supply authority's overall system peak, while at other times he may not do so. This simply means that his behaviour pattern is not at all unlike that of the industrial consumer wih a similar low load factor. In such circumstances, it cannot be regarded as entirely fair to adopt a procedure of charging the domestic type of consumer for the maximum demand which he creates, whether it is an on-peak or an off-peak demand, on the assumption that it is potentially an on-peak requirement.

"Of course, it is reasonable and fair to arrive at the charge for that demand on the basis of the measured average diversity which results from applying a charge to the aggregate of each individual consumer maximum demand in the domestic class when deriving that charge from the domestic class group maximum demand (the after-delivery maximum demand). The industrial consumers are treated in this same way as a group for their group contribution towards system peak and the domestic class of consumer in such calculations is, or should be, looked upon as receiving the supply for that group in bulk as if it was a domestic industry meeting the needs of the individual domestic consumers.

"For that reason, I have supported the endeavours of municipal authorities to introduce a demand basis for charging the domestic class of consumer. Attempts which have been made in this direction include the adoption of a charge for the available maximum demand, which is usually controlled by miniature circuit breakers or high rupturing capacity fuses. The latter method is, as I have stated in my paper, actually practiced overseas. Another method which has been adopted is to introduce ampere maximum demand meters and then to charge for the actual ampere maximum demand created by the consumer. I am inclined to the view that this second form is preferable though somewhat more costly in its application.

"The reason for my preference arises from the fact that, if a consumer is to be charged on the basis of the limited demand made available to him, he will find it necessary for his convenience to require the availability of a maximum demand which will meet his infrequent maximum needs. Having to pay for that demand whether it is used or not, there is no encouragement whatsoever for him to improve his load factor of use and it is this improvement which is so desirable and which, if effected, could result in reducing the cost of electricity to the domestic class of user. If the ampere demand method is used, then thecon sumer is only called upon to pay for the demand which he establishes from month to month. To argue that he may be penalised through inadvertent excessive demand carries no weight because the consumer can be protected from an excessive demand by utilising the circuit breaker which would otherwise form the basis of his tariff. In other words, if he is careful and can regulate his demand effectively, he need not pay the amount which he would otherwise be called upon to pay for availability because he might have these inadvertent excessive demands. Such a form of charging meets what I personally consider as a desirable condition of supply which is that a consumer should be free to use the supply in whatever manner he may desire, but that he must be called upon to pay for his freedom of use.

"The miniature circuit breaker may appear to give a consumer this freedom of use but it does not avoid other consumers being required to share the cost of that freedom because a consumer is not in any manner required to regulate his load to his and other consumers' advantage.

"Mr. Clarke is quite right in his suggestion that we should not only find the time but also use our utmost endeavours to bring home to our consumers the benefits and advisability of care in use. Present practice seems to permit usage which involves considerable waste of capital, time and money and this should be rectified, if at all possible.

"On the basis of our present tariffs, the suppliers of equipment have been able to place before the public appliances which are embarrassing to the supply authority and which, if the energy suplied to them were costed correctly, would not be acceptable to purchasers. The more we allow this condition to continue, the more difficult will it be to effect a correction in due course without severely penalising the unhappy owner of undesirable equipment.

"I wholeheartedly support Mr. Clarke in his plea that we, as engineers, should take the lead and try to develop ways and means of improving the load factor of individual consumers bearing in mind that we have a potential load that is

going to grow to large proportions in this country in the very near future.

"Mr. Clarke is justified when he calls upon us to face the fact that we have not been successful in obtaining the diversity between individual domestic consumer loads that we had hoped would be established. I am sure that he refers here to the encouragement given to the water heating and domestic cooking loads in the early stages of the development of that type of load because we felt sure, at that time, that it would be a valley load. In fact, it has grown to such proportions that we face the difficulty I have pointed out when replying to Mr. Dreyer of Paarl, namely, that the former valley in the load curve has been over-filled and we are now faced with the embarrassing position of having to continue to apply an attractive tariff to a load which is definitely embarrassing, having grown out of all proportions above the expectations of earlier years.

"Mr. van Wyk of the C.S.I.R. certainly made a good point when commenting upon the desirability of a thorough investigation into traiff problems. Whether the time is ripe for such a study on the lines which he proposes is not a matter for me to comment upon.

"Mr. Stanton of Oudtshoorn seemed to have the opinion that Escom only dealt with large users and was not faced with the difficuly of supplying the small domestic class of user in the same way that arises in a municipal system.

"It may interest Mr. Stanton to learn that Escom has to deal with the domestic class of consumer as individuals in far greater number than are to be found in Oudtshoorn. We also have a much more difficult class of consumer in this category in our rural schemes where the consumers are scattered and the supply is required for domestic purposes only, there being no power load associated with the installations of some of the individual rural consumers receiving supply from Escom! For that reason, Escom possesses an intimate knowledge of the difficulties encountered when supplying individual domestic consumers and it must not be assumed that, because their load is swamped by large industrial loads, that they are not given the same care and attention as they would receive if they were the only type of consumer requiring supply. From our point of view, the smallest consumer is still an important consumer.

"I must admit that I sympathize with Mr. Stanton when he draws attention to the fact that well designed tariffs may be completely distorted by the persons ultimately responsible for approving tariffs for application. I had personal experience of this aspect in the case of one municipality which shall be nameless.

"At that time, the late Dr. H. J. van der Bijl (Chairman of Escom) had agreed with the Provincial Administrations that he was prepared to assist any municipality in the design of its tariffs on being requested to do so. It was necessary to withdraw this offer when, at one stage, Escom was inundated with requests for assistance.

"In the particular case I have in mind, after a lengthy investigation, the necessary complete data in regard to the municipality's cost structure and the requirement of its consumers was furnished and analysed. Suitable tariffs were framed for various classes of user for the equitable distribution of costs among the consumers of that municipality, and the recommendations were submitted to the municipal council.

"Incidently, I would mention that the municipal council concerned desired to maintain a minimum profit level, which was taken into account when the tariffs were designed.

"Escom was not consulted beyond this stage, merely having been requested to furnish the necessary advice.

"In due course, the council promulgated revised tariffs and then came the bitter pill. The new tariffs had not been very long in force when the results of their application led to very severe criticism of Escom and its tariff recommendations were whole-heartedly condemned.

"Investigation showed, however, that those tariffs recommended by Escom which were favourable to the required group of consumers had been adopted without modification. Where Escom's recommended tariffs were not favourable to the influential consumers concerned, however, the council had retained its former tariff so as to relieve the group of the onus of bearing its fair share of cost! In the light of these disclosed facts, it was not surprising that the results were disastrous because the nett effect of the council's action was to reduce its income well below the minimum limit required to maintain the minimum margin of profit desired. When this action was pointed out to the council by way of the Town Clerk, all that ensued was — silence!

"Mr. Stanton has put me in rather a difficult position when he asks whether I have had any experience with municipal systems overseas where interference in the tariffs, in the manner he has described has occurred and if so how they have overcome the problem. The reply to that is that, in Great Britain, there are no municipal electricity consumers because the Area Boards have taken over supply to all consumers. This has overcome the diffculties previously faced resulting from causes such as Mr. Stanton has mentioned as well as for other very cogent reasons. We have not reached that stage in the Republic but it is not at all unlikely that we will do so in years to come.

"I must, however, cross swords with Mr. Stanton when he pleads that, as a result of competition with gas and other fuels, we must not interfere with our consumers and try to educate them on the subject of load factor. Surely, if we can show to our consumers how they can reduce the cost of electricity for which they pay, still leaving them able to use electricity freely, we are making our best effort to nullify the competition from these other sources. It is this complete freedom of use regardless of the effects on the cost to the supply authority of meeting that freedom which makes these other fuels so competitive. If we lose the electrical load, our costs are not proportionately reduced and it is this fact that we must appreciate in order that our efforts may be correctly directed in encouraging the use of electricity in proper manner.

"If we merely tell consumers when they should use electricity and when not, without making it clear to them that they can save money by following our advice, we are failing in our duty. If our tariff structures are such that our advice is meaningless in regard to the effect on cost to the consumer because the tariffs are improperly designed, then the first stage must be to put the tariffs right so that a consumer is able to realise that he can and will save money if he follows our advice, and that he can effect that saving without any sacrifice of utilisation.

"Mr. Berry has submitted a valuable contribution to the discussions.

"He has taken me to task for using the word "profit" in one paragraph and later referring to a surplus and suggests that the latter word is the correct one to use throughout. I had in mind that, in some cases, there is a very definite directive to obtain a certain minimum surplus for utilisation in the manner in which a profit is utilised and for that reason I deliberately used the word "profit". I agree with Mr. Berry that it is the surplus of income over expenditure to which one should normally refer.

"Mr. Berry expressed the view that it is unwise to attempt to obtain a surplus from the sale of electricity. In expressing this view he is quite correct. The Electricity Act which has as its basis the necessity for supplying electricity at or as near cost as possible was introduced for that very purpose.

"Our Government, at the time when the Act was first introduced, had had the evidence of electricity supply practices in other countries and had been able to obtain a very clear picture of the doubts and fears raised in those other countries on account of profits made from the sale of electricity.

"The Government was fully appreciative of the essential nature of cheap electricity in fostering the development of the country. One might almost say that electricity falls into the same category as that of water and air if the community is to develop at the fastest possible rate on sound economic lines.

"Since those days, the matter of self-finance has arisen. The surplus to achieve this end may be very desirable because it leads, ultimately, to cheaper electricity. After all, the money required to develop an electricity undertaking must come from accumulated profits which have been accrued from one source or another. To ensure that some of the accrual takes place in the electricity industry itself seems to be a not unworthy proposition. Recently, it was learned that in one country a surcharge of 10% on electricity cost provided approximately 33% of the capital required for expansion. This is also a requisite of the electricity supply industry in Great Britain and helps to avoid approaching either the treasury or the private sector for very large sums of money which are not always readily available.

"It is not the purpose of my paper or of this reply to discussions to do more than comment upon this practice adopted elsewhere.

"My old friend Mr. Eastman has again raised the question of the contributions from electricity revenue towards the relief of municipal rates. I have previously discussed this proposition and expressed my views. The matter has also been the subject of lengthy discussions at previous conventions. I note that Mr. Eastman has suggesed that the matter should be pursued by this Association.

"In conclusion, Mr. President, Ladies and Gentlemen, I would again express my gratitude to your executive for having permitted me to submit my paper and also my gratification at the manner in which my paper has been received. I am also very grateful to the proposer and seconder of the vote of thanks and to all those who have contributed to the discussions for the very kind remarks which they have passed.

'I find it hard to accept the praise which has been meeted out to me perhaps because I realise my shortcomings.

"I trust that I may be permitted to say how much I have enjoyed my official contact with your Association and its fore-runner. My experience goes back over a period of at least 33 years and during that time I have learned much from my discussions with the members. I now look forward to enjoying the role of honorary member. —Thank you."

Mr. J. W. Chappel, Port Elizabeth, then presented his paper entitled "Maintenance of a Distribution System" which was published with the Agenda of the Convention.

In proposing a vote of thanks to Mr. Chappel, Mr. J. Dawson, Uitenhage, addressed the meeting as follows:

"Mr. President, Gentlemen, I have known and been associated with Mr. Chappel for many years particularly in relation to his position as a Distribution Engineer and it was therefore with a great deal of pleasure that I accepted the invitation to propose this vote of thanks.

"It is obvious that this paper represents Mr. Chappel's considerable experience in the field of Distribution of Electricity and a paper such as this makes this knowledge available to all for reference purposes.

"It is my experience, and I should imagine that also of other Distribution Engineers present here today, that it is not possible to devote adequate time to the maintenance of the systems under our control. This is not because we do not appreciate the value, and you might even say necessity, of regular preventative maintenance but because, like it or not, there is not sufficient skilled staff available to do this work.

Mnr. J. W. Chappel, Port Elizabeth, het daarna sy referaat gelewer naamlik „Maintenance of a Distribution System" wat in die Agenda van die konvensie gepubliseer was.

In sy voorstel van dank aan mnr. Chappel het mnr. J. Dawson, Uitenhage, die vergadering as volg toegespreek:—

"It, therefore, appears to me that thought should be given in an attempt to reduce the amount of maintenance work required and possibly the following fields offer avenues for future investigation.

1) **Manufacture**

The original design of electrical equipment usually takes into account to some degree or other the problem of future maintenance and many manufacturers stress this point in relation to their products.

It would appear, however, that the restrictions arising from their efforts to keep their prices competitive from an initial capital cost point of view has not allowed this potential to be fully developed. We as purchasers should realise this and make more allowance in our specifications for the advantages of minimum future maintenance.

For example, the insulators used by all of us on transmission lines are usually made of porcelain or glass and

provided they are not mechanically damaged they require relatively little maintenance. It is a fact however that where transmission lines traverse certain areas, usually occupied by non-Europeans, that breakages due to vandalism are high and the number of interruptions to supply is considerable. Apart from the disadvantages to the consumer the actual repair costs mount rapidly.

Many a time under these circumstances I have wished for an insulator that would not tempt small boys to throw stones in order to have a free fireworks display.

Possibly the approach should be even more radical and that insulators in the form presently accepted by us could be completely replaced.

2) **Standardisation**

The advantages of standardisation are mentioned by Mr. Chappel in his paper and he quite rightly points out that under the present legal restriction imposed on local authorities that is is practically impossible to standardise on one form of equipment.

I think that we should question this restriction as the advantages of standardisation could outweigh possible abuse by purchasers, particulary in dealing with firms of repute. It is exceedingly difficult for technical staff to become au fait with all the varieties of equipment presently found on a Municipal distribution system.

On the other hand standardised equipment means easy maintenance, minimum stocks of spares and general knowledge by all staff of the foibles of the particular equipment used. This in turn reacts to the benefit of the undertaking both financially and in the building up of good relations with the consumer.

I would appeal therfore to those in authority and to Councillors in particular, to pay heed to the requests of their Engineers when they recommend the purchase of the equipment which they know is sound and which they already use on their systems and not always to purchase that which has the lowest initial capital cost.

This problem of standardisation could also be promoted by manufacturers in a slightly different respect by offering certain basic facilities common to the particular type of equipment.

For example, it might be possible to provide basic switchgear arrangements whereby, even if the name on the top of the switchboard is different, that the method of isolation and insulation, positioning of operating mechanisms, arrangement of protective systems, layout of wiring diagrams and so forth is offered in a standard form. This should reduce maintenance problems and possibly even capital costs.

It might be possible for those of us who are purchasers of equipment to initiate such schemes by agreeing amongst ourselves on certain standard requirements instead of each Electrical Engineer drafting his own specifications and including possibly too many of his own pet ideas and resulting, in switchgear for example, in each order being custom built to an unnecessarily large extent.

3) **Choice of Methods of Distribution**

It is the experience of my undertaking that the majority of maintenance is required by overhead lines.

My Council has therefore approved a policy that overhead lines should be replaced wherever practicable by underground reticulation and although the initial capital cost is undoubtedly higher it has been assessed that the savings in maintenance justify its use.

In addition there is an improved service to the consumer with fewer supply interruptions and the appearance of townships is considerably enhanced.

There are no doubt many other methods whereby maintenance can be reduced although not eliminated and in view of the staff conditions which pertain throughout the Republic and which will presumably continue for many years it behoves each one of us to implement schemes to reduce maintenance wherever possible.

Mr. President, I would like now on behalf of all members to formally thank Mr. Chappel for his paper which I am sure will be of benefit to all Distribution Engineers in one way or another.

Seconding the proposal, Mr. N. M. P. Clarke, Somerset East, said that he felt that Mr. Chappel's paper was particularly valuable in that it drew attention to what is an all too easily forgotten factor in supply systems and considered that it would be of particular interest to Councillor Members in assisting them towards a better understanding of the problems involved and one of the channels through which finance is absorbed. He felt that Mr. Chappel had provided valuable information which could assist in improving maintenance techniques and agreed with the views expressed by him and by Mr. Dawson concerning the advantages of a greater degree of sandardisation.

Discussion on Mr. Chappel's paper proceeded and those who took part were:

C. G. Lombard, Germiston.
M. H. L. Boshoff, Uitenhage.
H. T. Turner, Umtali.

Mnr. N. M. P. Clarke, Somerset Oos, sekondeer die bedanking en sê dat Mnr. Chappel se referaat van besondere waarde is aangesien dit aandag vestig op faktore wat maklik vergeet bly van voorsienings sistome en was van mening dat dit van besondere belang vir Raadslede is en hulle 'n beter insig in die probleme sal gee en in een van die hande waardeur finansies opgeneem word. Hy voel dat mnr. Chappel waardevolle inligting verskaf het wat sal bydra om instandhoudings prosedures te verbeter en stem met die stemswyse van hom en mnr. Dawson om die voordele wat madodn word deur 'n groter mate van staandardisasie.

Die volgende persone het aan die toespreking van mnr. Chappel se referaat deelgeneem:—

C. G. Lombard, Germiston.
M. van der Spuy. WNNR, Pretoria.
M. H. L. Boshoff, Uitenhage.

J. I. Inglis, Pietersburg.
M. van der Spuy, CSIR, Pretoria.
R. W. Kane, Hon. Member.
Cr. P. Glenday, Windhoek.

In his remarks, Mr. v.d. Spuy commented as follows:

"I would like to draw the attention of this Convention however, to a very important maintenance routine which is so very seldom attended to and which has not been mentioned by the author. This is the check of sub-station and system earths. Due to the direct dependence of the earth resistance on the moisture content of the soil, this resistance will, in a disturbingly large number of cases, undergo a seasonable change. In the areas more affected by lightning, the first severe lightning storms occur after a long, dry winter, when moisture content in the soil has been reduced to a minimum and system earths have reached unnaturally high values.

"Transients introduced into the system by lightning now produce potentials which exceed the normal values and flashovers occur.

"Due to the immediate dislocation of supply and the hubbub of replacement and recommissioning, usually no thorough investigation is carried out immediately after the occurrence of the fault. When supply has been restored and

Mr. Chappel replied as follows:

"Ladies and gentlemen, I must thank my proposer and seconder for their kind remarks. Mr. Murray Boshoff suggested that we possibly build in a number of our difficulties when we purchase equipment. This is probably true, for we select

SYNOPSIS OF SPEECHES AT JUBILEE BANQUET.

The President welcomed the many friends of the Association who had honoured it by their presence at this Convention and he referred to their representing many kindred organisations in the Republic, in Rhodesia, the United Kingdom and the continent of Europe.

In proposing the toast of the A.M.E.U., Councillor Boet Erasmus, Port Elizabeth, referred to the pleasure it was for him to undertake this task. On this occasion he was a guest of the Association but he reminded his listeners that he had at one time served as a member ofth e Executive Committee. He spoke of the wide applications of electricity to mankind in his many spheres and touched in light manner on the relationship between Town and City Electrical Engineers and their Councils and Chairmen. He spoke of the tremendous developments which had taken place over the years in regard to electricity supply and of the many problems which faced those responsible for Municipal electricity undertakings. He mentioned the establishment of the Association in 1915 under the name of the Association of Municipal Electrical Engineers, its first President, Prof. Dobson, Johannesburg, and the representative of Port Elizabeth at that time, Mr. Sankey. Seventeen members attended the first Conference and represented Johannesburg, Cape Town, Durban, Port Elizabeth, Pretoria,

H. T. Turner, Umtali.
J. I. Inglis, Pietersburg.
R. W. Kane, Ere-lid.
Rdl. P. Glenday, Windhoek.

In sy opmerkings het mnr. v.d. Spuy as volg kommentaar gelewer:—

things have returned to normal, the post-mortem discussions get under way and the why's and wherefore's of the fault causes are discussed. When high earth resistances are now suspected, checks are made.

"Due to the fact that many weeks or months have passed and the onset of the rainy season has improved the moisture content of the soil and thus the earth resistance values found do not always confirm the initial theories.

"If, however, the earth system has been designed for the worst conditions to be found — and here a study and knowledge of local earth resistance moisture conditions is essential, this bad state of affairs would not develop.

"This knowledge could be accumulated by the simple means of periodic measurement of the earth resistance values — as a normal function of system maintenance. These records kept on a card system will be an invaluable guide to the engineer in the design of future extensions as well as improving existing seasonable variations."

Mnr. Chappel het as volg geantwoord:—

designs of equipment which appear to best meet our requirements as we see them today. The passage of time often shows influences of which we were not aware. Better designs are only made from knowledge gained by practical experience."

SAMEVATTING VAN TOESPRAKE BY DIE JUBILEUMETE.

Die President het die baie vriende van die vereniging wat dit vereer het deur die konvensie by the woon, verwelkom met spesiale verwysing na die vele verwante organisasies in die Republiek, Rhodesië, die Verenigde Koningryk en die vasteland van Europa.

Raadslid Boet Erasmus, Port Elizabeth, het die heildronk op die V.M.E.O. ingestel en verwys na die plesier wat hy daaruit put. By hierdie geleentheid is hy die gas van die vereniging maar hy wys daarop dat hy eens as lid van die Uitvoerende Komitee gedien het. Hy het gepraat oor die vele maniere waardeur elektrisiteit vir die mens van diens kan wees en lighartiglik die verhouding tussen stads-elektrotegniese ingenieurs en hulle rade en voorsitters geskets. Hy het gewys op die geweldige ontwikkeling op die gebied van die voorsiening van elektrisiteit oor die jare wat verby is en die baie probleme waarmee die persone verantwoordelik vir Munisipale Elektrisiteitsondernemings te kampe het. Die spreker verwys na die stigting van die vereniging in 1915 met die naam van „Vereniging van Munisipale Elektrotegniese Ingenieurs", sy eerste president Prof. Dobson, Johannesburg en die verteenwoordiger van Port Elizabeth, Mnr. Sankey. Sewentien lede het die eerste konferensie bygewoon as verteenwoordigers van

Pietermaritzburg, Greytown, Ladysmith, Bethlehem, Heilbron, Harrismith, Queenstown and Oudtshoorn. Councillor Erasmus referred to the fantastic development in the electrical industry with which the Association had over the years kept pace. The country, he said, was indebted to the members of the Association for their contribution to the development and asked the gathering "to drink to the health and continued prosperity of this great auxiliary to the growth and prosperity of our country — the Association of Municipal Electricity Undertakings of Southern Africa."

In responding, the President referred to the contribution made by Cr. Erasmus to many aspects in the field of local government in the Republic. He spoke of the important technical impact of the Association on the development of the electricity supply industry throughout South Africa and Rhodesia and the many aspects in which it had influenced development, legislation, etc. He looked forward with every confidence to the future of the electricity supply industry in the Republic and in Rhodesia and the part that the Association will be called upon to play in its advancement and expressed the hope that nothing would be permitted to detract from this object which is enshrined in the Association's Constitution.

Mr. Horace Eastman, a former Electrical Engineer of Cape Town and President of the Association twenty-seven years ago and now an Honorary Member thereof, addressed the banquet and expressed appreciation for the compliment paid him in being invited to speak. He referred to the importance of learning from the past and with this in view said he would touch briefly on the work of the Association since its inauguration. He said that whilst nowadays the existence of the Electricity Supply Commission with its major generation and distribution network, its great contribution to major industry, railway traction and mining operation had become to be taken for granted, it should be remembered that when the Association was formed, public supplies of electricity in South Africa were given almost solely by Municipalities. The only other supplier at the time was the Victoria Falls and Transvaal Power Company which supplied the needs of the mining industry on the Witwatersrand. Engineering Societies were in existence at that time, but they did not cater for the scope envisaged when the Association was established, viz., the promotion of the interests of the Municipal electricity undertakings and it was with this background that the Association of Municipal Electrical Engineers (Union of South Africa) came into being in November, 1915. From its early days the Association has been a protagonist of the rights of Municipalities to supply electricity within their areas of jurisdiction. In its early years the Association invited councillors to attend and in 1935 the Constitution was altered to admit Councils as members and Mr. Eastman felt that this step had contributed greatly to the importance of the Association and the enhancing of its status. Later, Municipalities outside the then "Union" were admitted and more recently provision was made in the Constitution for the Affiliates to take their official place. Continuing, Mr. Eastman referred to the work of the "backroom boys" — members of Council and Sub-committees and representatives on other bodies connected with electricity supply. Outstanding work undertaken by the Association was in taking the initiative in:

Johannesburg, Kaapstad, Durban, Port Elizabeth, Pretoria, Pietermaritzburg, Greytown, Ladysmith, Bethlehem, Heilbron, Harrismith, Queenstown en Oudtshoorn. Raadslid Erasmus verwys na die fantastiese uitbreidings in die elektriese industrie waarmee die vereniging oor die jare tred gehou het. Die land, sê hy, is baie verskuldig aan die lede van die vereniging vir hulle bydrae tot die vooruitgang en hy vra die byeenkoms "to drink to the health and continued prosperity of this great auxiliary to the growth and the prosperity of our country —the Association of Municipal Electricity Undertakings of Southern Africa".

In antwoord verwys die President na die bydrae wat Raadslid Erasmus tot baie vertakkinge van plaaslike bestuur in die Republiek gemaak het. Hy praat van die belangrike tegniese invloed wat die vereniging op die elektrisiteitsvoorsienings-industrie dwarsdeur S.A. en Rhodesië gehad het en die baie rigtings waarin dit 'n invloed uitgeoefen het op ontwikkeling, wetgewing, ens. Hy sien met vertroue op die toekoms van die elektrisiteitsvoorsienings-industrie in die Republiek en Rhodesië en die aandeel wat die vereniging in die bevordering daarvan sal moet speel en spreek die hoop uit dat daar nie van hierdie doelstelling, soos in die grondwet van die vereniging neergelê, afgewyk sal word nie.

Mnr. Horace Eastman, voorheen elektrotegniese ingenieur van Kaapstad, President van die vereniging sewe-en-twintig jaar gelede en nou 'n ere-lid, spreek die vergadering toe en betuig sy waardering vir die eer om uitgenooi te word om die rede te voer. Hy verwys na die belangrikheid om uit die verlede te leer en vir dié rede wil hy kortliks die werksaamhede van die vereniging sedert stigting dek.

Hy sê, dat terwyl die bestaan van die EVKOM met sy groot kragsentrales en verspreinet en bydrae tot die nywerheid, spoorweg-elektrifikasie en mynbedryf vandag as vanselfsprekend aanvaar word, moet daar tog in die herinnering geroep word dat die Munisipaliteite feitlik die alleenvoorsieners van elektrisiteit aan die publiek was in die dae toe die vereniging gestig is. Die enigste ander voorsiener toentertyd was die V.F.P. wat in die behoeftes van die myne aan die Witwatersrand voorsien het.

Ingenieurs-verenigings was toe reeds gestig maar hulle het nie die doelstellings waaroor die vereniging gestig is gedek nie, naamlik om die belange van Munisipale elektrisiteitsondernemings te bevorder. Dit is met hierdie agtergrond dat die Vereniging van Munisipale Elektrotegniese Ingenieurs (Unie van S.A.) in November 1915 tot stand gekom het. Vanaf hierdie vroeë dae het die vereniging geveg vir die reg van Munisipaliteite om elektrisiteit te voorsien in hulle regsgebied.

In die eerste jare het die vereniging raadslede genooi om teenwoordig te wees, en in 1935 is die grondwet gewys ten einde Stadsrade as lede toe te laat en Mnr. Eastman is van mening dat hierdie stap baie bygedra het om die belangrikheid en aansien van die vereniging te verhoog. Later is Munisipaliteite buite die „Unie" toegelaat en betreklik onlangs is voorsiening in die grondwet gemaak vir 'n amptelike plek vir die ge-affilieerdes. Voortgaande verwys Mnr. Eastman na die bedrywighede van die stille werkers — lede van die Uitvoerende Raad en Sub-komitees en verteenwoordigers op ander organisasies betrokke by die voorsiening van elektrisiteit.

Uitstaande werk deur die vereniging gelewer was in die neem van leiding in:

(a) Formulating Standard Forms of Municipal Electricity Accounts. (They had been adopted by most Municipalities).
(b) Promoting Legislation for the Licensing of Electricians and Registration of Electrical Wiring Contractors.
(c) Drafting the Standard Wiring Regulations.

In these matters, he paid tribute to the co-operation of other bodies and persons who were associated in the finalisation thereof.

He also referred to the close liaison maintained with the South African Bureau of Standards. Dealing with the future, the speaker touched on new developments in generation technique which tended towards the installation of larger and larger units and transmission at higher and higher voltages. These fundamental developments would obviously have their impact on Municipal electricity undertakings, particularly by virtue of the long distance transmission now envisaged by ESCOM.

Dealing with the work of Municipal Electrical Engineers, the speaker mentioned the importance of managerial as well as technical training and the importance of "keeping up to date". The Association, he felt, might be able to assist in arranging a measure of exchange of personnel, particularly with major industrial concerns. Referring to the committees responsible for Municipal electricity undertakings, Mr. Eastman mentioned some of the difficulties with which they have to contend in maintaining efficiency and at the same time, keeping down expenditure. He suggested a greater degree of autonomy in this connection.

Concluding, Mr. Eastman referred to the fine record of the Association in the interests of Municipal electricity supplies in general and expressed confidence in its ability to maintain this record of service in the future.

In proposing a vote of thanks to the Guest Speaker, Mr. C. Lombard, Germiston, spoke of the thought-provoking and stimulating address which those present had heard. He expressed gratitude for the services of Mr. Eastman to the Association over so many years. He continued by recounting the names of leaders of the Association over the years and also referred to the contribution made thereto by City and Town Councillors. He concluded by wishing Mr. and Mrs. Eastman many more years of health, happiness and prosperity.

Mr. G. J. Muller (Hon. Member), in proposing the toast of the Affiliates, welcomed the opportunity afforded him of doing so and paid tribute to their assistance, not only to the Association, but to the opportunity afforded by contact with them in Convention to gain wider experience.

Mr. John Morrison responded to the toast of the Affiliates and dealt in witty vein with the role of those responsible for the work of the Association and of the various sections of the electrical industry. He concluded by expressing the appreciation of the Affiliates for the position they had been granted in the Association and the hope that it would grow in stature and in prosperity for many generations to come.

Wishing those present goodnight, the President expressed his appreciation to those of his staff and the members of the Parks Department of Port Elizabeth for the outstanding work done in the decoration of the hall utilised for the banquet, as well as to General Motors for providing 3½ tons of carpeting. Consluding, he thanked thevarious speakers and referred with gratification at the banquet attendance — approximately 500.

(a) Opstel van 'n standaard formaat van Munisipale elektrisiteits-rekenings wat reeds deur meeste plaaslike besture aanvaar is.
(b) Die bevordering van wetgewing vir die lisensiëring van elektrisiëns en die registrasie van elektriese bedradingsaannemers.
(c) Opstel van Standaard bedradings-regulasies.

In verband met hierdie aangeleenthede het hy hulde gebring aan die samewerking van ander organisasies en persone wat meegehelp het om finaliteit te bereik.

Hy verwys ook na die noue samewerking met die S.A.B.S. Met 'n blik in die toekoms verwys die spreker na ontwikkeling op die gebied van opwekking deur die gebruik van steeds groter eenhede en transmissie teen hoër en hoër spannings. Hierdie basiese ontwikkeling sal beslis 'n invloed hê op Munisipale elektriese ondernemings veral weens die lang lyne nou deur EVKOM in die vooruitsig gestel.

Die spreker verwys na die werk van Munisipale elektrotegniese ingenieurs en wys op die belangrikheid van bestuurs- en tegniese opleiding en die noodsaaklikheid om steeds ingelig te bly. Die vereniging meen die spreker, mag behulpsaam wees met uitruil van personeel vernaamlik met groter nywerheidsondernemings: Met verwysing na die komitees verantwoordelik vir Munisipale elektriese ondernemings, verwys Mnr. Eastman na enkele van die probleme waarmee hulle te doen het in die handhawing van doeltreffendheid en bekamping van uitgawes. Hy stel 'n groter mate van selfbestuur in die vooruitsig.

Ten slotte verwys Mnr. Eastman na die waardevolle diens van die vereniging in belang van Munisipale elektrisiteitsvoorsiening in algemeen en spreek sy vertroue uit dat die vereniging in staat sal wees om dit in die toekoms te handhaaf.

Mnr. C. Lombard, Germiston, bedank die geleentheidspreker vir die prikkelende en opbouende rede wat die aanwesiges kon aanhoor. Hy betuig waardering vir Mnr. Eastman se diens aan die vereniging deur die baie jare. Hy vervolg met 'n lys van name van leiers in die vereniging deur die jare en verwys ook na die bydrae van raadslede. Hy sluit deur Mnr. en Mev. Eastman baie jare van gesondheid, geluk en voorspoed toe te wens.

Mnr. G. J. Muller, erelid, stel die heildronk op die ge-affilieerdes in, is dankbaar vir die geleentheid hom daartoe gegun en betuig waardering vir hulle hulp, nie net aan die vereniging nie, maar ook deur die geleentheid om in konvensie uit hulle wyer ervaring te put.

Mnr. John Morrison antwoord op die heildronk op die ge-affilieerdes deur in onderhoudende luim te verwys na die aandeel van diegene verantwoordelik vir die werksaamhede van die vereniging en die verskillende vertrakkinge van die elektriese nywerheid. Hy sluit af deur waardering te betuig vir die plek wat die ge-affilieerdes in die vereniging gebied is en spreek die vertroue uit dat dit vir baie geslagte sal groei in aansien en voorspoed.

Die President wens almal teenwoordig goeie nag toe en betuig sy waardering teenoor sy staf en lede van die Parkeafdeling van Port Elizabeth vir die uitstaande versierings in die saal en vir die feestelike onthaal sowel as aan General Motors vir die 3½ ton van vloerbedekking voorsien. Ten slotte bedank hy die sprekers en verwys met voldoening na die opkoms by die ete — omtrent 500.

FOURTH DAY/VIERDE DAG

Addressing the closing session of the Convention, His Worship The Mayor of Port Elizabeth, Cr. Graham Young, expressed pleasure on his behalf as well as that of his Council with the visit to Port Elizabeth of the Convention which was now drawing to a close. He stated how much he had enjoyed meeting the delegates and felt that many new friends had been made. He considered that a great deal had been done in the sessions of the Convention which appeared to have been on a very high level.

Replying to Cr. Young, Cr. D. Eager, Deputy Mayor of Johannesburg, referred to the great privilege he considered it to be asked to take part "in the closing exercises of this most memorable Jubilee Convention of the A.M.E.U." He conveyed to the Mayor, Madam Mayoress, and through the Mayor, to his council, very warm and sincere thanks for all the kind and generous hospitality given to delegates during the Convention. He referred with particular appreciation to the floral decorations with which the halls and places of entertainment had been decorated in honour of delegates. He also referred to the friendly spirit of Port Elizabeth and said that he felt that delegates would return home enriched by the experience of their stay in that City. He hoped that Port Elizabeth had enjoyed the visit as much as the visitors.

Councillor H. G. Kipling, East London, proposed a vote of thanks on behalf of the ladies. To His Worship The Mayor of Port Elizabeth and Madam Mayoress in particular, he conveyed the appreciation of the ladies for the various entertainments organised and the many arrangements made for their comfort during the Convention in the Friendly City. He also expressed great appreciation to the hosts of the Convention during the delegates visit to Uitenhage.

Mr. N. M. Clatworthy spoke on behalf of the Affiliates and whilst expressing their thanks to the President, the Mayor and Town Councillors of Port Elizabeth, the Mayor and Town Councillors of Uitenhage, the Goodyear Tyre and Rubber Company, the A.M.E.U. itself and its Executive Committee for all that had been done for the delegates, he also congratulated the Association on having attained its half-century.

Votes of appreciation were concluded by Mr. R. W. Barton, Welkom, conveying the appreciation of all concerned

In sy toespreek tydens die afsluitings sitting van die Konvensie het sy Edelagbare die Burgermeester van P.E., Rdl. Graham Young, sy persoonlike blydskap sowel as die van sy Stadsraad uitoespreek vir die besoek van die Konvensie aan P.E. wat nou ten einde loop. Hy het dit baie geniet om al die afgewaardigdes te ontmoet en voel dat baie nuwe vriende gemaak is. Hy was van mening dat baie gedoen is tydens die sittings van die Konvensie wat van hoogstaande gehalte blyk te gewees het.

In antwoord op Rdl. Young het Rdl. D. Eager, Onderburgermeester van Johannesburg, gesê dat hy dit as 'n groot voorreg beskou om gevra te word om „aan die sluitings oefeninge deel te neem van die Jubileum Konvensie van die V.M.E.O.". Hy het die hartlike dank van afgewaardigdes oorgedra om die Burgermeester, Burgermeestergade en die Stadsraad vir die openhartige gasvryheid wat ontvang is. Hy het met besondere waardering verwys na die blomme versierings wat in die saal en ander plekke aangebring was ten behoewe van die Konvensie. Hy verwys ook na die vriendelik gees van P.E. en sê dat afgewaardigdes kuns waerts sal keer met verrykte kennis as gevolg van buite verblyf in hierdie Stad. Hy verskou dat P.E. die besoek geniet het in dieselfde mate as die besoekers.

Raadslid H. G. Kipling, Oos-Londen, het namens die Dames 'n voorstel van dank ingedien. Aan sy Edelagbare Die Burgermeester van P. E. en in besonder aan die Burgermeesters gode het hy die waardering van die Dames oorgedra vir die verskeidenheid van vermaaklikheid en funksies wat aangebied is gedurende die Konvensie in die vriendelike Stad. Hy het ook groot waardeur vir uitgespreek teenoor die gashere van die Konvensie met die besoek van afgewaardigdes aan Uitenhage.

Mnr. N. M. Clatworthy het namens die geaffilieerde Lede gepraat en terwyl hy dank vatgespreek het aan die President, die Burgermeester en Raadslede van P.E., die Burgermeester en Raadslede van Uitenhage, die Goodyear Tyre en Rubber Company, die V.M.E.O., die uitvoerende komitee vir alles wat vir afgewaardigdes gedra is, het hy ook die Vereniging geluk gewens met die bereiking van sy bestaan van 'n half-eeu.

to the President for the magnificent way in which he had handled the Convention.

Dr. Straszacher conveyed his appreciaion for the invitation evtended to ESCOM to attend the Convention and referred to the value of policy of this type.

The proceedings were concluded by the President with the following words:-

---

"Mr. Mayor, ladies and gentlemen: as there are no other speakers from the floor I will proceed to close this Convention.

"I would like to record appreciation for all the assistance we have had during your sojourn in this City.

"In the first place, our thanks must go to the City Council for the municipal privileges which we have enjoyed, and to the Uitenhage municipality and their friends for a very happy evening at Uitenhage.

"To our Secretaries, to Dick Ewing, Miss Brewin and Mrs. Lee for the enormous amount of work they have had to do to ensure the success of the occasion; and to the British Petroleum Company for all the services they have rendered, including the very helpful attention of Mrs. Stevens and Mrs. Smith at the Informaion Bureau.

"To all the industrial friends, who contributed in various ways for our pleasure, to the Port Elizabeth Tramway Company for its efficient bus service, and to those who provided teas during our intervals.

"I cannot let the occasion pass without expressing thanks to my wife for all the assistance she has rendered.

"It is said that the most helpful wife is the woman with the most helpful husband, and that describes the teamwork which existed on the domestic front.

"And talking of teamwork, brings to mind the loyal, willing and whole-hearted co-operation of many members of the staff of the Port Elizabeth Electricity Undertaking who have spared no effort in contributing to the success of this Convention, and also to the Director of Parks and the Deputy Director of Parks, and their enthusiastic staff who so willingly provided all the floral decorations which brightened

Voorstelle van dank is afgesluit deur mnr. R. W. Barton, Welkom, wat die waardering van almal aan die President oorgedra het vir die uitstekende wyse waarmee hy die konvensie gehanteer het.

Dr. Straszacker het sy waardering oorgedra vir die uitnodiging wat aan EVKOM gerig was om die Konvensie by te woon en verwys na die waarde van so 'n beleid.

Die President het die vereniging afgesluit met die volgende woorde:—

---

and beautified all the functions associated with this Convention. I would also like to thank the authors of the papers, and all those delegates and friends who contributed to the discussions, and also Percy Giles for his able conduct of a most successful Member's Farum.

"My thanks must also go to the Executive Council for their willing co-operation during the Convention and in anticipation of the work they will be called upon to do during the ensuing year, and also to the President Elect for his many assistances, particularly in overcoming my linguistic limitations.

"I cannot conclude without expressing my grateful thanks to our affiliate friends for all they have done towards endeavouring to make the Convention a success.

"The Commemoration Banquet has come and gone, but I can assure you that any success that might have attended that function was due in no small measure to the liberal co-operation of our affiliates.

"As I said at a previous function, we find our affiliate friends indeed when friends are in need.

"Mr. Mayor, ladies and gentlemen, I now have much pleasure in recording that the 50th Anniversary Convention of the A.M.E.U. held in Port Elizabeth is now closed. I wish you all a safe journey home and hope that you will take back with you happy memories of your visit to this city.

"Before actually concluding, I would like to say that in organising a Convention it is rather difficult to avoid errors. However, I would ask you to forgive me for any shortcomings there might have been in this respect. Baie dankie."

(Applause)

AMENDMENTS TO CONSTITUTION ADOPTED AT THE 38TH ANNUAL CONVENTION HELD AT WINDHOEK

Clause 6. Members and Affiliates

Add the following new sub-clause:—

(4) An authorised electricity undertaking, other than an undertaking as defined in clause 1, engaged in the supply of electricity in the area of jurisdiction of a local authority, may be admitted to the status of associate undertaking. Such Associate Undertakings shall be entitled to be represented at the Convention by such number of representatives as may be fixed by the Executive Council, but such representatives shall not be entitled to vote.

Clause 7. Qualifications of Members

Item (2) (iii): Delete the letter (a) and delete sub-clause (b) in its entirety.

Additional Item 7 (2)(v) **Retired Members:**
Where an engineer member or an Associate retires on superannuation and is in good standing and has been a member of the Association for not less than 20 years, he may apply for retired membership.

Clause 9. Membership Contributions

Item (4) Include the words "Retired Members in the first line between "associates" and "and".

Item (5) Between "Members" and "and" add "Associate Undertakings".

Item (7) Between "member" and "or" insert the word "Associate Undertaking".

Item (8) Between "Affiliates" and "shall" insert "and Associate Undertakings".

Clause 12

13

14 (ii) Where Vice-President is referred to substitute "President Elect"

15 (1)

17 (3)

WYSIGINGS AAN GRONDWET AANGENEEM TYDENS 38STE JAARLIKSE KONVENSIE GEHOU TE WINDHOEK

Artikel 6. Lede en Geaffilieerdes

Voeg in die volgende nuwe sub-artikel:—

(4) 'n Gemagtigde elektrisiteitsonderneming, ander as 'n onderneming soos omskrywe in klousule 1, besig met die verskaffing van elektrisiteit in die gebied van 'n plaaslike bestuur, mag ook toegelaat word tot die status van Geassosieerde Onderneming. Sodanige Geassosieerde Ondernemings sal geregtig wees om by die Konvensie verteenwoordig te wees deur 'n sodanige getal verteenwoordigers as die Uitvoerende Raad mag vasstel, maar sodanige verteenwoordigers sal nie geregtig wees om te stem nie.

Addisionele Item 7 (2)(v) **Afgetrede Lede:**

(2) (iii): Skrap die letter (a) en skrap sub-artikel (b) in sy geheel.

Addisionele Item 7 (2) (v) **Afgetrede Lede**
Waar 'n ingenieur-lid of 'n geassosieerde met pensioen aftree en van goeie naam en faam is en as hy minstens 20 jaar lank lid van die Vereniging was, kan hy aansoek om lidmaatskap as afgetredene doen.

Artikel 9. Lidmaatskap-Bydraes

Item (4) Insluitend die woorde „Afgetrede Lede" in die eerste lyn tussen „geassosieerdes" en „en".

(5) Tussen „Lede" en „en" voeg in „Geassosieerde Ondernemings".

(7) Tussen „lid" en „of" voeg in „Geassosieerde Onderneming".

(8) Tussen „Geaffilieerdes" en „moet" voeg in „en Geassosieerde Ondernemings".

Artikels 12

13

14 (ii) Waar na „Vise-President" verwys word vervang met „Aanstaande President" in.

15 (1)

17 (3)

AGENDA AND PROGRAMME

The attention of delegates is drawn to the following errata in the printed Agenda and Programme:—

Paper by A. A. Middlecote — "TRANSMISSION & DISTRIBUTION EQUIPMENT":

Page 16:

The fifth line in the third paragraph reading "countour and spiral grooved insulators as developed i" to be deleted.

Paper by M. J. W. Chappel — "MAINTENANCE OF A DISTRIBUTION SCHEME":

(The letters A.M.I.E.E., A.M.I.Cert. E. to be inserted after Mr. Chappel's name).

Page 38:

Paragraph (4) — The word "reasonably" in the second-last line to be amended to "reasonable".

The word "of" to be inserted between "acidity" and "the" in the second line of the second last paragraph.

Paper by W. H. Milton — "SOME NOTES ON TARIFFS":

The initials "B.Ss.(Eng.), M.Sa.I.E.E." to be inserted after Mr. Milton's name.

Page 55:

In paragraph 3.44 in the third line in the right-hand column insert the word "in" after the word "dropping".

In paragraph 3.47 the word "required" in the first line should read "requires".

Page 57:

In paragraph 4.18 the last word in the fourth line should read "at" instead of "as".

Annual Report of the Secretaries:

Page 69:

The first word in the third line of the last paragraph should read "debated" instead of "adopted".

Jaarverslag van die Sekretarisse:

Bladsy 69:

In die tweede paragraaf onder die opskrif „DIE TOEKOMS" vervang die woorde „nou 'n besluit moet uitbring" met „nou 'n bespreking moet hou".

PROPOSED AMENDMENTS TO CONSTITUTION
VOORGESTELDE WYSIGINGS AAN GRONDWET:

Die woord „Grondwel" moet vervang word met die woord „Grondwet".

"Rule 1 (iii)" to be changed to "Rule (iv)".

Artikel (ii)" moet vervang word met „Artikel (iv)".

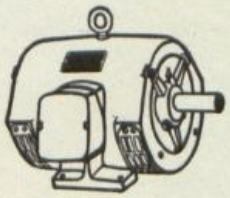
Crompton Parkinson

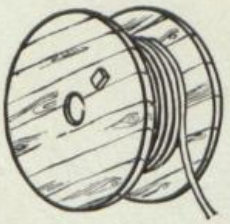
Contribution to Progress

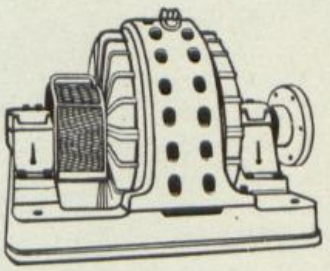
72 Years of Service

1892 • to Mining & Industry • **1964**

in South Africa

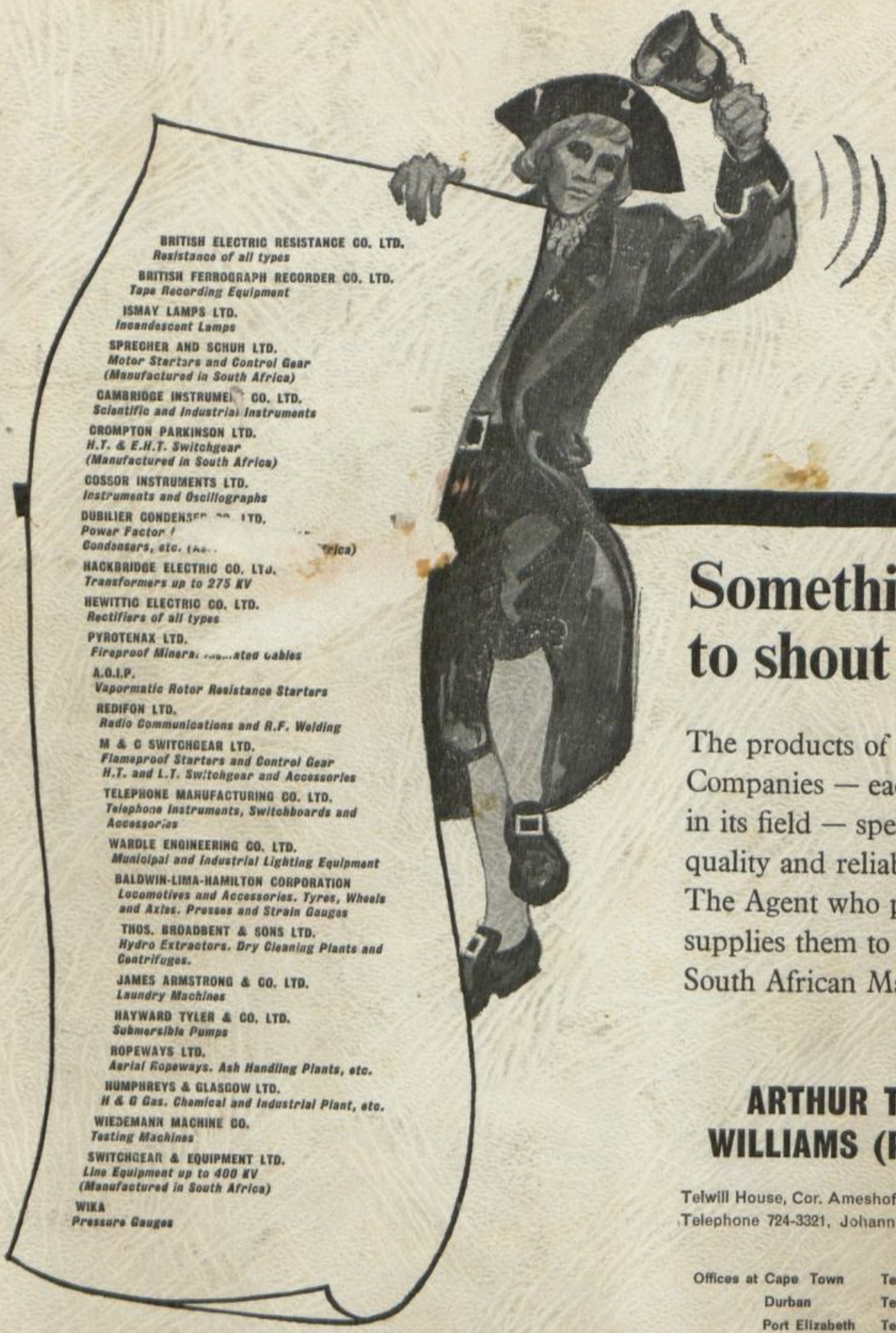






CROMPTON PARKINSON (S.A.) (PTY) LIMITED. P.O. BOX 4236, JOHANNESBURG. TELEPHONE 724-9431
ELECTRICAL EQUIPMENT

jonesson 1343



BRITISH ELECTRIC RESISTANCE CO. LTD.
Resistance of all types

BRITISH FERROGRAPH RECORDER CO. LTD.
Tape Recording Equipment

ISMAY LAMPS LTD.
Incandescent Lamps

SPRECHER AND SCHUH LTD.
Motor Starters and Control Gear (Manufactured in South Africa)

CAMBRIDGE INSTRUME[illegible] CO. LTD.
Scientific and Industrial Instruments

CROMPTON PARKINSON LTD.
H.T. & E.H.T. Switchgear (Manufactured in South Africa)

COSSOR INSTRUMENTS LTD.
Instruments and Oscillographs

DUBILIER CONDENSER [illegible] LTD.
Power Factor [illegible] Condensers, etc. (Ma[illegible]rica)

HACKBRIDGE ELECTRIC CO. LTD.
Transformers up to 275 KV

HEWITTIC ELECTRIC CO. LTD.
Rectifiers of all types

PYROTENAX LTD.
Fireproof Mineral [illegible]ated Cables

A.O.I.P.
Vapormatic Rotor Resistance Starters

REDIFON LTD.
Radio Communications and R.F. Welding

M & C SWITCHGEAR LTD.
Flameproof Starters and Control Gear H.T. and L.T. Switchgear and Accessories

TELEPHONE MANUFACTURING CO. LTD.
Telephone Instruments, Switchboards and Accessories

WARDLE ENGINEERING CO. LTD.
Municipal and Industrial Lighting Equipment

BALDWIN-LIMA-HAMILTON CORPORATION
Locomotives and Accessories. Tyres, Wheels and Axles. Presses and Strain Gauges

THOS. BROADBENT & SONS LTD.
Hydro Extractors. Dry Cleaning Plants and Centrifuges.

JAMES ARMSTRONG & CO. LTD.
Laundry Machines

HAYWARD TYLER & CO. LTD.
Submersible Pumps

ROPEWAYS LTD.
Aerial Ropeways. Ash Handling Plants, etc.

HUMPHREYS & GLASGOW LTD.
H & G Gas. Chemical and Industrial Plant, etc.

WIEDEMANN MACHINE CO.
Testing Machines

SWITCHGEAR & EQUIPMENT LTD.
Line Equipment up to 400 KV (Manufactured in South Africa)

WIKA
Pressure Gauges

Something to shout about

The products of these Companies — each a leader in its field — spell quality and reliability. The Agent who proudly supplies them to the South African Market is:-

ARTHUR TREVOR WILLIAMS (PTY) LTD.

Telwill House, Cor. Ameshoff and De Beer Streets,
Telephone 724-3321, Johannesburg. P.O. Box 2373

Offices at Cape Town	Telephone 2-9400
Durban	Telephone 25816 & 61327
Port Elizabeth	Telephone 4-5319

Printed by John O. Rodd (Pty.) Ltd.