PROCEEDINGS

OF THE

THIRD CONVENTION

OF THE

Association of Municipal Electrical Engineers

(UNION OF SOUTH AFRICA.)

Held at Port Elizabeth, South Africa,

From Monday, February 10th, to February 15th,

1919.

[PRICE FIVE SHILLINGS.]

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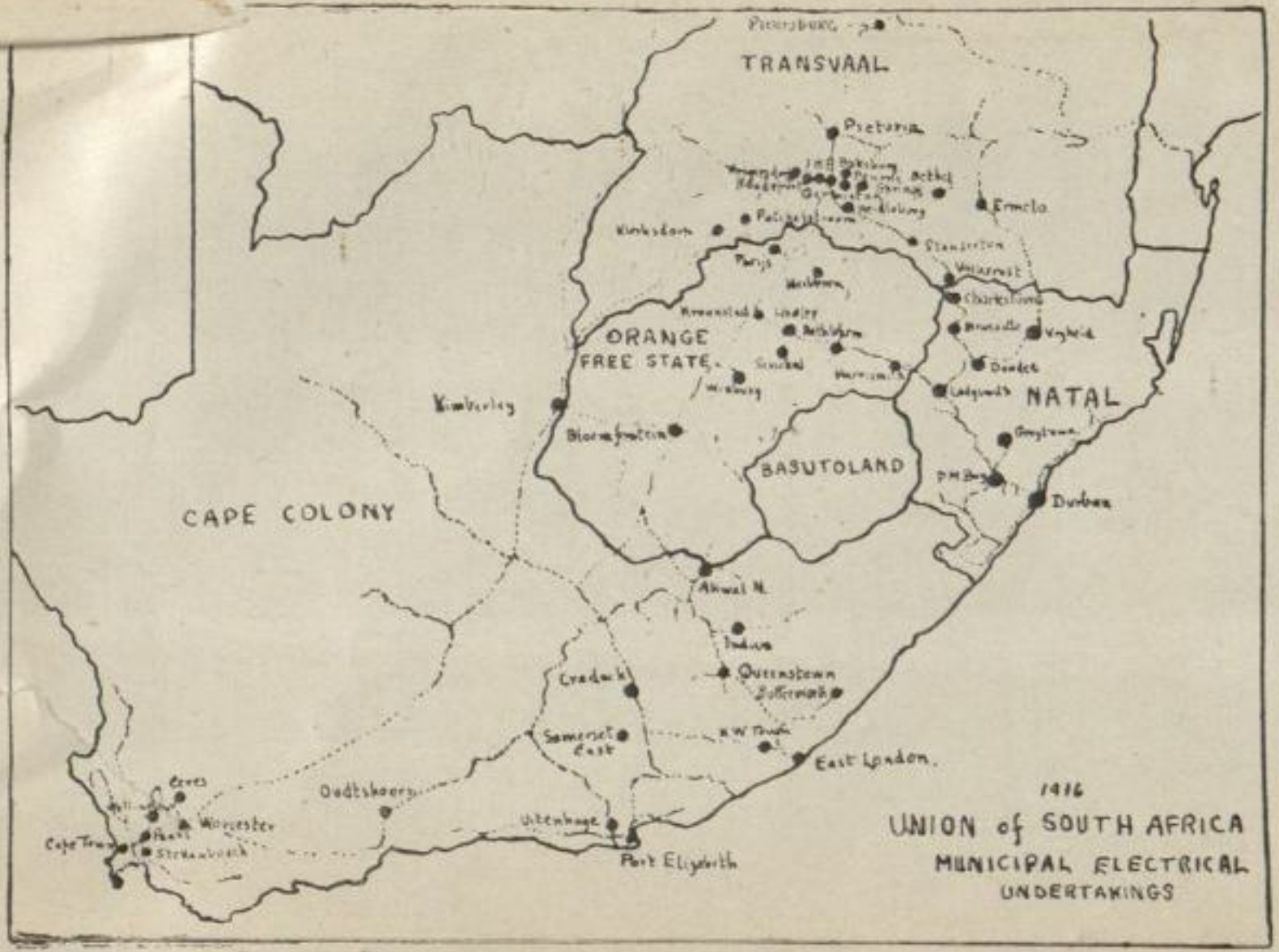
TRANSVAAL
Pretoria
Ermelo
Kimberley
ORANGE FREE STATE
Bloemfontein
BASUTOLAND
NATAL
Durban
CAPE COLONY
Aliwal N.
Queenstown
East London.
Port Elizabeth
1916
UNION of SOUTH AFRICA
MUNICIPAL ELECTRICAL UNDERTAKINGS

W. A. Hodge (Winburg). A. E. Val Davies (Capetown). T. Jagger (Ladysmith). Councillor Fairclough (Ladysmith). R. D. Coulthard (Oudtshoorn). G. Mercler (Bethul).

Councillor Thompson (Mayor of Bloemfontein). P. H. Newcombe (Alfred North). H. Brittle (Cradock). P. W. Mills (Cradock). J. Monly-Lamye (East London). J. Vowles (King Williamstown). Councillor De Jager (Oudtshoorn). J. Younger (Krugersdorp).

Councillor Crawford (Bloemfontein). A. S. Munro (Pietermaritzburg), Member of Council. G. A. Stewart (Bloemfontein), Member of Council. B. Sanley (Port Elizabeth), President. E. Poole (Durban), Hon. Sec. and Treas. W. Bellad-Ellis (Queenstown), Member of Council. Councillor Doull (Pietermaritzburg).

C. J. Everett (Johannesburg). T. Millar (Harrismith).

MEMBERS AND DELEGATES AT THE PORT ELIZABETH CONVENTION.

INDEX.

PROCEEDINGS

OF THE

Association of Municipal Electrical Engineers

(UNION OF SOUTH AFRICA.)

FOUNDED 1915.

EXECUTIVE COUNCIL:

President:

B. SANKEY, Port Elizabeth.

Vice-President:

T. C. WOLLEY-DOD (Pretoria).

Members of Council:

Past Presidents: JOHN ROBERTS (Durban).
COL. F. H. DOBSON, D.S.O. (Johannesburg).

Cape Province: W. BELLAD-ELLIS (Queenstown).

Orange Free State: G. A. STEWART (Bloemfontein).

Transvaal: E. T. PRICE (Johannesburg).

Natal: A. S. MUNRO (Pietermaritzburg).

Hon. Secretary and Treasurer:

E. POOLE (Durban).

RULES AND CONSTITUTION

OF THE

Association of Municipal Electrical Engineers

(UNION OF SOUTH AFRICA).

As submitted and passed by the full meeting of the Association held at the Town Hall, Johannesburg, on Friday, November, 1915, with amendments as submitted and passed at the Durban and Port Elizabeth Conventions.

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1. TITLE.—The Association shall be called the Association of Municipal Electrical Engineers (Union of South Africa).

2. OBJECTS.—The objects of the Association are to promote the interests of Municipal electric undertakings.

3. HONORARY MEMBERS shall be distinguished persons who are or have been intimately connected with Municipal electrical undertakings, and whom the Association especially desires to honour for exceptionally important services in connection therewith.

4. MEMBERS.—Members of the Association shall be Chief Electric Engineers engaged on the permanent staff of an electric supply or tramway undertaking owned by a local authority in the Union of South Africa, and any duly qualified assistants whom they may recommend for election. Should any member cease to hold his qualification as above, his membership shall cease.

5. ASSOCIATE MEMBERS.—Any member resigning under Rule 4 shall be entitled to apply for election as an associate member. Associate members shall not be entitled to vote on matters affecting the conduct and management of the Association, nor to hold office, but otherwise shall be accorded the privileges of ordinary membership.

6. CONTRIBUTIONS.—The subscription for members shall be £2 2s. for Chief Engineers and their Chief Assistants and £1 1s. for other members and associate members.

7. OFFICERS.—The Officers of the Association shall consist of:—President, Vice-President, Hon. Secretary, and the Hon. Treasurer.

8. COUNCIL.—The Council shall consist of the President, Vice-President, the two immediate Past-Presidents, and four members to be elected at the Annual Congress.

9. ELECTION OF OFFICERS AND COUNCIL.—Officers and Members of Council shall be elected by nomination and ballot at the Annual Congress, and shall hold office until the next Congress.

10. All those who attended the Congress in Johannesburg in November, 1915, shall ipso facto be members of the Association.

11. ELECTION OF FUTURE MEMBERS.—The election of future members of the Association shall be vested in the Council, and applications for membership must be made on the prescribed form.

12. The affairs of the Association shall be managed by the Council, who shall have power to incur any expenditure necessary for the objects of the Association.

13. The voting at the Congress shall be restricted to the members present at such Congress.

14. The financial year of the Association shall terminate on the first day of the Annual Congress, at which date all subscriptions for the ensuing year become due, and no member will be allowed to vote whose subscription is in arrear.

15. PRESIDENT.—The President shall take the Chair at all meetings of the Association, the Council, and the Committees, at which he is present, and shall regulate and keep order in the proceedings.

16. In the absence of the President it shall be the duty of the Vice-President to preside at the meetings of the Association, and to regulate and keep order in the proceedings. But in the case of the absence of the President and of the Vice-President, the Meeting may elect any Member of the Council, or in the case of their absence any Member present to take the Chair at the Meeting.

17. The local Press of the town in which the Congress is held shall be notified of the time and date of the reading of all papers, but the Association shall reserve to itself the right to resolve itself into Committee at any time during its proceedings; moreover, it shall be competent for any Member to have his paper read and discussed in Committee if he so desires.

18. The Honorary Secretary and the Honorary Treasurer shall present a yearly report on the state of the Association, which shall be read at the Annual Congress.

19. The Honorary Treasurer shall be responsible for the funds of the Association, and shall present a Balance Sheet at the Annual Congress.

Association of Municipal Electrical Engineers

(UNION OF SOUTH AFRICA.)

THIRD ANNUAL CONVENTION.

PORT ELIZABETH, FEBRUARY, 1919.

Programme of Proceedings.

Monday, 10th.

10.30 a.m.—Welcome by the Mayor and formal opening of Convention.
Valedictory Address by Retiring President.
Election of Officers, etc., and other formal business.
Presidential Address.

1 p.m.—Luncheon at the Port Elizabeth Club by invitation of the Mayor.

3 p.m.—Visit to Power Station and Boot Factory.

Tuesday, 11th.

10 a.m.—Meeting at Council Chamber, City Hall.
Discussion on Presidential Address.

2.30 p.m.—Report of Sub-Committee on Proposed Wiring Rules and Regulations, and Discussion.
Motion by Mr. J. Roberts (Durban) re "Inclusion of other Officials in this Association."
Report on "Statistical Returns," by Mr. E. Poole (Durban), and Discussion.

Wednesday, 12th.

9 a.m.—Cars leave Town for Official Visit to the Bulk River Waterworks of the P.E. Municipality.

Thursday, 13th.

9.10 a.m.—Train leaves Port Elizabeth for Uitenhage.

10.30 a.m.—Official Welcome to the Association by the Mayor of Uitenhage.

11 a.m.—Paper on "The Registration of Electrical Contractors," by Mr. G. H. Swingler (Capetown). Discussion.

1 p.m.—Luncheon at the Royal Hotel.

2.30 p.m.—Visit to Power Station and Railway Workshops.

5.10 p.m.—Train leaves for Port Elizabeth.

7.30 p.m.—Annual Dinner.

Friday, 14th.

9.30 a.m.—Paper on "Local Manufacture from South African Products," by Mr. C. J. Everett (Johannesburg). Discussion.

2.30 p.m.—Visit to Biscuit Works and Tannery.

Saturday, 15th.

9 a.m—Trip round the Bay.

PROCEEDINGS

OF THE

THIRD ANNUAL CONVENTION

OF THE

Association of Municipal Electrical Engineers

(UNION OF SOUTH AFRICA.)

Port Elizabeth, February 10th to 15th, 1919.

Monday, 10th February, 1919.

INTRODUCTORY.

The third annual Convention of the Association of Municipal Electrical Engineers (Union of South Africa) was opened at Port Elizabeth on February 10th, 1919, the proceedings being held in the Council Chamber, Municipal Buildings.

Members present:—B. Sankey (Port Elizabeth), C. J. Everett (Johannesburg), E. Poole (Durban), W. Bellad-Ellis (Queenstown), G. A. Stewart (Bloemfontein), T. Jagger (Ladysmith), T. Millar (Harrismith), H. Brittle (Cradock), A. S. Munro (Pietermaritzburg), P. H. Newcombe (Aliwal North), W. A. Hodge (Winburg), G. Mercier (Bethel), J. Vowles (King Williamstown), and R. D. Coulthard (Oudtshoorn).

Delegates present:—Councillors D. A. Thomson (Mayor of Bloemfontein), J. Crawford (Bloemfontein), Smith Hudson (Port Elizabeth), E. Fairclough (Ladysmith), J. de Jager (Oudtshoorn), H. W. Doull (Pietermaritzburg).

Visitors present:—J. Younger (Krugersdorp).

CIVIC WELCOME.

In welcoming the visitors to the City, the Mayor said it was a great pleasure and privilege for him to do so in the name of the citizens. Although not their first conference, it was their first visit to Port Elizabeth, and he assured them again that they were heartily welcome. He trusted that their deliberations would result in good—they could not do otherwise—not only to the particular centres whence they came but to the community as a whole. There must be many knotty questions which would engage their attention, but when a body of scientific expert experienced men like they were came together to make comparisons and suggestions their decisions must be only productive of good.

REVENUE AND EXPENDITURE ACCOUNT.

Period: August 16th, 1917, to December 31st, 1918.

Expenditure.				Revenue.			
To Printing	£80	9	0	By Balance..	£30	16	2
Postage and Receipt Stamps	6	11	7	30 Subs. at £2 2s. 32 members (one on active service, one contra for printing)	63	0	0
Stationery, Telegrams and Bank Charges ..	6	17	1	Sales of Proceedings ..	4	16	0
Clerical Assistance and Reporter	11	2	2	Advertisements	15	6	0
Photo for Home Press.	0	5	6	Durban Corpn. Grant ..	20	0	0
Balance to Balance Sheet	29	1	4	Sundry..	0	8	6
	£134	6	8		£134	6	8

BALANCE SHEET

as at December 31st, 1918.

Liabilities.				Assets.			
Revenue & Expenditure Account..	£29	1	4	Cash in hand	£29	1	4

E. POOLE,
Hon. Secretary and Treasurer.

I have examined the books, receipts and vouchers of the A.M.E.E. (Union of S.A.), and certify that the above Revenue and Expenditure Account and Balance Sheet are correctly drawn up.

Durban, January 20, 1919.

DAVID A. DAVIES,
L.L.B. (Lond.), R.P.A. (Natal).

ALTERATIONS TO RULES AND CONSTITUTION.

Moved by Mr. Sankey (Port Elizabeth), seconded by Mr. Munro (Pietermaritzburg), that amendments be added to the Rules and Constitution so as to include a class for Honorary Members and also Associate Members.

Moved by Mr. Everett (Johannesburg), seconded by Mr. Jagger (Ladysmith), that a special form of application be also included.

It was finally resolved that these matters be left for the Council to consider and submit at a later stage (see Friday's proceedings).

SUBSCRIPTIONS REMITTED.

Moved by Mr. Sankey, seconded by Mr. Jagger, that in regard to the outstanding subscriptions of Mr. Proctor on active service and Mr. Hamlin contra for printing, these be remitted in accordance with the Secretary's suggestion. Adopted.

ELECTIONS.

The Chairman raised the question of disqualifying prospective members, saying it was felt by the Council that any aspirant for membership with one mark against him should be the subject of investigation by the Secretary and President. Approved.

Arising out of the Secretary's report, the Chairman drew attention to the grant of £20 from the Durban Corporation, and on behalf of the members he humbly suggested that other Municipalities might be guided somewhat by Durban's action.

Mr. Sankey drew attention to another item in the financial statement, the amount of £4 16s. accruing from sales of proceedings, and asked all members, as far as they could, to try and persuade their committees to authorise a larger number of copies.

ADOPTION OF SECRETARY'S REPORT.

Moved by Mr. Bellad-Ellis, seconded by Mr. Millar, that the Hon. Secretary and Treasurer's Report be adopted.

Adopted.

DISCUSSIONS.

Before proceeding with the next business, Mr. Bellad-Ellis raised the question of limiting the length of discussion to fifteen minutes, and moved accordingly.

The Chairman suggested that an extension of fifteen minutes should also be allowed with the approval of the meeting, to which Mr. Bellad-Ellis had no objection. Mr. Jagger seconded.

Carried.

In the absence of Mr. John Roberts, the following valedictory address was read by Mr. G. A. Stewart:—

RETIRING PRESIDENT'S ADDRESS.

(By John Roberts, Durban).

I have deeply appreciated the honour of occupying the presidential position of this Association of Municipal Electrical Engineers during the past twelve months.

It has been one of great happenings, these happenings being all connected with the recent Great War which has influenced and overshadowed the lives of every one of us, both in our private, our business, and our professional affairs.

Since we last met we have passed through a period of deep anxiety, turned at last into joy and satisfaction at the successful issue of the labours and heroism of those who have won this war for us.

As engineers we rejoice in the magnificent part played by those of our own calling in the recent war, and we rejoice still more that now the world is free again to pursue its peaceful avocations we can resume our work in the world and help to make this world, by the arts of civilisation, a better and happier place for our fellow men.

The period of my presidency I am now reviewing has not been one of very striking progress from the Electrical Engineer's point of view as regards actual achievements, but I think it has been one of great promise for the future.

Achievements have been mostly confined to making things do, to carrying on somehow with what we have got, with devising expedients and generally in making bricks without straw. But it is I think valuable experience and many of us have learnt more about the qualities and possible uses of materials than we knew before when we simply used what was customary without in many cases going deeply into the ways and wherefores of their merits.

For instance we in the Durban Electrical Department hadn't much notion till a few months ago of how an old tram metal would do or how it would look when used as a pole for electric wires. We now find that a rail under 7 inches deep and weighing about 85lbs. to the yard will stand up quite alright 33 feet out of the ground and at a little distance away can scarcely be distinguished from a round pole, and so on.

We have also learnt how near we can run to the wind with our generating plants and how much overload can be got out at a pinch. We have learnt the necessity of keeping boilers in first-class order and of keeping condensers clean ; at any rate the penalties one has to pay for neglecting this important work.

We have learnt how to make the last use of every ounce of copper in our mains and how by re-arrangements of feeders and of sub-stations how much more we can do with our old networks than we thought was possible in the days when cables were one third or one-quarter of what they are to-day.

All this experience is valuable because one cannot keep too prominently in one's mind the fact that all Engineering is really a matter of £ s. d. especially is this the case in Electrical Engineering. The less one spends on plant and mains for a certain output the less of course will be the capital cost always providing that the service is good and free from interruptions. And the need for economy and the use of unusual expedients has not by any means terminated with the close of the recent great war. Cost of materials in many cases will fall but never I believe to their old pre-war standard. A forecast that, on the average, prices will be at least 50 per cent. higher than the old figures, errs perhaps on the side of moderation so that a power plant which in the old days might be put down for £12 a kilowatt will in future cost nearly £20.

That in itself will bring about a recasting of values. In the case of boilers which at the present time are more than twice the cost of the same thing before the war, the question will arise "does it pay to try and get the same efficiency as heretofore?" Especially does this economic consideration present itself when it is remembered that by far the greatest proportion of the work is done in the first half of the boiler, the transference of heat from the gases to the water with an outlet temperature of gases of say 300 degrees F. is very small per cent. area compared with what takes place where the gases first pass through the tubes. The tendency will undoubtedly be therefore to push up outputs of boilers by increasing the grate areas and draught pressures to perhaps double what we have been accustomed to look upon as an economical rating. This is more essential in stations with a poor load factor of course than one running with a steady daily load. But even at 50 per cent. load factor I have taken a case of a boiler recently purchased by the Durban Town Council evaporating 28,000 lbs. of steam and costing £12,500.

I find that the cost in fuel and standing charges reckoning coal at 15/- per ton will be .34d. per kwhr at a boiler efficiency of say 80 per cent.

Now suppose that boiler is run at 50 per cent. overload by increasing the draught and assuming the efficiency falls when pressed at this rate to 70 per cent. then by the saving in capital charges brought about by using the plant to greater advantage the cost is only increased to .35d. in spite of the poorer efficiency.

The same reasoning applies to turbines. In order to realise the last fraction possible of the heat in the steam the vacuum must be high, meaning large volumes of water and high cost in pumping. The condenser and air pump must be large. The connection between turbine and condenser must be huge to pass the steam at its great volume and the turbine must be very costly in having specially large blading in the last stage of the expansion. Of course one thing must be taken into account viz., that a saving in steam consumption means a saving in boiler plant as well as a saving in fuel but it is likely that the expense of utilising the last possible ½-inch of vacuum is dearly paid for in cooling towers, condensers, piping, pumps, etc., even after taking extra expense in boilers into account.

The same reasoning applies to mains, transformers, etc. We shall have to utilise copper to better advantage than we used to do. We shall have to run overhead wires and cables especially the former at higher current densities even if we have to boost up the pressure on long feeders. With A.C. working this is of course quite easy.

Already there is a tendency to run electrical machinery at higher temperatures: Motors and dynamos

must be better ventilated and transformers artificially cooled by means of fans.

In short we shall find that if our undertakings are not to be burdened with too heavy capital charges we must make a sovereign do if possible what it did before by getting more duty out of our plant. For it must be remembered that we are going to be hit in two ways. Not only will machinery be greatly more expensive but capital will not be borrowed at 4½ per cent. interest any more. We shall have to pay 6 per cent. for municipal loans while Governments are tempting investors with 5 per cent. stock free of income tax. That means a great difference. For instance, in the case of the boiler I just mentioned. It used to cost £5,500 bought with money we borrowed at 4½ per cent. costing £247 per annum interest. It will cost us in future £12,500 at 5½ per cent. to 6 per cent. —£687 per annum. Further comment on the need for utilising that boiler to the full is I think unnecessary.

I hope I have not, in these few words of caution for the future, trenched on a subject our new President may have chosen for his address. My excuse is that it seems to me to be a lesson which the last year's trend of high prices seems to be one we should take to heart.

There is just one other subject on which I should like to touch in my brief valedictory address, and that is on the relationships between each one of us, as the head of undertakings employing a greater or smaller number of men, with those whose work we direct. One of the most significant changes brought about in England by the great war is the improvement in the lot of the working man. It was realised when every effort had to be made to speed up output to feed the guns how much depended upon the good-will of each individual worker. It seems a pity that it required such an emergency to bring the lesson home. Some more enlightened did not need it, but I am afraid that we have to confess that as a whole the workman was exploited. The natural competition of the labour market forced him to accept conditions of employment which even in the short time which has elapsed are now recognised as being unsatisfactory if not intolerable.

I think we electrical engineers who can boast of keeping up to the times in all our methods and actions, should recognise this new spirit of the age which is that the man who works with his hands should benefit in a share of the wealth which his labour produces to a greater degree than he has done in the past. I think we should not stand aloof from him as someone whose claims for greater recognition have to be fought and resisted as long as possible. We have, I think, to cultivate a good understanding with him not only in his interests but in our own, and in the interests of the public in whose service we are. A spirit of antagonism only engenders bitterness which is the last thing conducive to good service, and I think we should get him to realise that we do not stand for an interest which is ranged against him to beat him down to the lowest terms of wages, but rather as one who is a fellow-worker though on a higher grade, and a friend who will see that good service is properly recognised.

With this I conclude my valedictory address as such an address should, I think, be brief, for our eyes are now on the future and nature's favourite slogan being "le roi est mort, vive le roi," we now look to our new President for inspiration for the future, and I take this opportunity of congratulating him upon his new honour, and wishing him every success in his year of office and thenceforward.

ELECTION OF PRESIDENT.

Moved by Mr. T. Jagger (Ladysmith), seconded by Mr. Everett (Johannesburg): "That Mr. E. Sankey be elected President of the Association for the ensuing year."

There being no other nominations, the Chairman declared Mr. Sankey duly elected as President.

Of course, the labour question was one very much in prominence just now, and no doubt that would cause some discussion amongst them, being brought into touch, as they were, with working men who had grievances or considered they had. Mr. Forbes went on to express the hope that socially and materially they would have a good time in Port Elizabeth, and proceeded to enumerate some of the attractions the City possessed. For that part of their stay, however, he felt he could safely leave them in the hands of Mr. Sankey. He understood they were to be taken out to the Bulk River Waterworks. They would there see that Port Elizabeth possessed an abundant supply, though what they wanted was additional storage in town. Continuing, Mr. Forbes touched on the vast potentialities of electricity, and again bade them a very hearty welcome to Port Elizabeth. (Applause.)

Mr. Thomson, Mayor of Bloemfontein, replying on behalf of the visitors, thanked the Mayor most cordially for the welcome extended to them. That Association, he said, had been formed for the advancement of Municipalities in regard to electrical matters, in accordance with the common interest of those Municipalities. Bloemfontein recognised the importance of such a conference as that by sending two delegates. Mr. Thomson also mentioned the fact that some of the visitors had brought their wives with them, and, concluding, thanked the Mayor again for the welcome.

Mr. Stewart also responded, voicing the pleasure of all at being in "your delightful City, with all its advantages of commerce, its beach undeveloped, where I understand you are likely to lay down £150,000, and where you still have systems of tramways in the hands of a company." He trusted that their labours would have a beneficial effect on the country as a whole.

BUSINESS MEETING.

On the motion of Mr. Sankey, Mr. Stewart was elected to the chair, pro tem, in the unavoidable absence of the President, Mr. John Roberts, of Durban. This gentleman Col. Dobson (Johannesburg), Mr. Wolley-Dod (Pretoria), and several others, sent apologies for their absence by letter and wire, and Congress expressed its regret at the circumstances which necessitated their being away.

CONFIRMATION OF MINUTES.

The Secretary suggested that, to save time, the minutes of the last meeting be scrutinised by the President and signed if found in order.

Adopted.

NEW MEMBERS.

The Chairman announced the Council had that morning elected the following new members:—Mr. R. D. Coulthard (Oudtshoorn), Mr. J. Vowles (King Williamstown), Mr. W. A. Hodge (Winburg), Mr. R. McCauley (Bloemfontein), and Mr. W. J. Prior (Bloemfontein).

GRATUITY.

Moved by Mr. Jagger (Ladysmith), seconded by Mr. Everett (Johannesburg), that a grant of £5 5s. be paid to the Durban typist for clerical work since the last Convention.—Adopted.

HON SECRETARY'S AND TREASURER'S REPORT.

Mr. President and Gentlemen,—In accordance with clauses 16 and 17 of our Rules and Constitution, I have pleasure in submitting my combined Report and Balance Sheet covering the period from the date of our last Convention (August, 1917).

Our membership now stands at 31, since the last Convention four members having resigned, three of whom have left municipal employ and three new members have been elected, the net loss in membership being one; but it is hoped this Convention will be the means of inducing new members to come forward, so that our Association will be more fully representative of the various municipal electrical undertakings.

We have every reason to feel pleased with the success of this Association, bearing in mind its inception came about while the Great War was raging, and now that it is happily closing we may look forward to still greater success and welcome back in the near future those who have enlisted for active service, i.e., Messrs. L. B. Proctor (Boxburg), R. A. Stoker (Kroonstad), E. J. Hamlin (Stellenbosch).

In regard to resignations, it has been suggested that our rules should provide for the retention of members whom the Council would honour, even though they may have left municipal employ, and it has also been suggested that the scope of our Association should be widened so as to include other municipal officers than electrical engineers, and a motion is to be brought forward at our Convention bearing on the subject.

Our rules need further modification in regard to elections, which at present are vested in the Council, but it is not clear if an objection by one member only of the Council shall disqualify a candidate, and I would suggest that any candidate for membership must be supported by one of our members.

It is satisfactory to note that our Association is having official recognition by some of the Government Departments, as I have had several communications from various offices on the subjects of "One-armed Soldiers" (as lately circularised to members) and the "Importation of cheap and inferior material" as submitted to the Council, and also on the question of "Statistics," which latter is the subject of a special report.

The Sub-Committtee on "Wiring Rules" have not had an opportunity of meeting, as they had hoped, but a report and discussion on the subject is included in our Convention's programme.

It is again satisfactory to note that an appreciable number of Councils are sending Councillor Delegates as was a feature at our last Convention, and I trust the interchange of views between Councillors and Engineers will be to their mutual advantage, and that we may always look forward to their presence at our Conventions.

With regard to the financial side of the Association, it is very pleasing to note that from a balance in hand as per last Balance Sheet of £30 16s. 2d. our balance stands at £29 1s. 4d. as at December 31st, 1918. There are only two outstanding subscriptions, that of Mr. Proctor on active service and that of Mr. Hamlin, whose cost in printing his own paper more than covered the subscription, and I suggest these subscriptions be remitted.

A banking account was opened on the termination of the last Convention with the Standard Bank of South Africa, as was suggested by my predecessor in office.

With the commencement of the Port Elizabeth Convention my term of office comes to an end, and I desire in conclusion to thank the President, Vice-President and members of Council, as well as other members, for their co-operation and assistance which they have so willingly given me in carrying out my duties.

I am,

Mr. President and Gentlemen,

Yours faithfully,

E. POOLE,

Hon. Sec. and Treasurer.

Mr. Sankey then assumed the Chair, and thanked the members in a few words for the honour they had done him.

VENUE OF NEXT MEETING AND ELECTION OF VICE-PRESIDENT.

Moved by Mr. Stewart (Bloemfontein), seconded by Mr. Millar (Harrismith): "That the question of the venue of next meeting and the election of Vice-President be deferred to a later stage." (See Tuesday's proceedings.)

Adopted.

ELECTION OF SECRETARY AND TREASURER.

Moved by Mr. Bellad-Ellis (Queenstown), seconded by Mr. Munro (Pietermaritzburg): "That Mr. E. Poole (Durban) be elected as Hon. Secretary and Treasurer of the Association for the ensuing year."

Adopted.

ELECTION OF COUNCIL.

Natal: Mr. A. S. Munro (Pietermaritzburg). Moved by Mr. T. Jagger (Ladysmith), seconded by Mr. J. Vowles (King Williamstown).

Orange Free State: Mr. G. A. Stewart (Bloemfontein). Moved by Mr. Millar (Harrismith), seconded by Mr. Everett (Johannesburg).

Transvaal: Mr. E. T. Price (Johannesburg). Moved by Mr. Everett (Johannesburg), seconded by Mr. Bellad-Ellis (Queenstown).

Cape Province: Mr. W. Bellad-Ellis (Queenstown). Moved by Mr. Munro (Pietermaritzburg), seconded by Mr. Stewart (Bloemfontein).

Adopted.

OTHER BUSINESS.

Mr. Bellad-Ellis (Queenstown) raised a question as to encouraging centres contemplating electrical installations or extensions to send delegates to the conventions to gather information likely to be of use to them.

His suggestions led to some little discussion.

Mr. Councillor Crawford (Bloemfontein) thought the best way would be to approach the various municipalities for a grant similar to that given by Durban, and any centre giving, say, ten guineas to the Association should have the right to send a representative to its gatherings, where, as stated, they would learn much that would be of value and possibly prevent them bumping their heads against a dead wall. They would, instead, probably strike something more feasible and remunerative to the centre concerned (hear, hear).

Mr. Councillor Doull (Maritzburg) contended that there was quite sufficient electrical ability in the Union now to advise on any projects, and that they had no need at all to go outside the country for such advise. (Hear, hear). He had been advocating at Maritzburg that they should obtain such advice in regard to that centre.

Mr. Stewart (Bloemfontein) remarked that they must be careful. They did not want to take away the livelihood of any private engineer, yet at the same time the suggestion thrown out by Mr. Crawford was a valuable one. The speaker urged that one way of more widely enlisting the sympathy and support of municipalities would be to have a larger number of the official report of their proceedings printed and circulated.

The Secretary agreed that they must be very careful not to tread on the private man's corns.

The President supported Mr. Ellis's proposition, and claimed that the man who had had years of experience with a public municipal supply possessed an experience which a man never engaged in central station work had not—(hear, hear)—and he did not know of any private consulting engineer in this country who was an old municipal man (hear, hear). There might be such, but he did not know of one. If there were any, however, it would not be right for the Association to bump up against them (hear, hear). Altogether, it

Mr. B. SANKEY, M.I.D.E., (President).

was rather a difficult question, which they could not go into at the moment, but they might get into touch with municipalities, and he felt sure they could give them a lot of valuable information which would put them on the right lines, at any rate.

Eventually, on the motion of Mr. Everett (Johannesburg), seconded by Mr. Millar (Harrismith), it was agreed that during the Convention the subject should be discussed by the Association's Council and the Municipal Delegates present, and reported upon to the Convention.

Adopted.

PRESIDENTIAL ADDRESS.

(By B. SANKEY, Port Elizabeth.)

Gentlemen,—I desire to express first of all to the Members of this Association my appreciation for the honour they have conferred upon me in electing me to the office of President for the ensuing year.

As the third President of this Association, it is particularly gratifying to me to feel that we are now entering upon a new era in Municipal Electrical Engineering, that the dark shadow of the war which has hung over us ever since we first met, and has caused so many anxieties, not only in our public, but also in our private duties and responsibilities, is now happily removed. We can, I think, look back upon the past work of our Association with some feelings of satisfaction for the good we have accomplished. Our first meeting at Johannesburg was the commencement of an interchange of views and experiences of great benefit to all concerned. At our second meeting at Durban we invited the Chairmen of the Committees, which proved to be a most successful innovation to which several Chairmen publicly testified before our Convention terminated. At this convention it is my hope that we shall welcome a larger number of Chairmen of Committees to their and our mutual benefit.

The objects of our Association were very well expressed by our first President, Prof. Dobson, in his address at Johannesburg when he said: "There are many problems in Municipal Electrical Engineering which require consideration, with special reference to the conditions which exist in South Africa. In the first place, in the absence of a body comparable to the British Board of Trade and Local Government Board, the newly formed Municipal Electrical Association would be a body to which Municipal Electrical Engineering problems could be referred for expert advice connected with the spending of money for public undertakings. The Association might also be a body which could standardise electrical systems throughout South Africa, more particularly with regard to voltage and frequency of supply. In this way each Municipality would be able to buy the standardised materials such as lamps, motors, etc."

Again the question of electricity tariffs on a Municipal Electric System is a problem peculiar to every public lighting system. An interchange of ideas as to how to deal with idle plant outside the hours of peak load, and suitable tariffs to obviate the necessity of increasing the number of meters is bound to result in advantage to every Municipality.

Professor Dobson also mentioned the question of meter reading, advertising, licensing of electricians and tramways for small towns.

Of this programme the standardisation question was one of the first to be taken in hand, being originally initiated by Mr. John Roberts. Our friends, the S.A. Institution of Electrical Engineers not wishing to be left behind, also took up the subject independently and eventually a joint Committee representtive of the various Engineering Societies and Government Departments was formed. At the last Congress this Committee was reported to be still sitting and our view as to Municipal standardisation were taken and duly placed

before them, as recorded in our proceedings. Since that date nothing has been heard of their activities and the Committee appears to have become defunct. If so, this is the second effort which has died a natural death. Now of all times on the eve of great developments is standardisation needed, and I look to our Association to take this matter up again, this time independently, and to show that they can of their own accord adopt standardisation in every feasible direction, and thus lead the way for general standardisation by other interests as well.

The question of tariffs has been discussed at length and I can recommend new members to study carefully the contributions to our proceedings on this question They will find in them much useful and valuable information. Of the other questions we hope at this meeting to consider that of "The Licensing of Electricians," and later in this address I hope to offer some observations on tramways for small towns. One has only to read through our two Books of Proceedings to find much valuable and useful information of special value to South African Central Station Engineers.

And if we can look back with some satisfaction upon our activities that are past, we must also remember that we have now to face the more serious responsibilities of the future.

On our shoulders to a large extent depends the success and progress of the public supply and development of electricity in the future throughout nearly every town in the Union of South Africa. We look forward to a vast development in the use of electricity during the next few years in the factories and workshops, and last but not least, in every domestic circle, and the degree of success attained depends to a large extent on the cheapness and reliability of the supplies we can give and the facilities we can provide in supplying and maintaining suitable apparatus and material. The British manufacturer we feel can supply the goods, but we must introduce and popularise them with the public. In other words the commercial and the supply sides of the business must work hand in hand for their mutual benefit.

During the past five years enormous advances have been made in Electrical and General Engineering with which we have not been able to keep in touch as in peace times.

In Great Britain the Municipal Electrical Association comprises members representing all grades of undertakings, from the huge superpower stations, down to the smallest country town station, but in this country we are not graded in the same way. Of our members it may be said that eight represent the larger stations all steam driven, whilst the rest (who constitute the majority) represent small stations, few of whom have an output in excess of half a million units per annum. The larger stations it may be said being steam driven are all developing on more or less standard lines, and most of them have already adopted or are contemplating turbo generators, 3-phase high tension transmission, and where feasible, A.C. low tension distribution.

It is in the smaller stations, however, that future development has not yet reached any approach to standard lines, and I therefore propose to deal with this problem first as being of most importance to our members and Councillor delegates generally.

GOVERNMENT CONTROL.

Our first President in his address remarked upon the absence of any body comparable to the British Board of Trade and the Local Government Board.

There is no doubt to my mind that some more adequate Government supervision is required in the case of Municipal Electricity Undertakings than exists to-day. The Union of South Africa in so far as the control of Municipal Electrical Undertakings is concerned is somewhat lacking in unity, and it is time that some degree of unity was established, for which object our Association would and could give most valuable assistance.

An Electrical Undertaking is essentially a business venture containing highly technical features in its establishment, administration and control, and one would anticipate some more definite method of procedure in connection with the borrowing and expenditure of public moneys on such ventures.

One method when technical advice is sought by Municipalities is to enquire from several Engineers what their fees will be, and to accept the lowest tender.

The scheme having been drafted and estimates prepared, application is made in due course to the Administrator for sanction to the loan. I cannot learn, however, that the public interest is safeguarded by any measures whereby the financial and technical problems involved are subject to local investigation and enquiry by the Government prior to the loan being sanctioned.

The methods adopted by the Local Government Board of Great Britain are considerably to be preferred, as they not only afford protection to the public but to Municipal Engineers as well, as I can vouch from personal experience of 3 L.G.B. enquiries. In the first place the loan periods granted by the L.G.B. are as follows:—

Land, 60 years

Buildings (permanent) 30 years.

Armoured Cables laid direct, 15 years.

Cables laid solid or drawn in, 25 years.

Switchboard and Equipment, 25 years.

Generating Sets (unless small), 20 years.

Transformers, Boosters, Balancers, Converters, Instruments, Motors, Boilers, Steam and Feed Piping 15 years.

Motors for Hire, Lamp Pillars Brackets, etc., for Pubilc Lighting, 10 years.

Accumulators and Batteries, 5 to 7 years.

Arc Lamps, Meters, Indicators, 5 years.

These periods are, in my opinion somewhat on the short side. The procedure in the case of a Municipality requiring to start or extend an Electricity Undertaking, is that in the first case formal application is made for the loan sanction required, giving details of proposed plant, estimates, etc.

The L.G.B. next requires papers to be filled in showing exactly how the previous loans (if any) have been spent, amount outstanding or overspent, etc., and finally a day is fixed for the Local Public Enquiry by the L.G.B. officer (who is also an experienced Engineer) and duly advertised in the Borough, at which any ratepayers are entitled to appear. Woe betide the Engineer who has unduly packed his estimates or the Town Council who have borrowed money for an engine and spent it on a drinking fountain.

The conscientious objectors and obstructionists have also the opportunity of stating their case and raising any points they may deem of importance to the town. Eventually the official sanction to raise the loan in part or whole is obtained, the whole procedure usually taking about three months. There is no doubt to my mind that such a procedure is a great safeguard in the expenditure of public moneys, but of course its success largely depends on the experience and ability of the responsible L.G.B. officials.

MANAGEMENT.

The conduct and management of some of our small stations undoubtedly leave much to be desired. For these short-comings we cannot entirely blame their Engineers. Our Association membership carried with it no hall mark of ability or qualifications, nor is it in any sense a protection Association, yet we know personally that much good has been done by the mutual Association of Engineers and Chairmen at our Annual Conventions.

One of the most important points is the question of salary. Some small towns appear to think that a

salary of £300 per annum is sufficient to obtain the services of a man who must give satisfaction, be he a qualified Mechanical or Electrical Engineer possessed with the tact of a diplomat , all for less than the pre-war wage of a fitter on the mines. Surely £400 per annum is not too large a minimum salary to pay where the success or failure of a scheme whose capital is anything from £20,000 upwards is concerned. Then again it is not in the best interests of our profession that Councils or Committees should be the sole judges of the abilities or qualifications of applicants. How often is the applicant with the most assurance appointed to the exclusion of the quieter and perhaps more capable man, and how many Committees are there who can judge of the technical abilities or qualifications of applicants? They are usually keen and quick judges of character, but for technical qualifications, I venture to say that professional advice and guidance should be sought. Whilst such a course of procedure is not infallible, I feel that the members of our Association are best able to judge qualifications, and are in the closest touch with the profession in this country.

Great Britain during the past year has seen the formation of the representation of Electrical Associations having for their objects the representation of Electrical Engineers and the proper recognition of Electrical Engineering as a profession.

I feel that this address would not be complete unless I gave voice to the communications which have been received from several members of this Association emphasising the difficulties and disabilities under which Municipal Engineers are placed in many of our towns, particularly the small towns. I would like to point out to Municipal Councillors that the Municipal Electrical Engineer being the manager of a business concern must, in order to be successful, be quick in decision and often courageous in enterprise. Recognition of these qualities, however, is not always forthcoming. If his judgement is correct he feels fortunate when his actions are passed over without comment. If he makes a mistake, censure is to be anticipated. How often does the principle of control seem to mean that if a man be given power to make a decision he may make a mistake. Therefore in order to avoid mistakes , avoid decision.

These principles drive the Municipal Official to entrench himself for protection behind the barriers of red tape, and inevitably reduce the efficiency of the municipal machine.

What appears to me to be most needed is a clearer understanding on each side of the outlook and responsibilities of the other. It must be remembered that with the Councillor on the one side, municipal business is one of the many interests, though one having certain responsibilities as far as the public is concerned. Moreover, he has to keep in mind that certain pains and penalities are involved should the statutes and ordinances enveloping a Municipal Council be transgressed. On the other side it needs to be remembered that municipal business is the Municipal Officer's daily avocation and means of livelihood, and that as he is encouraged or discouraged, so may his interest and consequently his efficiency be affected. If our Annual Meetings and discussions lead in any degree to the better understanding of the mutual interests involved, then they are doing a good work.

PRIME MOVERS FOR SMALL STATIONS.

This is one of the questions which looms large in the immediate future. With what types of plants are we going to equip our small stations in the future? Have the Diesel Oil and Suction Gas Plants of the past filled our requirements? Engineers are inclined to be led away by some of the admitted advantages of these types, and do not take into sufficient consideration such items as cost and suitability of fuel, running, maintenance and also general overhead or capital charges, more particular-

ly the latter, which are important items in small towns. One other point is the necessity which often occurs in a small station to run an overload during peak time. Does the average Gas or Diesel Engine in practice give its full rated load?

The above questions I would answer by saying that it is a case of the survival of the fittest, and only those types which have actually withstood the severe work entailed will survive.

If we therefore desire to profit by others' experience we shall consider the experience of the past. In the home stations of to-day there is one type which stands out ahead of all others for medium-sized stations, and that is the high speed forced lubrication enclosed steam engine, whilst the problem of the small station plant is one which is not yet solved or likely to be in Great Britain owing to the expansion of the large power supply undertakings. For South Africa I venture to suggest two types (there may be others), viz.: The Locomobile Superheat Steam Engine and the High Speed Forced Lubrication Gas Engine, built on the lines of the steam prototype, and both capable of using the cheapest classes of fuel such as coal, coke or wood refuse.

Before leaving this subject, I would like to refer to a paper entitled "A Comparison of the Working Costs of the Principal Prime Movers," read by Mr. Oswald Wann of Lincoln before the Institution of Mechanical Engineers in London. His conclusions appear to me to be of particular interest to central station engineers where he states:

"The relative fuel prices do, however, indicate that the scope of the steam engine is less than the oil engine, for in the best practice of the former the price of coal for the larger installations of 250 h.p. and upwards may not exceed on the average one-fifth of the price of fuel oil for an engine of the solid injection type and one-fourth for Diesel engines, and appreciably less for smaller powers. Between these extremes stands the suction gas plant, for which the prices of coal and coke may be respectively twice and one and a half times the price of coal for steam engines of the larger powers. The use of town gas engines is clearly confined to the few cities in which gas can be obtained at about 1/1 per 1,000 cubic feet, and the refuse suction gas installations to industries in which there is an ample supply of suitable waste material.

"It is obvious, therefore, that the commercial superiority of a prime mover is not established by reference to its thermal efficiency, but by the local conditions regulating the price of fuel. From the purely engineering point of view this is not entirely satisfactory in that, however thermally efficient an engine may be, the ultimate test is a commercial one involving the market price of fuel, which must always depend upon the facilities for distribution from the source of supply. In practice, therefore, railway and shipping freights have a marked and direct influence upon the type of engine giving the most favourable performance from the commercial standpoint."

OTHER PLANT.

The rest of the small central station plant hardly calls for individual comment. Switchgear should include reliable output meters and time limit circuit breakers on machines and heavy feeders. I cannot understand why automatic voltage regulators are apparently never found in small stations. It appears to me that they would be of particular value and economy under these conditions where the cost of switchboard attendance is a heavy item.

Batteries are another item of heavy expense, and it is unfortunate that battery companies or agents are unable to supply batteries under maintenance agreements as at home. A battery needs and well repays constant care and attention, but as it is inert and not moving machinery it is, alas, too often left to its own devices until too late, and obvious damage is done. In many stations also one finds batteries installed of far too

small a capacity. In overhead mains and distribution networks attention needs to be paid to the dividing up of the network into sections by disconnecting fuse links at points where the various sections of the town interconnect, but indiscriminate fusing of circuits in all directions only aggravates the trouble it is sought to cure, as failures from faulty fuses or corroded fittings are likely to be more frequent than the electrical faults whose effects it is desired to limit. In this connection it is well to emphasise the desirability of an accurate large scale map being kept at the power station showing at a glance the areas of supply and fused interconnecting points.

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THE OUTLOOK FOR THE FUTURE.

It is when one begins to prophesy as to the future that one begins to tread on thin ice. I well remember listening to an address by Dr. Ferranti some eight or nine years ago, in which he then prophesied the super power stations which only now are coming into existence, and which then seemed to be dreams of a distant future. At home the linking up of the country and the absorption of small stations into the network of the super power stations is actively proceeding. In South Africa, the land of long distances and scanty population, we can look for no such universal network of electrical supply for many years to come; yet much can be done in this direction. In Port Elizabeth we set a particularly bad example of national economy. Within the Municipality we have two independent power stations, one for power and lighting and one for trams, which could be combined with considerable economy if some means of its equitable division could be devised, a by no means very difficult problem to the Engineer (though one involving many legal difficulties). Some 22 miles away at Uitenhage we have two more independent power stations with a supply area between offering considerable possibilities of future development. In the Capetown and Johannesburg areas considerable advance has been made in this direction, and we hear from time to time of possible developments in Natal.

It seems to me that in the future our large power stations will continue the use of large steam turbines with 3-phase generation and transmission and the gradual change over of supply and distribution to A.C. in preference to D.C. It is in our boiler house where further economics are to be sought, and I hope the day is not far distant when we shall be able as a commercial proposition to gas fire our boilers and to recover from our coal its valuable by-products—coke, benzol, tar, sulphate of ammonia and gas. From each 100 tons of good quality coal the weight of by-products mentioned above amounts to approximately 70 tons, leaving 1,100,000 to 1,200,000 cubic feet of gas for boiler firing. Of these by-products all would command a ready sale to-day except coke, and I look to our smaller stations to provide the market for this product for use in their steam and gas plants.

These remarks would not be complete without some reference to the outlook for the sale of our commodity, viz., electricity, on which, after all, all other considerations ultimately depend. In our large towns, especially at the coast, power supplies are developing rapidly. At Port Elizabeth manufacturing developments have proceeded at such a rate that we are at present unable to keep pace with the demands for additional power from all quarters, while lighting supplies are much in the same condition. There is still to be developed a large field of supply in heating and cooking which we are at present hardly able to touch, but which shows signs already of rapid development which it will tax our utmost capabilities to supply fast enough and keep pace with the demand, and the same may be said of most of the large towns.

In the small central stations inland the scope is more restricted, and everything depends on economical generation and cheaper supplies (which I might remark will not be attained by the employment of cheap labour). The power supply is naturally restricted to the small local trades, but there are possibilities (and pitfalls also) in the supply of power for domestic uses which it would need a separate paper to adequately deal with, and I hope that when our next Congress meets we shall have sufficiently advanced towards the goal of cheap generation and distribution to be ready to discuss a paper on the possibilities and economies of domestic power supply in small and large towns; meantime I commend the earnest study of this question to the engineers of our small towns. There is one other possible direction in which small towns can find a most valuable outlet for their surplus power or dayboard supplies and at the same time fill a much-needed public want.

Many, if not most of our small inland towns, are designed, or, more correctly speaking, have grown up in accordance with Euclid's definition of a line, and in some cases also the railway station is some distance from the centre of the town. The need of some public means of locomotion is severely felt, especially in summer with temperatures of over 100 deg. F. in the shade. Electric trams, trackless trams and motor buses are out of the question on the score of heavy first cost or high running costs, or both, but I venture to put forward as the possible solution of the problem the light railway with accumulator traction. This is not only moderate in first cost, but extremely economical in working and maintenance cost, provided a fairly level and straight track of light railway from 2 feet gauge upwards can be provided. Most of our small inland towns are both straight and level to a remarkable degree, and there appears to me to be an opportunity here for many small towns to supply a much-needed public want and at the same time materially benefit their electricity undertaking.

In conclusion, may I express the hope that your visit to Port Elizabeth will be both pleasant and profitable. The programme set before you is a strenuous one, but, as you know, we have always endeavoured to make our Conventions occasions for serious and valuable work and free from possible criticisms as mere pleasure outings. To our retiring President, Mr. John Roberts, our thanks are due for the energy and interest he has displayed in the conduct of affairs, and to our Secretary and Treasurer, Mr. Poole, we are under a deep obligation for the way in which he has carried out his duties during the past year in his dual office.

Finally, I thank you once more for the honour you have done me in electing me your President for the ensuing year, a position which I enter with many feelings of diffidence as a comparative newcomer amongst you; but nevertheless with the determination to do my best with your assistance for the interests of the Association in which I have taken a deep interest from its earliest days.

LUNCHEON AT P.E. CLUB.

The delegates to the Convention of the Association of Municipal Electrical Engineers were entertained by the Mayor (Mr. Henry Forbes) to luncheon at the Port Elizabeth Club, when most of the visitors were present and a number of prominent local citizens also sat down to table.

After the toast of His Majesty the King and His Excellency the Governor-General had been honoured, the Mayor rose to propose "The Association of Municipal Electrical Engineers." The Association, he said, was a young one, this being only their third annual convention.

and Port Elizabeth consequently felt proud that they should have chosen the City as the venue for their meeting. Incidently they had not only done the City an honour in meeting here but they had elected Port Elizabeth's Electrical Engineer as their President. (Applause). "I congratulate him," said Mr. Forbes, "and we can congratulate ourselves that they have chosen Mr. Sankey for so honourable and prominent a position. The Association may be sure that in every way he will be a credit to the office he holds."

Replying, Mr. B. Sankey, the newly elected President of the Association, expressed, on behalf of the delegates, their hearty appreciation of the magnificent welcome they had been accorded, saying that as Port Elizabeth's Electrical Engineer he was particularly proud of the honour that had been done them. He would not take up the time of the gathering by dilating upon the objects of the Association, but he felt that the present meeting of engineers from all over the Union could not but be productive of good for the electricity supplies of the country in general. Three years ago before the Association was formed, every engineer and councillor concerned with the supply of electricity to his town, was in a way an isolated unit, but to-day they were pooling their experiences for the common good. The proceedings of their convention were printed and sent out to all municipalities in the Union with electrical supplies, and it was now proposed to also place the proceedings at the disposal of any towns contemplating an electrical supply.

VISIT TO POWER STATION AND BOOT FACTORY.

In the afternoon a visit was paid to the Power Station, the party being conducted over the works by Mr. Sankey and his staff.

A visit was then made to the boot factory of Messrs. Edworks, Ltd., where the application of electricity for motive purposes was seen to great advantage.

Tuesday, 11th February, 1919.

Members present: The President (Mr. B. Sankey), W. Bellad-Ellis, E. Poole, G. A. Stewart, T. Jagger, T. Millar, H. Brittle, A. S. Munro, R. D. Coulthard, J. Vowles, W. A. Hodge, C. J. Everett, P. H. Newcombe, G. Mercier, J. Mordy Lambe (East London) ,and A. E. Val Davies (Capetown).

Delegates present: Councillors D. A. Thomson, J. Crawford, J. de Jager, E. Fairclough and H. W. Doull.

Visitors present: J. Younger and F. W. Mills.

NEW MEMBER.

On a proposal by Mr. C. J. Everett, seconded by Mr. G. A. Stewart, Mr. A. E. Val Davies (Capetown) was elected a member of the Association.

CONTRIBUTIONS FROM MUNICIPALITIES.

The President announced that at the special meeting of the Council and Councillor Delegates, held that morning to consider in what way this Association could be helpful to Municipalities, it was felt that further discussion during the week should be invited; but in view of the importance of the Association and the good which resulted from its deliberations, it was hoped they might contribute towards our funds.

Moved by Mr. Sankey, seconded by Mr. Millar, that Municipalities be invited to contribute annually a sum to the funds of the Association, and those not so contributing be charged a fee of £2 2s. per delegate.

Adopted.

PRESIDENTIAL ADDRESS (Discussion).

Mr. Val Davies (Capetown) raised the point of dealing with idle plant outside the hours of peak load, he putting forward the suggestion that the American practice of turning out ice might be adopted with advantage.

Some difference of opinion seemed to exist as to whether a municipality ought to compete with private enterprise in this respect. Mr. Stewart (Bloemfontein) said that it was all a matter of cost of current; if current was cheap enough the private consumer would take it. There was nothing to debar municipalities from competing with private concerns and where it would be of more benefit to the community this should be done. As it was, electric light was supplied by municipalities in the ordinary way because private enterprise had failed to take it up, and the same applied to tramways.

Mr. Davies (Capetown) further pointed out the usefulness of an ice-making plant to be run in conjunction with municipal abattoirs. It was possible to purchase plants with a capacity of five tons in twelve hours, quite a lot of ice for a small town, and this would fill up twelve hours of the load curve very well, he said. On the matter of standardisation, he suggested that the Secretary of the Association should communicate with the Committee, which the President had said had the matter in hand, and find out its personnel. It was the only body, he said, that the Government recognised in connection with the question in this country.

The President recapitulated the circumstances leading up to the formation of the joint Standardisation Committee, saying that if they proceeded at their present rate nothing would ever be done, and suggesting that if that Committee did not do the work the Association should do it for them.

Mr. Mills (of the S.A. Railways, a visitor to the Convention) explained that the Standardisation Committee had been divided into three sectional committees, he being the chairman of the one dealing with electrical questions. Each one of these committees had a certain number of subjects to deal with, basing the discussions on the specifications issued by the British Standardisation Committee. The position now was that the main committee was waiting for the reports of the sectional committees, one of which he knew to be very nearly ready, while the others were also nearing completion. It was impossible to deal with the matter very quickly, he said, and great difficulty had been experienced in getting the sectional committees together.

The President expressed his pleasure at the information given by Mr. Mills. The Association had been in the dark, he said, and it was gratifying to know that the work was being carried forward.

On the motion of Mr. Mordy Lambe (East London), seconded by Mr. Davies (Capetown), it was decided to ask the Standardisation Committee to expedite the issue of their report.

Adopted.

Mr. Munro (Pietermaritzburg), in referring to the matter of Government control, explained the procedure in Natal, where, he said, Government control was less than in any of the other Provinces, and it was possible to divert a portion of a loan raised for a specific purpose to some other object. He agreed with the President that there should be more uniformity in regard to the question between the four Provinces.

Mr. Stewart (Bloemfontein) related the method that had been introduced into the Free State, where a board of three was instituted, consisting of the chief law adviser, the M.O.H. for the Province and a technical adviser of the Irrigation Department, for enquiry in regard to the loan. The old order of things, he said, had merely been for the Municipality to get the sanction of the ratepayers, and then application to the Administrator was all that was

further necessary. Dealing with the question of depreciation and loan periods, that was an important matter, and it would be well to have a recognised standard in the country, although the conditions in different parts of the country varied greatly. For instance, on the coast it was necessary to paint poles fairly often, so rapid was their depreciation, but inland a painting once in about 14 years was sufficient. If fixed periods for different areas could be arranged, however, it would be very nice for the Engineer.

Mr. Mordy Lambe (East London) stated that in the Cape Province the provincial authorities passed loans on the estimated physical life of plant. Application for a loan was made to the provincial authorities, who referred an outline of the scheme to a technical adviser, and eventually the period of the loan was fixed on the physical life of the plant.

The President related the manner in which the preliminaries to the raising of a loan were conducted in the Cape Province, detailing in this connection the circumstances of the raising of the loan for the electricity undertaking of Port Elizabeth.

Mr. Munro (Pietermaritzburg) wanted to know why small stations had been specially singled out, as under the heading of "Management" the President had stated in his address that "the conduct and management of some of our small stations undoubtedly leave much to be desired."

The President replied that the point was that if there was a gross mismanagement of a large station everyone got to know of it, but some of the smaller stations were in a hopeless mess and nothing was known about it. If a small station ceased to exist not much comment was caused, but at a big station where high salaries and wages were paid to many men, cessation of work was a serious matter.

Mr. Everett (Johannesburg) said that he was glad to see that the President had brought up the question of salaries for engineers of small stations. If in the appointment of an engineer at a small station the question of salary were to get more attention it would mean that that station would produce better results because the man who was not being paid sufficiently did not put his heart and soul into his work.

Mr. Bellad-Ellis (Queenstown) defended the small stations as representing one, and declared that he did not know of many that were not successful, and the method of conducting them in this province was laid down by the Administrator.

Mr. Davies (Capetown) paid a tribute to the Lungstrom turbine for prime movers for small stations, and described a vessel which had recently put into Table Bay equipped with this class of engine. It was very economical, should be very cheap to run, and would suit a small town just as well as a Diesel engine.

Mr. Everett (Johannesburg) said that his view was that in putting down plant the endeavour should be to use the product of this country—coal, coke, etc.—rather than have to import oil to run engines.

Mr. Vowles (King Williamstown) said that a number of municipalities in England had installed that type of turbine during the war, and the Admiralty placed so much faith in it that they put it in without spare plant to be used in the case of breakdown. Like Mr. Everett, however, he felt that we should use our own products, such as coal, for power-producing in this country. There was no reason why a small station should not run a steam plant, and his opinion was that the Diesel plant would not win out.

Mr. Brittle (Cradock) said that the drawback in regard to a Diesel plant was the water it needed, and in some small towns this was a serious matter.

Mr. Bellad-Ellis (Queenstown) speaking in praise of the Diesel engine, said that he had been instrumental in getting this type installed in Uitenhage and Queenstown. Its great advantage was

that there was no stand-by loss—not all small municipalities could afford to pay wages while steam was being got up. In Queenstown steps were being taken to use tar for running the engine, as nine-tenths of the Diesel engine stations in England were doing.

Mr. Davies (Capetown) related the trouble which had occurred with a tar extractor in connection with a plant which was erected in Johannesburg some years ago.

Mr. Hodge (Winburg, O.F.S.) said that his experience of a small gas plant was that it was very successful indeed. It was reliable and easy to start, but the most serious objection was that one could not get much of an over-load.

Mr. Val Davies (Capetown) pointed out in connection with the President's reference to automatic switchboard regulators for small stations that the cost of these was so great that they could not be included in small schemes. As for batteries, was there one in South Africa receiving the attention it ought to?

Mr. Mills (S.A. Railways) gave his experiences of batteries on trains, saying that it was found that the life of an average battery was between four and five years. The Railway was experimenting with Edison batteries, and found they bore out what was claimed of them. They were very valuable to the Railway because they were more rugged than the ordinary lead plate battery, and would stand bad attention.

Mr. Mordy Lambe (East London), who also adversely criticised batteries, said that he agreed that they were a necessary evil, but only under conditions which precluded running on the plant direct.

The President then replied to points raised in the debate on his address, for the most part amplifying his original statements. Turning to the question of batteries, however, he related how Port Elizabeth had been spending £600 per annum on batteries which should have been giving 1,200 ampere hours, but were not giving more than 600. He threw these out altogether, and instead put down a light steam engine, which was being run at week-ends and times of low loads. The engine installed was compound in preference to triple expansion, and the loads at which it ran were so low that the question of economy did not enter into the matter. If it were thrown out to-morrow it would have paid for itself; it had earned its capital and keep.

INTERVAL FOR LUNCHEON.

A telegram was read from Mr. Wolley-Dod stating that the next Convention would be welcome at Pretoria.

VENUE FOR NEXT CONVENTION

Moved by Mr. Stewart, seconded by Mr. Everett, "That the next annual meeting of the Association be held at Pretoria."

Adopted.

The President expressed the opinion that after the larger towns had been visited, he hoped there would be ways and means found of meeting in the smaller towns, two towns being visited at each Convention if possible. Members should not feel that because they represented a small town they should be excluded from a visit.

ELECTION OF VICE-PRESIDENT.

Resolved: "That Mr. T. C. Wolley-Dod (Pretoria) be elected Vice-President of the Association for the ensuing year."

WIRING RULES AND REGULATIONS.

On behalf of the Committee appointed to consider the question of Wiring Rules and Regulations, Mr. G. A. Stewart presented the following report:—

Owing to the epidemic and other unforeseen causes, your Committee have been unable to complete their labours, but beg to present the work so far completed.

All existing regulations have been carefully scrutinised and gone through by each member and a complete copy prepared on the lines presenting the most suitable conditions, this being again revised. The members were then prepared to meet in conference in Bloemfontein in June last, but owing to different causes your Committee were unable to meet, and since that date it has been impossible to deal with this important matter. It was arranged that all three should take up this work last week, but unfortunately Mr. Wolley-Dod, although on his way here, had to return to Pretoria, having been recalled when he reached Bloemfontein. The other two members have had sittings and continuous deliberation since Friday, the 8th inst., but have been unable to complete their work. In the absence of Mr. Wolley-Dod we particularly desire to point out that the printed draft before the conference prepared by Mr. Wolley-Dod has been used as a basis, to which amendments have been made as per statement presented herewith.

We would respectfully beg to suggest that the conference consider the desirability of allowing a committee to continue this work, and on completion to circulate the final draft to all members for criticism and comment. In carrying out this proposal we are definitely of the opinion that it will be necessary for the committee to sit for several days at some convenient centre.

We are of the opinion that after a final draft has been prepared, legal opinion should be obtained, and the whole work thoroughly scrutinised from a legal point of view, and should be undertaken in all your provinces independently, inasmuch as ordinances appear to the writers to somewhat vary in each province. It is desirable, however, that the finished document be of such a character as may be applicable to all, and that uniformity be achieved prior to submission to the respective administrations. It is therefore suggested that the legal opinions proposed be those of the respective administrations, emphasis being laid on the desirability of uniformity in application on publication.

It will therefore be necessary in order to achieve the above object that the final draft copies be submitted to Municipalities (Councils) so that they may take and adopt the necessary resolutions to support our application.

Proposed by Mr. Munro, seconded by Mr. Bellad-Ellis, that the existing Committee consisting of Messrs. Sankey, Wolley-Dod and Stewart, continue in their work on Wiring Rules and Regulations, and circularise members when completed.

Adopted.

INVITATION TO ELECTRICAL CONTRACTORS.

Before proceeding with the next business, consent was given to the President's suggestion that an invitation be extended to the local electrical contractors to be present at the meeting of the Association at Uitenhage, and to take part in the discussion following a paper on "The Registration of Electrical Contractors."

MOTION ON INCLUSION OF OTHER OFFICIALS.

By JOHN ROBERTS, (Durban).

A motion re "The inclusion of other Municipal" officials in the Association which was to have been moved by Mr. J. Roberts was read by the Secretary in the absence of that gentleman. The motion was: "Our Association has now been in existence since 1915 and has already, I believe, established itself well in the hearts of its members. It has undoubtedly been the means of bringing Municipal Electrical Engineers into closer touch with one another, to their own personal advantage and more importantly to the advantage of the work in which each one is engaged. Our members however are few, and though that in itself is no disadvantage so far as the principal objects of our

Association are concerned, it has occurred to others as well as myself that if the scope of our Association could be extended to embrace other branches of municipal service, the Association itself would be strengthened, and by collaboration with others we should benefit by exchange of views and experiences. I do not press however that we should immediately take steps in the direction indicated, but rather that during the ensuing year each one of our members should carefully consider the question, and sound those in other municipal departments with whom they are brought in contact to get their views, and then at our next Convention to either turn the proposal down, or to carry it out on different lines.

"My proposal is: (1) That the Constitution of the Association be altered to include all engineers in responsible posts in municipal service. (2) That the title of the Association be altered accordingly. (3) That sections of the new Association be formed: (a) Electrical and Mechanical Engineering; (b) Civil Engineering; (c) Sanitary Engineering. (4) That annual conferences of all the sections be held at the same time and place. (5) That the Secretary be asked to obtain the views of members of the present Association not later that six months from date, and thereupon to submit a report on the proposal at the next Conference."

Mr. Munro (Pietermaritzburg), in expressing his approval of the idea of widening the scope of the Association, pointed out that in municipal schemes it very often happened that civil and mechanical engineers had to work in co-operation with electrical engineers. Quite apart from the advantageous financial aspect of the matter, he felt such a step as that contemplated would create a better feeling between the engineers employed by a municipality.

Mr. Bellad-Ellis (Queenstown) thought it would increase the usefulness of the Association if the inclusion were made, he also pointing out how the work of the engineers of a municipality was linked up.

Mr. Mordy Lambe (East London) said that he had felt so strongly on the matter that he had not offered himself as a member of the Association before. He took the broader view of the desirability of such a step as that contemplated, inasmuch as it meant co-operation between engineers—civil, mechanical and electrical—in matters affecting their status, and they would be in a better position to approach their various municipalities, the provincial administrations, or even the Government than small sectional associations.

Mr. Vowles (King Williamstown) said he had been in correspondence with several engineers during the past two years who were standing out of the Association because they thought its scope inadequate.

Mr. Stewart (Bloemfontein), speaking as one who was both city engineer and electrical engineer of his town, thought that before adopting the suggestion members should think it over well. The electrical engineers' section, he thought, would be to some extent swamped if the scope of the Association was widened too much. Then it was also likely that a member attending one sectional meeting would be entitled to and wanting to attend another sectional meeting in progress at the same time, and the amount of work to be done at the Conventions would be so great that a week would not be sufficient.

Mr. Davies (Capetown) and Mr. Mordy Lambe (East London) agreed with Mr. Stewart that the Association should not be precipitate in deciding upon the question, but should think it carefully over first.

The President also agreed that the matter could not be settled at once. His views, he said, had been rather against amalgamation before coming to the meeting, but since hearing the arguments put forward he had changed them somewhat. He had one thing at the back of his mind, and that was the promotion of greater harmony between officials of a municipality. The other side of the question,

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however, was, did not members think that the Association, being a young and virile body, would lose efficiency and speed if a large number of other members were brought within its scope? It was funny, too, that electrical engineers, who might be described as being the "youngest" officials of municipalities, should have formed themselves into an association before town engineers had. Perhaps, after all, the best plan would be for town engineers to form an association of their own, and then co-operate with the electrical engineers at the annual Convention. It would be better, he considered, to work in conjunction than actually to co-operate. Then, again, would there be three presidents (one for each section), or would there be one composite president? There were many questions to be settled, and he thought Mr. Roberts' suggestion that the Secretary obtain the views of members and submit a report at the next Convention a good one.

Resolved: "That the Secretary collect the opinions of members, and that the question come up for further consideration at the next Convention."

REPORT ON ELECTRICAL STATISTICAL RETURNS.

By E. POOLE (Durban).

Mention having been made at our previous Conventions of the need of a universal form of Statistical Returns among our S.A. electrical undertakings, and as the subject is one on which the Government Statistical Department asks for our co-operation, I beg to bring forward my views on the subject with a hope that this Association will put forward such a form as will give universal satisfaction, and one in which there is little chance of the terms being misinterpreted.

I have recently been in correspondence with the Government Statistical Department on the subject, and it was on my suggestion that the industrial census form was slightly modified last year, and since then it is gratifying to note the Government have adopted further of my suggestions and expressed a wish to have the views of this Association on any points which are not clear.

I was in hopes that this Association would have been officially represented at the meeting of the Statistical Council held at Capetown in April last, to which we were invited to send a representative, but time did not permit to make the arrangements.

The Capetown City Electrical Engineer, however, attended, so that the Association was represented unofficially, and the census form as recently issued is the outcome of that meeting. A copy of the electrical details is attached herewith, by which it will be seen that it combines the previous separate and special form relating to electrical undertakings in as far as the classification of units are concerned, and in addition includes costs of generation.

Two other forms of returns are also called for, one issued by the Statistical Department and headed "Municipal Statistics," which has 17 queries, and another form issued by the Department of Mines and Industries, in which further classification of units are asked for, and are as follows:—

CENSUS FORM VII.—COST OF GENERATION.

Heading.	Quantity.	Value of Cost.
Fuel—		
Coal	.....tons (2000).....	.....
Other Fuel	.....	.....
Water	.....galls.	.....
Oil, Waste and Stores.....	.....	.....
Salaries and Wages	.....	.....
Repairs and Maintenance	.....	.....
Other Expenses	.....	.....
Total Cost of Current Generated	.....	.....

VIII.—CURRENT GENERATED.

Description.	Units.
Units sold or used during the year—	
Private Lighting and Domestic Supply (including Heating and Cooking)	.....
Private Motive Power and Industrial Supply (excluding Tramways)	.....
Tramways (Private and Municipal)...	.....
Municipal Supply—	
Lighting of Buildings...	.....
Street Lighting	.....
Motive Power (excluding Tramways)..	.....
Used in Station	.....
Lost in Distribution	.....
Total Units Sold or Used..	.....
Total Units Generated..	.....
Total Value of Units Sold or Used	.....

I hereby certify that the particulars given in Sections I—VIII of this Return are correct to the best of my knowledge, information and belief.

Signature.....

Proprietor, Manager or Secretary.

Date.....

Place.....

1. MUNICIPAL STATISTICS.

8. ELECTRIC LIGHT AND POWER STATIONS.

Name of Municipality .....

Year ended .....

Query.	Reply.
1. Date of Establishment of Undertakings.....	
2. System	
	.....
	.....
3. Total Capital Expenditure ..... £.....	

4. Revenue—
   From Electricity Supply ..... £.....
   From Meter Rents and other Sources... £.....

   Total..... £.....

5. Expenditure—
   Working Costs ..... £.....
   Interest ..... £.....
   Loan Redemption ..... £.....
   Depreciation ..... £.....
   Other ..... £.....

   Total ..... £.....

6. Total Capacity of Plant ..... kw.....
7. Units Generated .....
8. Units Sold or Used—
   Private Lighting .....
   Private Power .....
   Public Lighting .....
   Tramways .....
   Units used in Station .....
   Units lost in Distribution .....
9. Number of Consumers .....
10. Working Cost per Unit Sold—
    Coal or other Fuel .....
    Oil, Waste, Water and Stores .....
    Wages of Workmen .....
    Repairs and Maintenance .....
    Rent, Rates and Taxes .....
    Management, Salaries, Offices and Legal Expenses, Insurance, etc. .....

    Total.....
11. Charges to Consumers—
    Lighting ..... { Min. ..... Max. .....
    Power ..... { Min. ..... Max. .....
12. Total Connections ..... K.W.....
13. Maximum Load on Feeders ..... K.W.....
14. Load Factor—Units sold x 100

    Max. Load x Hours ..... %.....
16. Fuel—
    Nature of Fuel used .....
    Cost per Colonial Ton .....
17. Number of Employees—
    European .....
    Coloured .....
    .....

    Total.....

DEPARTMENT OF MINES AND INDUSTRIES.

OFFICE OF THE GOVERNMENT MINING ENGINEER.

P.O. Box 1132, Johannesburg.

Sir,—I shall be obliged if you will kindly supply me with information regarding the disposal of electric power produced at your station during the year 1917.

This Return is called for under No. 138 of the Mines, Works and Machinery Regulations, 1911, as amended to date.

The following Tables show the information desired:—

A.—DIRECT CURRENT.

Disposal of Total Units generated as per first column.				Industrial Units.		
Total Units Generated at Switchboards.	Units Supplied to Mines.	Units sold to Private Consumers for Lighting, Domestic Purposes or Motive Power.	Units Supplied for Street Lighting, Pumping and other Municipal Services and Purposes.	Units Supplied for Tramway Services. (a)	Units Used in Electric Power Station and Sub-Stations.	Units Lost in Distribution.
No.	No.	No.	No.	No.	No.	No.

(a) Excluding the units appearing under Alternating Current and subsequently transformed into Direct Current; see below.

B.—ALTERNATING CURRENT (b).

Disposal of Total Units generated as per first column.				Industrial Units.		
Total Units Generated at Switchboards.	Units Supplied to Mines.	Units sold to Private Consumers for Lighting, Domestic Purposes or Motive Power.	Units Supplied for Street Lighting, Pumping and other Municipal Services and Purposes.	Units Supplied for Tramway Services. (c)	Units Used in Electric Power Station and Sub-Stations.	Units Lost in Distribution.
No.	No.	No.	No.	No.	No.	No.

(b) State whether single phase, two phase or three phase.

(c) State whether subsequently transformed to Direct Current.

I have the honour to be, Sir,

Your Obedient Servant,

R. H. KOTZE,

Government Mining Engineer.

It would simplify matters very much if all these forms could be combined in one, but for the present such is not their intention, and it was a surprise to me to know that the Statistical Department did not even know that the Mines Department were also calling for statistics.

Dealing with the first form to which I refer, and regarding the classification of units, I give herewith the original and the amended terms with reasons for such amendments:—

ORIGINAL.	AMENDED.	REASONS.
1. Private Lighting.	Private Lighting and Domestic Supply, including Heating and Cooking.	Some Engineers consider heating & cooking as Power.
2. Private Power.	Private Motors and Industrial Supply.	This will then include heating on a large scale, such as welding, etc.
3. Public Lighting.	Municipal Supply— Lighting Buildings. Motive Power, (ex. trams), Street Lighting.	Some Engineers include lighting Municipal Buildings as Public Lighting.
4. Tramways.	Tramways.	
5. Other Public Power		
6. Used in Station.	Used in Station.	
7. Lost in Distribution.	Lost in Distribution.	
8. Total Sold.	Total Sold.	
9. Total Generated.	Total Generated.	

The original item of "Other Public Power" has for some reason not been carried forward in the Amended Form, and here I would suggest that a "Special Supplies" item takes its place so as to provide for such supplies as "Bulk," "Restricted Hour," "Government," etc., which it is often impossible to separate as between Light and Power.

The details of the cost of Generation are quite clear, and are on the lines that later on I suggest we adopt in our Municipal accounts.

Dealing with the second form headed "Municipal Statistics," and taking the various items in their numerical order, item 4 "Revenue" is one where I am of opinion that a little adjustment might be made by adding another class of revenue for "Trading Departments" as well as in item 5 "Expenditure," the same additional items might be added. By "Trading Department" is meant such items as "assisted wiring," "hire of apparatus," etc., which can hardly be correctly assumed as income from electricity supply, neither should such show on the expenditure side in working costs, but may be included in the revenue account, as shown later on.

Item 8, "Units Sold," is already covered by the first form referred to, and such items should be altered accordingly.

Item 10, "Total Working Cost." A portion of this cost is already detailed by the first form referred to in the shape of generating costs, which should be added here together with such headings as are now suggested to show the total, i.e., "Distribution," Street Lighting," "Rents, Rates, etc." and "Management and General."

Item 12, "Total Connections." This seems a rather useless item, and in these days of variety of lamps and apparatus it is almost im-

possible to keep a true record of what the total K.W. are in connections.

Dealing with the third form issued by the Department of Mines and Industries, the further classification of converted units as well as the sub-dividing of single, two, or three phase units is not by any means an easy matter, and in a mixed power station it is almost an impossibility, as often a D.C. machine may be running on the same bus-bar as a converter supplied with A.C., and from this bus-bar both tramways and D.C. motors may be supplied, and it is impracticable to say how many units the converter or the D.C. machine have supplied to the tramways or D.C. motors. For this reason I would suggest that the Mines Department be content with a statement of units sold as is detailed in the first form, and if this form was sub-divided into A.C. and D.C. units it should satisfy both offices.

With these remarks I will close my reference to Government Statistical Returns and deal more with the details as they affect municipal electrical engineers generally, particularly in regard to the forms of financial accounts as now in use, which comprise the following:—

1. Revenue.
2. Net Revenue.
3. Appropriation.
4. Capital.
5. Renewals or Depreciation.
6. Sinking Fund.
7. Balance Sheet.

I will, however, confine myself to the first two forms of accounts as having greater bearing in the working of every electrical undertaking, and my references are in regard to the Town Treasurer's financial statements which are circulated for the information of the public.

While in some towns the Electrical Engineer also issues a yearly report, this often differs in style and detail from that of the Town Treasurer, and as such reports are not universal I will confine myself to the Town Treasurer's Statement.

In this regard it would be a great advantage if all Town Treasurers would adopt such a form as this Association would approve of, and thus remove the necessity for a further analysis by the Electrical Engineer according to his own particular idea, or, as an alternative, if the Town Treasurers prefer to retain their present forms could not the Electrical Engineer make up a statement on the lines that this Association would approve and have it embodied together with his usual Yearly Technical Report in the Town Treasurer's Statement or Mayor's Minutes. Dealing with the expenditure side of the revenue and net revenue accounts, the custom is to sub-divide them under three main headings, i.e.: (1) Generating Costs, (2) Distribution, Management, etc., which with generating costs gives Total Working Costs, and (3) Capital Charges.

The heading Generating Costs is sometimes spoken of as "Costs to Switchboard," and it would perhaps be convenient if a term could be coined to embrace the remaining costs such as, say, "External Costs."

The details under each of these headings is a very contentious matter, and as various Electrical Engineers hold different opinions as to what and how many details there should be, any attempt at comparing the detail costs in one town with those in another is bound to be of little value.

It is hoped that the setting up of such a standardized form of accounts will not be looked upon in the light of inducing rivalry among Electrical Engineers for obtaining records, but rather as a means of

help to one another, so that in future when any comparisons are made it can be felt that such comparisons are on a similar footing throughout, which is not the case at present.

In my paper last year I started off with the idea of going very fully into detail costs of working, but finally only just touched the fringe of it, as I found there were so very many ways of detailing these costs, and many towns were unable to give me any details at all which I felt could be used on a comparative basis. Out of all our South African towns I was only able to produce a chart concerning 13 towns in which there was anything like similarity in detailed costs, and the majority of these were the large towns where the Town Treasurer and Auditors scrutinise finances perhaps more thoroughly than is done in the smaller towns. It is much to be regretted that the smaller towns do not go more fully into detail, as I feel sure if they did the result would be very helpful all round, and an Engineer, by comparing his costs with other towns, would see at a glance in what respects his costs are higher or lower than a similar sized town with a similar plant, and would naturally aim to obtain the same result at least, and there seems no doubt as to the educational value of standard returns.

If only the large towns, who have practically adopted a well set-out form of accounts, would first of all fall into line as to detail, it should be an easy matter for the smaller towns to do likewise.

It may be of interest to tabulate the various headings and details used by some of the towns and to extract from them what would appear as being most applicable for all our towns, but before doing so I will set down the form as approved of by the Board of Trade in England, and this should provide a good basis on which to go.

EXPENDITURE.

A. Generation (coal and charges thereon, oil, waste, water and stores, generating wages, repairs and maintenance detailed, sundry).

B. Distribution (wages, R. and M. mains, R. and M. house services, R. and M. sub-stations).

C. Public Lighting (wages and repairs, lamp renewals).

D. Royalties (Royalties).

E. Rents, Rates and Taxes (rents, rates and taxes).

F. Management (salaries, accountant, treasurer, commissions, establishment charges, stationery).

G. Law and Parliamentary (law expenses).

H. Special Charges (insurance, etc.).

INCOME.

Sale of Current.
Sale under Contract.
By Public Lighting.
Rents of Meters and other apparatus.
Sales and Repairs.
Rents.
Special (detailed).

I have consulted the financial statements of 13 of our South African towns from which I was able to obtain details, which seem a small number out of 37 complete municipal plants in operation. The towns are as follows:—Johannesburg, Durban, Capetown, Pretoria, Port Elizabeth, Pietermaritzburg, Bloemfontein, East London, Krugersdorp, Ladysmith, King Williamstown, Queenstown and Greytown.

From the various Revenue Accounts I find that these towns between them adopt no less than 15 headings of expenditure and 25 classes of income, as is set out herewith:—

EXPENDITURE.	Towns adopted by
Generation	12
Distribution	11
Street Lighting	9
Rents, Rates, Taxes, etc.	5
Management & General	12
R. & M. Bldgs. & Plant	1
Generation and Distribution	1
R. & M. Mains, Meters, etc.	1
House Service Mtce.	1
New Connections & Jobbing	3
Administration	2
Establishment Charges	1
Miscellaneous Charges	2
Special Charges	3
Law and Parliamentary	1

INCOME.	Towns adopted by
Private Consumers—	
Lighting	4
Light and Heat	3
Power and Heat	6
Power and Heating	3
Municipal Lighting	8
Municipal Power	5
Street Lighting	11
Current for Street Lighting	2
R. & M. for Street Lighting	1
Tramways	6
Government	9
Bulk Supply	2
Meter Rents	8
Assisted & Free Wiring	3
Connections & Jobbing	3
Hire Purchase	2
Sales	5
Show Rooms	3
Sundry & Miscellaneous	8
Minimum Charges	2
Outside City	1
Charitable Institutions	1
Current used at Works	2
Tram Track Lighting and Waiting Rooms	1

The expenditure headings are again further divided, as I will refer to further on, but before doing so I feel it would be desirable to first of all decide on which headings can be best applied to South African conditions, and I would suggest the following arrangement:—

EXPENDITURE.	
Generation	
Distribution	
Street Lighting	
Rents, Rates, etc.	
Management & General	
Total Working Cost	£
Trading (detailed)	
Balance to Net Revenue	
	£

INCOME.	
Private—	
Lighting and Domestic Supply	
Motors and Industrial Supply	
Municipal—	
Lighting of Buildings	
Motive Power ex Trams	
Street Lighting	
Tramways	
Special Supplies (detailed)	
Government	
Bulk, etc., etc.	
Total for Current sold	£
Sundry Revenue (detailed)—	
R. & M. Street Lamps	
Meter Rents	
Sales	
Trading (detailed)	
Gross Income	£
Less Bad Debts	
	£

NOTES.—The item "bad debts" I show as a deduction off the gross revenue, though this is by no means the general practice; some show it on the expenditure side, which unfairly increases the working costs, and in another case it is shown in the net revenue account.

The item "Sundry" or "Miscellaneous" in one case actually shows a revenue for fees for registration of births and deaths, which may be a printer's error!

Two towns show the revenue for current and R. and M. for street lighting separately; others do not define it as I suggest in the above form.

On the expenditure side the following headings have been omitted for reasons as follows:—

(1) House Services Maintenance—to be included under "Distribution."

(2) New Connections—assumed as more correctly a charge on "Capital Account."

(3) Repairs and Maintenance—to be divided between "Generation" and "Distribution."

(4) Administration, Departmental Charges, Establishment Charges and Miscellaneous—to be included under "Management and General."

(5) Jobbing—to be included under "Trading."

(6) Law and Parliamentary—to be included under "Rents, Rates, etc."

(7) Special Charges—to be separated out under the selected heading.

Similarly on the income side are the following omissions:—

(1) Connections—to be placed to the credit of "Capital Account."

(2) Jobbing, Show Rooms, Hire Purchase, Assisted and Free Wiring—to be included under "Trading" in Sundry.

(3) Minimum Charges—to be included under "Consumers' Light or Motors."

(4) Outside City, Charitable Institutions—to be included under "Special Supplies."

(5) Current Used at Works—to be included under Municipal "Lighting Buildings," unless the charge for such current is also shown as a detail cost in "Generation."

(6) Tramway Track Lighting—to be included under "Street Lighting"; and Waiting Rooms—to be included under Municipal "Lighting Buildings."

From the preceding Table there seems little chance of confusion as to what is included in "Total Working Cost," and in this connection I would remark that while the home practice is adopted here in a few cases by using the term "Works Cost," this is somewhat confusing for the reason that such a term may be assumed as costs of generation in the works only, whereas it includes generation and distribution, and I do not suggest the use of this term.

Again in "Street Lighting" some engineers do not assume this as a charge against total working cost, at least in as far as "R. and M." are concerned, but as a portion of the lighting is included in the shape of generating costs for current supplied, I do not see why the R. and M. should not also be included. Some look on it as a sort of trading account, but my view is that the street lighting is an obligation on the part of the supply authority, and in most cases the poles, wires, cables, etc., are used for the supply to private consumers as well.

Turning now to the details of the headings suggested, I will take the heading "Generation" first, and I set out herewith the various details as now in use, from which it will be seen there are no less than sixteen ways of classifying them.

GENERATION DETAILS.

	Towns adopted by
Coal	11
Fuel, Oil, Grease	1
Oil and Stores	8
Water	7
Oil, Waste and Water	2
Generating Wages & Salaries	12
R. and M. Buildings	4
R. and M. Plant	6

	Towns adopted by
Use of Pipe Track	1
Station Lighting	1
Sundries	1
Insurance	1
Stores	2
Proportion E.E. Salary	1
New Boiler Foundations	1
R. and M.	5

I would suggest the details to be adopted be as follows:—

Fuel and Charges thereon.
Oil, Waste and Stores.
Water.
Salaries and Wages (generating).
R. and M. Plant
R. and M. Buildings.
Sundry Charges (detailed).

Certain details have been omitted as follows:—

(1) Use of Pipe Track. Without further knowledge of this detail I would suggest it being included under "Water" or "Sundry Charges."

(2) Station Lighting. Suggest this be omitted unless an income is also shown on account of station current, otherwise to be included in sundry charges.

(3) Insurance. As only one town shows this detail under Generation, I assume the others must include it under "Rents, etc.", or "Management," which I suggest be adopted in this case.

(4) Proportion E.E. Salary. This is shown in one small station, and it is in the smaller stations where it may be correct to do so, especially if the E.E. takes a shift; otherwise I suggest it be included under "Management."

(5) New Boiler Foundations. This item could be included under R. and M. Plant, but it may be more correct to have this paid out of either "Renewals" or "Capital Account."

DISTRIBUTION DETAILS AS AT PRESENT EXIST.

	Towns adopted by
R. and M.—	
O.H.H..	2
U.G.H..	2
S.S.	3
Meters & Time Switches	1
Mains & House Services	1
Meters	1
Mains, Meters & House Services..	1
Meter Maintenance and Inspection..	
Wages Meter Reading. ..	
Salaries Inspectors and Meter Readers.	1
New Meters..	1
Repairs & Mpintenance..	1
Maintenance Material. ..	1
R. and M.—	
Switchboard & Motors.	1
Transformers.	1
New H.T. Cable..	1
Insurance..	1

	Towns adopted by
Salaries and Wages	5
Salaries and Wages and Locomotion	1
Prop. B.E.E. and District Engineer's Salary	1
Salary Clerk..	1
Wages Mains Supt.	1
Active Service Pay	1
Materials and Sundries ..	1
Stores	1
Mtce. Street Lamps	1
Tools..	1
Repairs Motor Car	1
Rents	1
Altering Mains to Tram Pole..	1
Miscellaneous	3
Transportation Expenses	1
Office Alterations..	1

From the above it will be seen that there are less than thirty-three various ways of classifying the details of distribution, and I would suggest the number be reduced as is shown below:—

R. and M.	O.H.M.	Wages Material Sundries
"	U.G.M.	Wages Material Sundries
"	S.S.	Wages Material Sundries
"	House Services	Wages Material Sundries

The reasons for omitting certain details are as follows:—

(1) Tools, Stores, Materials and Sundries, Salaries and Wages, Miscellaneous, Mains, Meters and House Services, Maintenance material, Repairs and Maintenance. To be sub-divided between the various details under "Distribution."

(2) R. and M. Meters and Time Switches, Meter Maintenance and Inspection, Wages Meter Reading, Salaries Inspectors and Meter Readers. To be included under "House Services."

(3) New Meters, New H.T. Cable. To be included as a charge against "Capital Account."

(4) R. and M. Switchboard and Motors, Transformers, may be included under "Sub-Stations."

(5) Salaries and Wages and Locomotion. The last item to be included under "Management."

(6) Proportion B.E.E. and Distribution Engineer's Salary, Salary Clerk, Wages Mains Superintendent, Repairs Motor Car, Active Service Pay, Office Alterations. To be included under "Management."

(7) Insurance, Rents. To be included under "Rents, Rates, etc."

(8) Maintenance Street Lamps. To be included under "Street Lighting."

"STREET LIGHTING" DETAILS AS AT PRESENT.

	Towns adopted by		Towns adopted by
R. & M. Wages	5	Lamp Globes, etc.	1
R. & M. Material	4	Town Hall Lighting	1
R. & M.	3	Police & Market Lighting	1
Renewals of Lamps, materials	1	Motor Cycle	1
Renewals of Lamps, wages	1		

NOTES.—No labour is shown in one town. One town charges only £17 for Maintenance on some 300 lamps.

I would suggest the following details be used:—

R. & M. { Wages / Material / Sundries

The reasons for omitting certain details are as follows:—

(1) Town Hall and Police and Market Lighting to be included under House Services in "Distribution."

(2) Motor cycle to be included in "Sundries" under Street Lighting.

"RENTS, RATES, &c.", AS AT PRESENT EXIST.

	Towns adopted by		Towns adopted by
Rents	4	Gala Season	1
Rates	3	Audit Department	2
Fees and Licenses	1	Estates Department	1
Insurances	1	Stables	1
Rents, Rates and Taxes	1	Stores	1
Rents S/S	1	Telephone	1
Rents, Poles and Way Leaves	1	Town Clerk	1
Rent, Power Station	2	Town Treasurer	1
Insurance Rates & Taxes	1	Locomotion Allowance	1
Rents and Rates—Mains S/s & Way Leaves	1	Sundries	1
Superannuation	1	Tram Fares	1

NOTE.—Some towns omit any rents in which, perhaps, they are very fortunate unless the item "Sundries" covers such item.

I would suggest we use only the following details:—

Rents.
Rates.
Fees and Licences.
Insurances.
Legal.

The reasons for omitting certain details are as follows:—

(1) Gala Season. One town uses this apparently unfair charge, and since it is included I would suggest it goes under "Management."

(2) Audit Estates and all other Departmental Charges, together with Superannuation, Tram Fares and Locomotion. To be also included under "Management."

"MANAGEMENT AND GENERAL" DETAILS AS AT PRESENT EXIST.

	Towns adopted by
Salaries B.E.E. and Office Staff	6
Printing, Stationery, Advertising	7
Locomotion	4
Estab. or Admin. Charges	10
Departmental Charges	3
Pensions	1
Law Charges and Claims	5
B.E.E. Salary sub-divided	1
Rent	2
Telephones, Insurance, Sundries	3
Office Expenses	1
Wages Meter Readers & Clerks	3
B.E.E. Salary	1

	Towns adopted by
Military Pay	2
War Bonus	1
Miscellaneous	6
Insurance	4
Telephones & Telegrams	1
R. & M. Buildings, general	1
Bad Debts	1
Wages	1
Stores	1
New Offices	1
Tram Tickets	1
Commission	1
Office Furniture	1

I would suggest the following details be adopted:—

Salaries B.E.E. and Staff.
Printing, Stationery and Advertising.
Locomotion and Travelling Expenses.
Establishment Charges.
Departmental Charges (detailed).
Superannuation and Pensions.
War Bonus and Military Pay.
Miscellaneous.

The reasons for omitting certain details are as follows:—

(1) Insurance, Law Charges, Rent, Telephones and Insurance. To be included under "Rents, Rates, etc."

(2) Telephones and Telegrams, Office Expenses, Office Furniture. To be included in "Establishment Charges."

(3) R. and M. Buildings, Stores, New Offices. Insufficient data to suggest how these details should be allocated.

(4) B.E.E. Salary sub-divided or allocated to other sub-heads. Similar remarks would apply here as in "Generation" (No. 4 omission).

(5) Wages Meter Readers and Clerks. To be sub-divided, the first item to House Services under "Distribution" and the latter item to Salaries under "Management."

(6) Bad Debts. To be included as a deduction off the "Gross Income."

(7) Tram Tickets. To be included under "Locomotion."

(8) Commission. To be included under "Miscellaneous."

In the foregoing analysis I have refrained from referring to any particular town, but I would here remark that I have not taken Durban's form of accounts as a model in all respects, because it may be observed with the Durban accounts I have omitted the heading "House Services" and transferred it to a detail of "Distribution," while the item

"Gala Season" and "Departmental Charges" I have transferred from "Rents, Rates, etc." to "Management." With two exceptions in the towns I have referred to, the Town Treasurers' statements of accounts are on similar styles to home towns, the larger towns going more fully into detail; but if all the towns, especially the smaller ones, would adopt some general form it would be of much value to the Electrical Engineer. It may not be out of place to summarise a few of the points which call for particular attention, such as the proportioning of the B.E.E. salary in the smaller towns as between "Generation," etc., and again when he has charge of a combined tramway and electric light undertaking, or further, when he happens to be Town Engineer also. The suggestion of the term "External Cost" and the omission of the term "Works Cost," the inclusion of "Trading Account" and the allocation of "Bad Debts," the consideration of whether "New Connections" should be charged out of "Revenue" or "Capital Account," and the question of how to place the revenue and expenditure in connection with "Street Lighting."

In connection with the opening of a Trading Account I would suggest the following details be used:—

Assisted Wiring.
Hire of Apparatus.
Sales of Plant, etc.
Show Rooms.
Testing.
Jobbing.

NET REVENUE ACCOUNT OR CAPITAL CHARGES.

While this account is one more, perhaps, for the financial expert, it is naturally of great interest to the B.E.E., though perhaps not so much as is the "Working Costs," which reflects a good deal on his management.

The following are the details as in use under this heading:—

	Towns adopted by
Interest	13
Renewals & Depreciation	11
Sink. Fund & Redemption	12
Loan Expenses	2
Agency Charges	1
Legal and other	1
Relief of Rates	1

	Towns adopted by
War Bonus	1
Arrear Interest	1
Mains Extension	1
Active Service Pay	1
Gravitation Water Scheme	1
Bad Debts	1

I would suggest the following details as being sufficient:—

Interest.
Renewals or Depreciation.
Sinking Fund or Redemption.
Sundry (detailed).

The reasons for omitting certain details are as follows:—

(1) Loan Expenses, Agency Charges, Arrear Interest. To be included under "Sundry."

(2) Legal. To be included under "Rents, Rates, etc."

(3) Relief of Rates, Gravitation Water Scheme, Mains Extension. To be included under "Appropriation" Account.

(4) War Bonus, Active Service Pay. To be included under "Management."

(5) Bad Debts. To be included as a deduction off the "Gross Income."

White the question of Capital Charges cannot be got away from the question of Depreciation or Renewals is one in which the B.E.E. opinion should figure very prominently, but it seems somewhat difficult to arrive at any conclusion as to the rate of allowance. One town places an amount to a "Reserve Fund," another town does not show any allowances, another allows 4 per cent. all round, others again allow varying percentages according to the class of plant, and one town again shows a payment into Sinking Fund and Capital Account from its Depreciation Fund, and so on.

APPROPRIATION ACCOUNT.

Four towns show this form of account in which the following items are included:—

	Towns adopted by
To Capital Expenditure	3
„ Relief of Rates	4
„ Special Sinking Fund	1
„ Special Renewals Fund	1
„ Special Expenditure (Alterations, etc.) ..	1

In conclusion, I would like to add that though certain suggestions have been made throughout this report, they have been made more with the idea of drawing out further and improved suggestions, and even if I have only merely whetted the appetite of B.E.E.'s on the advisability of some standard form of returns I shall feel my efforts have not been in vain, and I trust the subject will be followed up by others more competent to deal with the matter, not only in regard to forms of accounts, but also in technical detail returns and records generally.

DISCUSSION ON STATISTICAL RETURNS.

The President said that it would be impossible to discuss the paper in detail. It seemed to him, though, that two of the forms mentioned in the paper might be modified; the first was that issued by the Statistical Office and that sent out by the Government Mining Engineer. In the form issued by the Department of Mines and Industries too much was made of separating alternating and direct current—an impossible proposition as far as Port Elizabeth was concerned, where there were alternating and direct current districts close together.

Mr. Val Davies (Capetown) said that the census form was not quite so bad, but that issued by the Department of Mines and Industries was absolutely hopeless.

Mr. Stewart (Bloemfontein) complimented the Secretary upon the trouble he had taken in preparing his paper. He also criticised the forms on the point of ambiguity, and saw no reason why the number of headings should be limited if better results could be obtained by increasing them.

Mr. Mordy Lambe (East London), after stating that he had been instrumental in getting his Municipality to model its accounts after the manner laid down in the Cape Electrical Ordinance, said that the main objects of the authorities wanting returns were for record and purposes of comparison. This being so, it was strange that there were so many forms issued; one only should be enough for the purpose. In regard to the item "Generation," he held the opinion that current generated was the current actually turned out of the station, and he did not see why the current used in the power station should be included in the units generated.

Mr. Bellad-Ellis (Queenstown) endorsed Mr. Mordy Lambe's views, and stated that the practice in his town was to put meters in a separate account instead of against capital account, as it could not be estimated what number would be used.

Owing, however, to the many points raised in the report, it was felt that time did not permit to

make any recommendations at present, but that a committee should be appointed to consider the matter.

Moved by Mr. Stewart, seconded by the President: "That a committee consisting of Messrs. Roberts, Munro, Lambe, Davies and Poole be appointed to consider the matter of Statistics and draw up desirable forms for submission to the Government."

Adopted.

Wednesday, 12th February, 1919.

On Wednesday a visit was paid to the Bulk River Waterworks of the Port Elizabeth Municipality, the members and delegates journeying there by motor cars kindly placed at their disposal by the local engineers and friends. A journey of about 30 miles brought the party to the Waterworks, where they were received and welcomed in the name of the Port Elizabeth Municipality by Mr. Kelly, the City Engineer.

After luncheon had been partaken of and the party having viewed the works, a start was made back to Port Elizabeth, passing through Uitenhage on the way, where a brief halt was made.

Thursday, 13th February, 1919.

In response to an invitation from the Mayor of Uitenhage (Mr. R. F. Hurndall), the members and delegates entrained for that town at 9 a.m., where they arrived shortly after 10 a.m., and were received at the Town Hall by the Mayor, who in a few well chosen words welcomed the party to that town, and made the suggestion that it would be of great assistance to small municipalities if the Association had a standing committee to which it would be possible for towns in the position of Uitenhage —which would shortly have to select an Electrical Engineer from a number of applicants—to refer for advice and guidance on the matter.

In reply to the welcome, after expressing the cordial thanks of the Association for the reception they had received, the President (Mr. B. Sankey) said that the question to which Mr. Hurndall had referred had already been touched upon by the Association, and it was likely that it would receive further consideration.

Members present: The President (B. Sankey), A. S. Munro, H. Brittle, J. Vowles, A. E. Val Davies, P. GALLEY SIXTEEN
H. Newcombe, T. Millar, T. Jagger, J. Mordy Lambe, G. Mercier, G. A. Stewart, C. J. Everett, R. D. Coulthard, W. Bellad-Ellis, E. Poole and W. A. Hodge.

Delegates present: Councillors D. A. Thomson, J. Crawford, E. Fairclough, H. W. Doull, J. De Jager and W. J. Wright.

Visitors: J. Younger, F. W. Mills, W. S. Jones, Geo. Richman, and C. E. Mackintosh.

The first business of the meeting was the reading of a paper on

THE REGISTRATION OF ELECTRICAL WIRING CONTRACTORS

By G. H. Swingler (Capetown).

In the absence of the author of this paper, the President called on Mr. A. E. Val Davies (Capetown) to read the paper, which was as follows:—

At the last Convention I undertook to prepare a short paper on the above subject for reading at the 1919 meeting. Since then, however, matters have progressed, and a great deal has been done, not only in South Africa, but in other parts of the world, to hasten legislation in the direction of the registration and licensing of not only contracting firms, but of their respective employees.

The need of such legislation is obvious. At the present time any person may call himself an electrical contractor, or electrician, or electrical engineer, as he may think fit, and may tender for installation work, and should he be incompetent the unfortunate would-be consumer who has paid for the work has no redress except an action at civil law to recover whatever expenses may be necessary to put the installation into a condition satisfactory to the supply authorities.

Furthermore, it is well known that numbers of wiremen have been known to engage in private work in their spare time, and this practice lends itself to the theft and misappropriation of material belonging to the employer. The absence of regulations is also responsible for the illicit extension of installations in dwelling houses, stores and factories, since, according to the by-laws of most municipalities, it is necessary to make application for any extension whatsoever which may be required, and numerous cases are on record where the owner of a building has called in a wireman to extend further his installation without having gone through the formality of applying for permission.

There are other cases in which consumers have been known to purchase the necessary material and engage a wireman to execute the work, and this is sometimes varied by engaging a wireman to carry out the job for a round sum, the wireman finding both labour and material. The work done under these circumstances is almost invariably unsatisfactory, and the proposed legislation would, therefore, not only make this work illegal, but would protect the consumer, who, perhaps, may be ignorant of the regulations relating to electrical installations; and it would also protect the legitimate contractors and would ensure that all electrical work would be open to fair trade competition, and the temptation which at present exists for employees to misappropriate wiring material would be largely diminished.

Taking the foregoing statements as some reasons for the need for legislation, the next question is: What form should the necessary by-laws take? I have endeavoured to ascertain by correspondence to what extent legislation has been introduced in other parts of the world.

Through the courtesy of the Statistical Secretary of the National Electric Light Association of America, I am informed that there is no national legislation on the subject in the United States, all such regulations being confined to states or localities. He was unable to inform me how far this practice was in effect in the various States, but he understood on good authority that such legislation existed in the State of Massachusetts.

From information received from the Electrical Contractors' Association (Incorporated) of Great Britain, it would appear that this body has approached the Board of Trade through a special committee appointed to report on electrical matters after the war, and they have recommended that legislation should be effected to cover the following points:—

"That it shall be unlawful (under penalty) for any person, firm or corporation to engage in, or conduct, the business of electrical installation contracting either as a master electrician or contracting electrician unless he or they are registered by the registration authority."

"That all applicants for registration should have such qualifications and pass such examinations and pay such fees as the registration authority may determine."

"Provided, however, that any person, firm or corporation that has been engaged in said business for at least five years next prior to the date of the application shall not be required to pass said examination, but shall present proof of fitness."

"That all certificates of registration shall be renewed annually, and shall be revocable at any time."

"That the registration authority should consist of representatives nominated by the Board of Trade, the Institution of Electrical Engineers, Supply Authorities, Fire Offices and by the Electrical Contractors' Association."

The Electrical Contractors' Association have apparently not yet been officially informed of the views of the Board of Trade on the matter.

Concurrently, it would appear that the Corporation of Manchester have taken steps to introduce municipal by-lays to restrict the activities of unqualified contractors, and I am informed by Mr. S. L. Pearce, Chief Engineer and Manager of the Manchester Corporation Electricity Works, that the scheme has been very beneficial, as, prior to its introduction, it was the practice of wiremen to do installation work on their own account whilst still in the employ of a contractor, and he further states that several firms, after due warning, have been removed from the list of licensed contractors for non-compliance with the requirements of the by-laws.

I should imagine that in the event of the Board of Trade introducing any general legislation, any existing municipal by-laws which might overlap the work of the Board of Trade would naturally lapse in favour of what would become a national matter.

As far as India is concerned, I find that there is no general registration of contractors, but it would appear that some of the local supply companies keep a register of approved electrical contractors, whom they recommend to the general public.

Australia, as usual, is well to the fore, and I have received from the Electrical Traders' and Contractors' Association of Victoria a report of the Committee of the Electrical Association of Australia (Victorian Branch), the Electrical Traders and Contractors' Association of Victoria and the Federated Electrical Trades Union of Australia (Victorian Section), appointed to consider the question of licensing of wiremen. The date of the report is October, 1917, and the report would appear to cover completely the points which I have mentioned in this paper. They recommend that authority should be obtained for the enforcing of the regulations by means of a clause in the Electrical Light and Power Act of that country. I am informed that the report has been placed before the Government, and will in all probability form the basis of any legislation which may be enacted.

In South Africa it has been left to Johannesburg to introduce and legalise a complete scheme to attain the desired end. The by-laws have been published in the "Provincial Gazette" of the 13th February, 1918, and deal with the licensing of electricians, the constitution of the Examining Board, the subjects upon which the examination is held, together with the form of application for a licence.

The syllabus of the examination includes from

(a) "Pressures of supply and systems employed in municipal area," down to

(f) "General methods of wiring and the knowledge of balancing of large installations," etc., including in

(c) "Definition of and calculations involving the use of the various electrical units," etc.

The examination, though of quite an elementary character, is sufficient to indicate whether the aspirant for a licence has had sufficient training to justify his registration, and I am in agreement with this principle, since it would be a manifest hardship to make the examination so stiff as to embarrass many wiremen who are otherwise quite competent, although perforce compelled to work by rule of thumb methods to a large extent.

The constitution of the Examining Board is:—

1. The General Manager of the Council's Electric Supply Department or his authorised representative.

2. The Professor of Electrotechnics of the School of Mines.

3. A representative of the Electrical Section of the Master Builders' Association.

4. A representative of the electricians (?) electrical contractors.

5. A representative of the Council of the South African Institute of Electrical Engineers.

The three last-mentioned examiners to be elected annually.

The penalty for the contravention of the by-laws has been fixed at a maximum of £5 for the first offence and a fine not exceeding £50 for every subsequent offence.

Provision has been made for the employment of apprentices, who need not necessarily hold a licence, provided the apprentice is working under the supervision of a licensed electrician engaged upon the same work.

Authority is given to the Council to cancel any licence granted to any electrician if the Examining Board shall be satisfied that he has performed any electrical work in an unworkmanlike or negligent manner, etc. The culprit, however, whose licence it is proposed to cancel, is to be given an opportunity of appearing before the Examining Board concerned and being heard in his own defence.

From the information which I have been able to gather, and which is at the disposal of the members of the Municipal Electrical Engineers' Association, I have come to the conclusion that the Association cannot do better than to adopt, in toto, the regulations and by-laws of the Johannesburg Municipal Council, except for such slight alterations as may be necessary to suit the requirements of the individual Provinces; and I should recommend that a resolution be passed at the Convention authorising the Association to approach the four Provincial Governments in order that the regulations finally decided upon may be made law in each of the four Provinces, as I feel that the increasing importance of the electrical industry in South Africa justifies the drafting of an Act of Parliament, so that the same regulations would apply in every town in any of the Provinces.

There will, of course, be certain difficulties. In the larger centres, such as Capetown, Bloemfontein, Johannesburg, Durban, Pretoria and Port Elizabeth, it would not be difficult to have a permanent examining body appointed, but in the case of the smaller towns and villages some arrangement would have to be made whereby the applicant for a licence should write his examination under the supervision of some local authority, in order to ensure that neither favour nor personal prejudice would contribute in any way to the applicant's success or failure to secure the licence.

Breaches of the by-laws in the smaller towns could, in the first case, be dealt with by the local supply authority, and in the event of any dissatisfaction on the part of the contractor being dealt with, he would, in the first case, be able to obtain satisfaction under the common law, or alternatively he would, as a matter of course, be able to decide to be heard in his own defence by the examining body. This latter alternative would, of course, present many difficulties, as it would mean either that the examining body would have to proceed to some remote dorp in the Karroo to hear the case, or alternatively that the parties concerned, or their representatives, would necessarily be compelled to travel to the locality in which the nearest governing body was situated. It will, therefore, be necessary for these points to be thrashed out before any recommendation is made to the Provincial Council, and I suggest that a small sub-committee be formed to secure legal advice on the matter, so as to enable them to draw up a scheme which would be applicable to each of the four Provinces.

DISCUSSION.

Mr. Davies added on his own behalf that if a plumbers' examination scheme was in force in some parts in this country it should not be a very difficult thing to institute an examination for electricians. In Johannesburg plumbers had to pass an examination, and this was a stiffer one than the examination of electricians would ever be. There was one point which needed going into closely, and that was while the Union Government and the Public Works Department did a lot of work which was ultimately connected up to the mains of supply companies, the official attitude, he understood, was that they were above reproach, and any regulations should not apply to them. He thought this a very one-sided view for the Government to adopt, as however careful one might be in the choice of a man, bad work was almost bound to happen somewhere, and it could best be prevented by making the examination scheme apply to every electrician in the country.

Mr. Bellad-Ellis (Queenstown), in supporting the proposal suggested in the paper, brought forward the position of up-country towns where the climate led to rapid disintegration of material that was not up to the proper standard. Unless contractors had to employ good men and materials and municipalities were in a position to insist upon this being done, he said the unfortunate consumer would be in a bad way. He was sure that any dependable contractor would hail with delight any form of registration because it meant that the public would know that he only employed the best men and used the best material. If legislation could be brought about giving municipal authorities more power to condemn bad materials, and if the Association could ensure the registration of contractors, he felt that it (the Association) would have been of good service to the country.

Mr. Stewart (Bloemfontein) criticised the suggestion made in the paper that the Examining Board, as a Board, should have the authority to cancel any licence. He thought this would be unduly interfering with the liberty of the subject, and considered the better plan would be to have the withdrawal of licences dealt with in the same manner as taximen's and drivers' licences were cancelled—by a magistrate after a certain number of convictions. He also saw no difficulty in regard to the examination of applicants for licences if the particulars of the apprentice's experience were clearly set forth on a form and he was set a written examination. He held the opinion, too, that the examination should not be too easy, and did not see why electricians and wiremen should take second place to plumbers in this respect.

Councillor Doull (Pietermaritzburg) expressed his agreement with the registration of electrical contractors, but doubted the method of procedure. In Natal the difficulty would be, he said, that after the by-laws had been framed and the matter referred to the Provincial Council, the subject would stick. If one waited for the Provincial Council to pass them they would never be passed. He added that there were only two contracting firms in Pietermaritzburg, and although there had been no complaints of the work done, the great objection had been the fact that they employed poorly paid coloured labour.

Mr. Everett (Johannesburg) suggested a point which might lead to confusion if it was decided to licence electricians. Registration of a man, he said, should not mean that he was entitled to a certificate, but that he was given a licence or put on a register of electricians. If a man was given a certificate it meant that he might give himself out as a certificated electrical engineer, which he would not be.

Mr. Mills (S.A. Railways) held views that were against requiring electricians to be licensed. He pointed out that fitters and other artisans did not have to hold a licence before securing employment, and that if such were made necessary in connection with elec-

tricians it would be in the nature of an admission that the trade of the latter was in some way inferior and that the standard of workmanship, as things were, did not compare too favourably with that of other trades. The rule in the railway, he said, was only to take on a new man if he could show that he had served his apprenticeship like any other class of artisan, and he thought that if this method were adopted in regard to all electricians it would be all that was necessary.

Mr. Davies (Capetown) said that the intention was not to interfere in the Government's domestic affairs, but if any regulations were brought in he felt they should apply to Government men who did electrical work in public buildings—such as the Public Works Department—which would ultimately be connected up to a corporation's supply. The people at which the proposed legislation was aimed were those who went in for electrical contracting as a speculation and did work cheaply with coloured and even Kafir labour. He agreed that having served an apprenticeship should be a qualification, but was afraid if this principle were accepted now twenty years must elapse before the thing was in order. An examination scheme was in force in Johannesburg, and it should be borne in mind that whatever provincial legislation they had to wait for there was nothing to prevent any municipality taking a like step in regard to local affairs.

The Secretary supported the idea expounded in the paper, saying that if it was considered necessary that plumbers should be registered it was still more necessary that electricians should. One could easily see a leak in a pipe, but the first indication that there was anything wrong with electric wires might be the burning down of the building in which they were fitted.

Mr. Everett (Johannesburg) said that he was not connected with the Board of Examination in Johannesburg, and he suggested that that Association form a committee to collaborate with that Board in the matter. He also held the view that the registration of plumbers was not as essential as the licensing of electricians for the safety of the general public and for the benefit of the Association and contractors.

Mr. Mordy Lambe (East London) said that the aim of the suppliers of current was to ensure the best class of work being done, and to attain this end the best way was to have a rigid system of inspection; this could be obtained by such regulations as were being considered. Another point was that if the system of inspection were carried out and a uniform standard insisted upon the undesirable type of contractor would soon be driven out of business altogether. No matter, however, what regulations were framed, if the spirit was not there, the desired results would not be attained. The thing should start by their insisting on a uniform standard and having rigid inspections. Only first-class work should be accepted by the supply authorities, and inspections should be made as the work was proceeding. In regard to the matter of apprentices, he knew a firm that had no competent workmen, and it was training apprentices; the result would be that in five years these apprentices would go out as qualified men.

The President, before putting any resolution to the meeting, invited electrical contractors who were present to give their views on the subject.

Mr. Richman expressed the conviction that if a written examination were set for electrical workmen only about 5 per cent. of them would pass, but in a practical examination probably 90 per cent. of them would prove themselves competent workmen. By all means, however, he said, see that the contractor was duly qualified and register him, but leave him to look after and be responsible for the work done by his men. Registration and examination of workmen would also be likely to lead to further labour troubles and a demand for higher wages. In Port Elizabeth would-be consumers wanted to have their houses wired now at

£1 per point. This work was previously done at 18s. with material costing 16s. per point. Could you expect good workmanship at that price? asked the speaker. If good and reliable workmen were wanted, let a start be made with the apprentice. Corporations could employ a qualified man to take apprentices at a small fee.

Mr. Mackintosh, another contractor, also gave it as his opinion that many good, practical workmen would fail in a written examination. On the other hand, men who had studied the practical side of the matter would pass with flying colours, but would not be capable of doing a decent practical job. Legitimate contractors, he thought, would welcome registration, but the registration of their electricians should be left to their discretion. Before the Association gave the suggestion their full approval, he thought that contractors should be given due notice so that they could put their case forward.

Mr. Everett (Johannesburg), for the information of the contractors present, said that it had been found in Johannesburg that the percentage of passes in the examination there was very high, something like 5 per cent. only failing.

The President, at some length, gave his views on the matter. He said that he felt that Mr. Richman had touched the core of the whole position when he laid emphasis on the commercial side of the question; the concern of both the supply authorities and contractors was to get consumers. He agreed with Mr. Richman that the time was not yet ripe in this country for the registration of individual workmen in the electrical trade. But he thought the licensing of electrical contractors was of the utmost importance. "We, as supply authorities," he said, "need it, and contractors also need it for protection against unauthorised wiring."

Arising out of the discussion a motion was brought forward, being proposed by Mr. Mordy Lambe, seconded by Mr. Val Davies: "That the Association approves of the principle of the registration of wiring contractors, and that the following Committee be appointed to go into the question of legislation to cover the points set out in the paper: Messrs. Swingler, Dobson, Jagger, Stewart, and the President (ex officio)."

Adopted.

A further motion bearing on the paper was also brought forward, and proposed by Mr. Crawford, seconded by Mr. Bellad-Ellis: "That this Association considers that the time has arrived for municipalities of suitable centres to take into consideration the establishment of technical schools (Government aided) where not already in existence."

Adopted.

PAPERS FOR NEXT CONVENTION.

The following papers were promised for submission to next year's Convention:—

1. "Electric Cooking and Heating," B. Sankey (Port Elizabeth).

2. "Gas Plants," G. Mercier (Bethel).

3. J. Mordy Lambe (East London).

4. A. E. Val Davies (Capetown).

This concluded the business meeting of the day, after which the members and delegates were entertained to lunch by the Mayor of Uitenhage.

VISITS TO POWER STATION & RAILWAY WORKSHOPS.

After lunch the party were shown over the Uitenhage Municipal Power Station by Mr. Molesworth, the Electrical Engineer; and from there were conducted over the South African Railway Workshops by Mr. Duncan, the Mechanical Engineer, after which they entrained again for Port Elizabeth, arriving there about 6 p.m.

"THE CONVENTION" AT DINNER.

The Annual Dinner of the Municipal Electrical Engineers' Association was held at St. George's Club, when about forty gentlemen sat down, under the chairmanship of the President, Mr. B. Sankey.

After the loyal toasts had been honoured, the Mayor of Bloemfontein, Mr. D. A. Thomson, rose to propose "The Port Eliabeth Municipality." In submitting the toast he added to it "prosperity to the trade of this town." They must all have noticed the necessity of Port Elizabeth not only holding but increasing its trade. He went on to speak of the treatment the Association had received, of what they had seen and what they had been told, and said they must all have realised that Port Elizabeth had a great future. No doubt, like other industrial centres, this city would have its ups and downs, but with such a body of men as he had met he felt sure it would cope with everything.

The Mayor, in responding to the toast, said he appreciated very much the happy terms in which Mr. Thomson had proposed it. Mr. Forbes spoke of the pleasure it gave to the city to entertain such Associations. Nothing but good could come from such meetings, as he had remarked before, and they could become a great power—in fact, they had already become such a power in their short existence.

"Our Guests," the next toast, was proposed by the President. They, as an Association, he said, should be particularly proud that they had with them that evening the chief citizens of Port Elizabeth.

"The Association of Municipal Electrical Engineers" was proposed by Mr. F. W. Mills, chief electrician of the South African Railways. The railways, he said, was undoubtedly their largest purchaser of electric power, since they bought power from practically all the principal towns of the Union and many of the smaller centres.

This Association was a very important body, and although this was only their third year of life he felt sure it would continue to increase in power and importance. It had to increase, and their aim should be to make it do so to the greatest extent, since the electricity industry was one of the greatest aids to progress. In this connection he referred to one of the chief planks of Mr. Lloyd George's programme—the creation of an Electrical Board to organise and control the electricity supply of the country. It seemed to him that an Association like that was bound to be an important factor towards that end in South Africa.

From the point of view of the railways, they probably all knew that they were considering the electrification of the railways. Big schemes were under consideration, and he felt sure that when the report of the consulting engineers was received there would be little difficulty in persuading Parliament that at any rate some sections of the railways should be electrically driven. The great thing was centralisation. The contrary was ridiculous.

Mr. Mills continued by thanking the Association for the pleasure their Convention had given him. The Railway, at a rough estimate, bought about ten million units of electricity from the towns of the Union, and therefore in the future they must have a great say in the lay-out of schemes. They must be treated as something different from the man who simply wired his house. As business men they would all see his point. He did not wish to single out any municipality, but the service the Railway had had was so good that there was little to complain about. For this he thanked the Electrical Engineers themselves—members of that Association, who often kept up the supply under appalling conditions.

Mr. Mills explained that with the exception of East London every railway workshop in the Union was electrically supplied, power being bought from the Municipality. The railway were content to buy their power in this way, and with the exception of Pretoria and Uitenhage they had practically no big

plants of their own. He looked forward to the day when Port Elizabeth would be prepared to supply the Uitenhage shops with electricity at a rate which he, as an honest adjudicator, could recommend to the General Manager.

The response was made by Mr. A. S. Munro, City Electrical Engineer of Maritzburg. Having expressed thanks to the Mayor, officials and residents of the city, on behalf of the Association, he went on to say that they had very little knowledge of the powers of nature, pointing to the realisation of many of the wildest dreams of fiction in the last few years.

The object of the Association was to bring about a unity of practice. The present diversity of plants and working was appalling. This the Association was endeavouring to obviate, which would be to the good not only of themselves as engineers but of everybody. As engineers they had a very high opinion of Port Elizabeth's engineer. He was one of the stalwarts of the Association, and had been since its inception. He coupled the name of Mr. Sankey with those of Colonel Dobson and Mr. J. Roberts, the two former Presidents, as the "vim" of the Association, and he looked forward to great progress under his presidency.

Friday, 14th February, 1919.

Members present: The President (B. Sankey), A. S. Munro, H. Brittle, J. Mordy Lambe, A. E. Val Davies, G. Mercier, C. J. Everett, T. Millar, T. Jagger, P. H. Newcombe, G. A. Stewart, W. A. Hodge, J. Vowles, W. Bellad-Ellis, E. Poole, and R. D. Coulthard.

Delegates present: Councillors D. A. Thomson, E. Fairclough, J. Crawford, J. de Jager, W. I. Wright and H. W. Doull.

Visitors present: F. W. Mills and J. Younger.

In accordance with the resolution passed at Monday's meeting, the Council had met and drafted the following, which they recommended for acceptance:—

ALTERATION TO RULES AND CONSTITUTION.

(1) Honorary Members shall be distinguished persons who are or have been intimately connected with municipal electrical undertakings, and whom the Association especially desires to honour for exceptionally important services in connection therewith.

(2) Associate Members. Any member resigning under Rule 4 shall be entitled to apply for election as an Associate Member. Associate Members shall not be entitled to vote on matters affecting the conduct and management of the Association, nor to hold office, but otherwise shall be accorded the privileges of ordinary membership. The subscription shall be £1 1s.

Moved by Mr. Lambe, seconded by Mr. Everett, that the alterations to Rules as submitted be accepted.

Adopted.

(3) Form of Application. Applications for membership must be made on the prescribed form.

Moved by Mr. Mercier, seconded by Mr. Millar, that the form to be used shall follow the lines as in the form in use by the I.M.E.A. as submitted.

Adopted.

ADVISORY BOARD TO MUNICIPALITIES.

Discussion was resumed on the question mentioned earlier in the week of affording assistance to municipalities contemplating electric installations in an advisory capacity. The discussion followed the lines of the previous debate on the subject, the opponents of the

idea basing their arguments on the contention that the Association would be ousting legitimate private consulting engineers from their livelihood, while the Association would have to hold itself at any rate morally responsible for the advice given by any of its members whose advice might be followed. The counter argument was that there were not any engineers in the country who would concern themselves with the smaller towns, who consequently found it very difficult to know how to take the first steps towards getting an electrical supply.

After considerable discussion, it was moved by Mr. Stewart, seconded by Mr. Everett: "That the question of this Association selecting a Board to act in an advisory capacity to any municipality remain in abeyance until the next Convention."

Adopted.

LOCAL MANUFACTURE FROM SOUTH AFRICAN PRODUCTS.

By C. J. EVERETT (Johannesburg).

This all important question, which has more or less been a bone of contention for some considerable time, can now be regarded as having been taken up seriously.

The Government, who has realised the necessity of encouraging local production, has a special department known as the Mines and Industries Department, and with the inception of that valuable paper the "South African Journal of Industries," engineers and the public have had placed before them the enormous possibilities of this country, whose vast resources of wealth have been lying dormant for centuries and only known to so few ,due possibly to the fact that preference has been given to the "get-rich-quick" policy by practically ignoring everything else except gold and diamonds.

The difficulties experienced in obtaining essential supplies during the four and a half years of war have brought home to engineers in South Africa the great necessity of developing the resources of the country, and in this connection the forming of the Scientific and Technical Advisory Committee is a step in the right direction, for in that body we have men whose highest ambition is to see South Africa one of the greatest producing countries in the world. The size of the country, coupled with its great range in altitude from sea level to 6,000 feet above sea level gives every facility so far as climate is concerned, this varying from the moist heat of the low veld to the dry cold of the high veld. It should be possible to find a locality somewhere in South Africa to meet practically any climatic requirement, or, in the words of the old saying, "A place for everything and everything in its right place."

When speaking of South Africa we must not overlook our sister colony Rhodesia, which in forming part of this vast continent is not to be despised. The people of that colony have not been idle, for a committee was formed in 1915 known as the Rhodesia Munition and Research Committee, under the able chairmanship of J. G. McDonald, Esq., O.B.E. Some of you may have had the pleasure and satisfaction of reading their report of 1918, which gives room for much study and thought. It is hoped in the near future that we may see, if not an amalgamation, at least an understanding between this body and our own Scientific and Technical Advisory Committee, with also the possibility of extending their powers to include the new Protectorates of South-West and East Africa, and other committees co-operated with the two mentioned. With these ideas attained one can see South Africa practically independent and self-supporting, which unfortunately is not the case to-day.

Local productions have had and are still experiencing a great uphill fight, mainly due to the preju-

diced ideas of consumers which have to be overcome. The producers themselves are likewise to blame, inasmuch as they are inclined to give preference to cheapness instead of quality. Quality should be the first consideration; prices will adjust themselves as soon as successful organisation is attained. Modern machinery has made such vast strides that very few things are impossible. At the end of 1917 the Union had a total number of large and small industries amounting to 5,301, which are made up as shown in the Provincial Gazette as follows:—

Treatment of raw materials, the product of agricultural and pastoral pursuits, excluding tanning:

Cape of Good Hope	63
Natal..	15
Transvaal	10
O.F.S..	2
Total..	90

Processes in stone, clay, earthenware and glass:

Cape	103
Natal	34
Transvaal	97
O.F.S.	30
Total	264

Working in wood:

Cape	115
Natal	52
Transvaal	50
O.F.S.	9
Total..	226

Metal, engineering, machinery and cutlery works:

Cape	221
Natal	89
Transvaal..	288
O.F.S.	53
Total	651

Preparation, treatment and preserving of food, drinks, condiments and tobacco:

Cape	798
Natal..	221
Transvaal	407
O.F.S.	144
Total..	1570

Production of clothing (excluding boots and shoes), textile fabrics and similar articles:

Cape	319
Natal..	63
Transvaal	180
O.F.S..	30
Total..	592

Books, paper, printing and engraving:

Cape	138
Natal..	46
Transvaal	85
O.F.S..	14
Total..	283

Vehicles (mechanically propelled and otherwise), fittings for and parts of vehicles:

Cape	225
Natal..	67
Transvaal	147
O.F.S..	40
Total..	479

Ship and boat-building and repairing:

Cape	7
Natal..	4
Total..	11

Furniture, bedding and upholstery:

Cape	85
Natal..	24
Transvaal	50
O.F.S..	2
Total..	161

Drugs, chemicals (including fertilisers and by-products), paints, varnishes and allied products:

Cape	37
Natal..	21
Transvaal	31
O.F.S..	1
Total..	90

Surgical, dental and other scientific instruments and apparatus:

Cape	4
Natal..	5
Transvaal	8
Total..	17

Jewellery, timepieces and plated ware:	
Cape	17
Natal	9
Transvaal	19
O.F.S.	1
Total	46
Heat, light and power:	
Cape	47
Natal	29
Transvaal	53
O.F.S.	15
Total	144
Leather and leatherware:	
Cape	124
Natal	28
Transvaal	42
O.F.S.	8
Total	202
Building and contracting:	
Cape	217
Natal	54
Transvaal	143
O.F.S.	26
Total	440
Other industries:	
Cape	20
Natal	7
Transvaal	8
Total	35
Totals:	
Cape	2,540
Natal	768
Transvaal	1,618
O.F.S.	375
Aggregate	5,301

In the previous census the aggregates were 1,970, 597, 1,157 and 274 respectively, or total 3,998.

The amount of capital returned as invested in the Provinces is as follows: Cape, total capital invested, £15,692,405; value of land and buildings, £3,144,273; value of plant, machinery and tools, £3,524,133. Natal, £11,184,378, £2,692,005 and £3,882,550 respectively. Transvaal, £20,979,269, £4,167,058 and £9,002,250. O.F.S., £2,101,703, £725,818 and £836,343. Union agregates, capital invested, £49,957,755; land and buildings, £10,729,154; machinery, plant and tools, £17,532,296. The previous census aggregates were, respectively, £46,532,750, £8,760,212, and £15,777,237.

The persons employed are as follows:—

Whites: Cape, 17,571 males, 2,892 females; Natal, 6,582 and 713; Transvaal, 14,806 and 1,339; O.F.S., 1,833 and 192; Union, 40,792 males, 5,136 females.

Asiatics: Cape, 233 males, 1 female; Natal, 10,573 and 1,249; Transvaal, 166 and 6; O.F.S., 1 male; Union, 10,973 males, 1,256 females.

Natives: Cape, 10,243 males, 417 females; Natal, 10,244 and 114; Transvaal, 23,085 and 72; O.F.S., 2,629 and 9; Union, 46,201 males, 612 females.

Other coloured: Cape, 12,866 males, 4,137 females; Natal, 972 and 85; Transvaal, 302 and 13; O.F.S., 78 males; Union, 14,238 males, 4,235 females.

All Races: Cape, 40,933 males, 7,447 females; Natal, 28,371 and 2,161; Transvaal, 38,359 and 1,430; O.F.S., 4,541 and 201; Union, 112,204 males, 11,239 females.

Total for four Provinces: Cape, 48,380; Natal, 30,552; Transvaal, 39,789; O.F.S., 4,742; Union, 123,443. The previous census gave Provincial totals as 37,839, 26,200, 32,871, and 4,260, and aggregate as 101,178.

SALARIES AND WAGES.

The salaries and wages paid were as follows:—

Cape: White persons, £2,350,317; Coloured, £1,145,963; total, £3,496,280. Natal: £1,389,339, £598,837 and £1,988,176 respectively. Transvaal: £3,667,636, £832,940 and £4,500,576. O.F.S.: £321,080, £82,199, and £403,279. Union: Whites, £7,728,372; Coloured, £2,659,939; total, £10,388,311. The previous aggregates were £6,739,966, £2,172,891, and £8,912,857.

Cost of Fuel, Light and Power: Cape, £314,023; Natal, £233,237; Transvaal, £858,562; O.F.S.,

£50,975; Union, £1,456,797. Previous total, £1,246,379.

Value of materials used, articles produced and work done: Cape, material used £10,784,373, articles produced and work done £17,861,598; value added to materials in process of manufacture or treatment £7,077,225; Natal, £6,890,807, £11,284,394, & £4,393,587; Transvaal, £8,715,231, £17,638,888, and £8,923,657; O.F.S., £1,595,323, £2,491,152, and £895,829; Union, £27,985,734, £49,276,030, and £21,290,298. The previous census showed £22,315,587, £40,334,882, and £18,019,295.

These figures have been considerably augmented during the year 1918, and when the returns are complete they will make some interesting reading. In glancing down the list one will notice with satisfaction that at the head of the list is the production of food followed very closely by the manufacture of clothing, which all will agree are the paramount necessities of every country.

The shortage of shipping due to the war has, so far as local industries are concerned, proved a blessing in disguise. The following list shows the decreases in imports of foodstuffs alone:

Wheat	83,178	tons
Wheatflour	58,000	,,
Meats	5,860	,,
Condensed Milk	4,931	,,
Malt	3,274	,,
Bacon and Ham	2,882	,,
Cheese	2,536	,,
Confectionery	2,435	,,
Butter	1,933	,,
Biscuits & Cakes	1,102	,,

The fact that there were decreases in imports does not mean that there were corresponding decreases in consumption of the various articles, but proves that our local energies having been put to the test have satisfactorily met the contingency, which goes to show what can be done when a country has its back to the wall.

The great war is on the eve of termination, but there is still the possibility of having to fight a war against shortage of material. Great efforts have been put forth during the period of the war, but still greater efforts are called for. The enormous demand for materials of every description in the devastated portion of Europe, which has been created by the destruction during the war, opens a big market. The facts as mentioned above should allay the fears of the would-be producer, in that so far as one can see at the present time, the chances of flooding the market for some considerable time are very remote, therefore South Africa should endeavour to assist in supplying the deficiency by increasing the productions.

The publication of books such as "The Trade and Commerce of Port Elizabeth" which has been published by the Council of this town should go a long way towards assisting the promoters of South African industries. This Association can regard it with some degree of pride, inasmuch as the name of our worthy President for the ensuing year appears as one of the Joint Editors. The contents of the publication form a volume of useful information, and I feel sure great benefits would accrue to other Councils and to the public in general if such methods of advertising were copied by other municipal bodies.

ELECTRICAL SUPPLIES.

To deal now with this particular industry, the development of which is or should be the ambition of every member of the South African Association of Municipal Electrical Engineers and similar institutions: the question of local manufacture of electrical supplies has been discussed for some considerable time with apparently no great results to date.

The constituent materials—copper, cotton, mica, cast iron, soft iron, steel, rubber, asbestos, hard wood, insulators, lead, tin, and various sources of supply of paper for cables, and the necessary oils and compounds for impregnating purposes—are all obtainable in South Africa. Take each item separately; copper ore is found in

given satisfactory results, and plates 5ft. 0in. by 4ft. 0in. by ¼in. have been produced cheaper than imported plates during the war period. The quantity of such plates used on the mines is quite considerable, and it is to be hoped that as a result of further experiments it will be possible to compete with the imported article in normal times. Apparently no actual manufacture of drawn or extended wire from South African copper has yet been undertaken in this country, but imported copper wire has been successfully rolled into many sizes and sections with excellent results. It is estimated that 63,949 tons of copper matter and concentrates were produced at the Messina Copper Mine alone during the last six months of 1917, the value of which amounted to £2,265,568, whilst 22,842 tons valued at £1,137,384 were exported from the Union.

COTTON.

Cotton is cultivated in South Africa, but when one considers that only about 5,000 acres are under cultivation producing approximately 175 tons per annum, it appears as though it were in its experimental stages. Some of you may be aware that Great Britain spends annually £500,000,000 on cotton and its manufacture, finding employment for about 10,000,000 people. The total output of cotton in the world for 1917 was 27,764,000 bales, which is equivalent to 6,941,000 tons. A commencement in cotton spinning is being made at Amatikulu, Lower Tugela, Natal, and the success of this venture will open up great possibilities, not only for the electrical trade, but also for many other trades. A many places in this country, but excepting at the mines of Katanga in the Belgian Congo it has not been turned into a commercial commodity. Some experiments have, however, been carried out at the Falcon Mine in Rhodesia for the production of copper plates under the Elmore process, which is the only process that has so far considerable amount of money has been spent in India and other parts of the world on cotton spinning, but unfortunately success has not been attained in producing the finer qualities. Apparently there is only one place in Great Britain, the Bolton district, where high-class cotton can be spun, which rather indicates that certain special climatic conditions are necessary. It is to be hoped that these special conditions exist on the Lower Tugela so that the Amatikulu venture may be a complete success. The cotton covering of wire is being done in Johannesburg by at least two firms, and with the possibility of a local supply of cotton such plants might merit extensions.

MICA.

Mica is to be found in many parts of South Africa. The South African mica has excellent insulating properties and some of the best samples in the world are found here. In developing the mica preference has apparently been given to hard, clear qualities; others, such as are required especially for commutators, have been more or less ignored. The writer has been called upon during the war period to produce certain commutators for traction motors for the Johannesburg Municipal Tramways. Experiments were carried out with practically every known class of mica in the country. Eventually, after almost giving up hope of obtaining a sufficiently soft mica, a suitable grade was found to come from the Leijdsdorp district, and this is at present being used with excellent results. The so-called "amber" mica which is largely used in the imported commutators, comes from Siberia and India; it is of a silky nature, non-transparent, quite soft and easily worn down by the action of the brushes. The modern practice of undercutting the mica on some commutators has made it possible to use harder qualities, although the Leijdsdorp mica above referred to is used in commutators in which the mica is not undercut. Other uses to which local mica can be applied have been demonstrated by

Mrs. Broad Roberts, who manufactures in Johannesburg, micanite in all its forms—lamp covers, lamp shades, fire screens, motor goggles, etc., etc.

CAST IRON, STEEL, SOFT IRON.

The two first are now being manufactured or produced by the Union Steel Corporation, Vereeniging, and the Pretoria Iron Mines, with good results. The introduction into this country of electric furnaces similar to those installed in England and America during the war, should materially assist in producing these essential commodities, not only for electrical work but also for mining and agricultural machinery. With these electric furnaces it will also be possible to produce from local ore soft iron suitable for rolling into laminations for electrical machinery, as well as nickel and chrome steel of all qualities.

RUBBER.

The manufacture of rubber from its raw state has made considerable progress under the efforts of the South African Rubber Manufacturing Company, who obtain their rubber from the Congo and other parts of Africa. The whole process of manufacture from the raw rubber to the completed article is carried out in their workshops at Johannesburg. At present the whole of the rubber requirements of the South African Railways are made by them as are also a lot of hard vulcanised rubber or ebonite parts for the Telephone Department. The progress of this firm will be watched very carefully as they contemplate, when their new works are completed at the Howick Falls, making anything in the rubber line that there is a market for.

ASBESTOS.

There is an abundance of asbestos in the country, and the various uses to which it can be applied are only beginning to dawn on the people of this country. Recent figures are not available, but about 5,000 tons of asbestos in the raw state are exported from South Africa annually.

HARD WOODS.

Hard wood, such as teak, so extensively used for the mounting of switches, etc., in house wiring, is very plentiful in South Africa, and the locally made article has practically replaced the imported article.

INSULATORS.

Insulators made by the Vereeniging Potteries Company are being used in considerable quantities on the mines on a working pressure of 2,000 volts, but so far a high-class porcelain insulator has not yet been made in South Africa although in my opinion the clay necessary for such production exists in this country waiting to be developed. In the meantime, glass insulators could be used to advantage in many cases. Some municipal engineers are to-day using glass insulators for overhead lines.

LEAD AND TIN.

Lead and tin have for some considerable time been refined in South Africa and made up into the usual sticks of solder for use by wiremen, etc., but their uses in this branch are small compared with the requirements in other fields of manufacture not yet developed in this country, such as in the making of tin plate, lead pipes, lead covered cables, etc.

PAPER.

Should South Africa ever progress sufficiently to make its own copper cables the paper for the insulating thereof could be made in abundance, as all the necessary raw material is available. Some firms have already started to manufacture paper, and when the grasses, fibres and timber of the two additional colonies—West and East Africa—are available, raw material for the making of paper, millboard and cardboard, etc., will be plentiful. I note from that excellent publication "The Trade and

Commerce of Port Elizabeth" already referred to that with the possible exception of certain chemicals, all necessary materials are on the spot for the manufacture of paper, and with all the other inducements offered, all one has to do is to find the money and then settle right here in Port Elizabeth making paper, but beware of making paper money.

During the latter stages of the war the shortage of certain articles, not only in the electrical but in the mechanical line, was keenly felt, and the local manufacture of such articles or substitutes had to be faced. The following articles have been made in the Workshops of the Electric Supply and Tramways Department of the Johannesburg Municipality during the period mentioned, but unfortunately the writer cannot say that they are made entirely from South African products, although such should be possible:

Tramway Motor Commutators.

Steel and Monal Metal Turbine Blades.

Carbon Brushes.

D.C. Automatic Switches, 5,000 amperes.

Knife Switches, 5,000 amperes.

Automatic Oil Switches, 150 amperes 10,000 volts.

Time Switches (Street Lighting).

Section Insulators (Tramway System).

For the information of those interested, the Tramway Motor Commutators were manufactured in the following manner: The Department was fortunate at the time when commutators were required in having a fair stock of 4in. x ¼in. copper bar which had been stored from the dismantling of the old switchboard connected with the well-known gas engines. These bars were split and cut up into pieces 4½in. x ¼in. x 2in., heated in a muffle furnace and then passed through rolls in a die plate which gives them the necessary taper. The ends were then punched out in a die to form the angular recess for the reception of the mica cones, after which the bars were assembled in a gig without the mica segment for the purpose of rough turning over the top and ends. This being finished, the segments were slotted in a milling machine for the armature wire connections. The mica segments were gauged with a micrometer and cut by a die in a similar manner to the copper segments. The final assembling and turning was done on the same gig as used for the rough turning. About thirty commutators were made in this manner, and the results of about fifteen months' running indicate that the locally made commutators are quite equal to the imported articles.

Turbine rotor blades are being produced from scrap boiler tubes discarded from Babcock & Wilcox' water tube boilers. The good portions of the discarded tubes are cut up into the length of blade required, then split in half and heated up in a muffle furnace for the purpose of annealing and removing the scale. The section of tube is then clamped on a gig fixed to a lathe saddle. A cutter having been made to the shape required is fixed on a mandrel between the face plate and the back centre, after which the tube is traversed automatically under the cutter and thus the rough blade is produced. This is heated again and pressed in a gig or former to the correct curvature, after which the ends are punched for fixing into the rotor and for the reception of the shrouding. After a final annealing the blades are ready for use. A question might arise as to why these blades are not being made on a milling machine instead of a lathe, and in reply thereto it may be stated that no milling machine was available and none could be purchased at the time when this work was started, otherwise the process would be simplified.

Fixed or diaphragm blades are being made in a similar manner to the rotor blades from Monel metal sheets imported from Canada. A few samples of both types of blades are here for inspection by the members or visitors.

Carbon brushes of all sizes and types are being made in very considerable quantities. Actual manufacture of the carbon itself has not been undertaken as an ample supply of carbon slabs was purchased soon after the outbreak of the war, these being of a quality giving good all-round results, although not being made specially for the purpose. For the cutting up of the slabs, a small electrically driven vertical saw using ordinary hacksaw blades has been specially made, allowing the carbon to be cut either radially in the case of turbine gland rings or straight for brushes. A grinder, also motor driven, has been specially made and arranged with a gauge so that the brushes are perfectly square and uniform after passing through this machine. The tails from worn-out brushes are used over again where possible, but when this source of supply is exhausted an excellent substitute can be made out of scrap "workshop" or "cab-tyre" flex.

The copper plating of the tops of the brushes is done in the usual manner, too well known to need any explanation.

Two D.C. S.P. Automatic Switches have been made of a capacity of 5,000 amperes at 600 volts, the type being a replica of the existing ones on the Council's switchboard, all parts being proportionately increased in size and strength. At the same time certain modifications or improvements have been made as a result of experience on the smaller switches.

One D.P. Knife Switch of 5,000 ampere capacity has also been made with modifications so that the switch can be worked as a whole or in three parts, so arranged that whichever way it is operated it acts as an ordinary D.P. switch; that is, both circuits are made or broken at the same time. The reason for this method of construction will be obvious to anyone who has ever tried to open or close an ordinary type of D.P. knife switch of such large capacity.

A photograph showing the complete panel is available for the inspection of those interested.

Twelve S.P. 10,000 volt, 150 ampere Automatic Oil Switches have also been made to the existing pattern, together with all the necessary remote mechanical control gear, trip gears, cellwork, instrument desks, etc., the only parts of the complete high tension switchgear not being locally produced being the instruments and the porcelain insulators.

As before stated, the above described locally manufactured articles were all taken in hand due to difficulties brought about by the war, but there appears to the writer to be no reason why such articles should not continue to be manufactured in South Africa, together with numerous other articles for the engineering trades. It is not suggested that we are in a position to start on the manufacture of large prime movers at present, but it should be possible to produce small motors and transformers with their necessary switchgear to meet the requirements of local industries. In the production of these articles the question of standardisation, which is receiving consideration from a very strong committee formed in the country, is very important. The hopeless method of manufacturing in the past any two or more types of machines or fittings which, whilst having similar characteristics as regards efficiency and capacity, are dissimilar in every other respect, must give way to properly standardised articles particularly so far as leading dimensions are concerned.

A further very important matter from the point of view of local manufacture of electrical supplies is the great necessity for standardisation in the nature of electric supply from the various power stations in the country.

The value of electrical machinery, cables and fittings imported into South Africa during the year 1913-14 was £965,717.

Dealing now with some of those industries to which we must look for a market for our electrical commodities when made: The recent development in design and applic-

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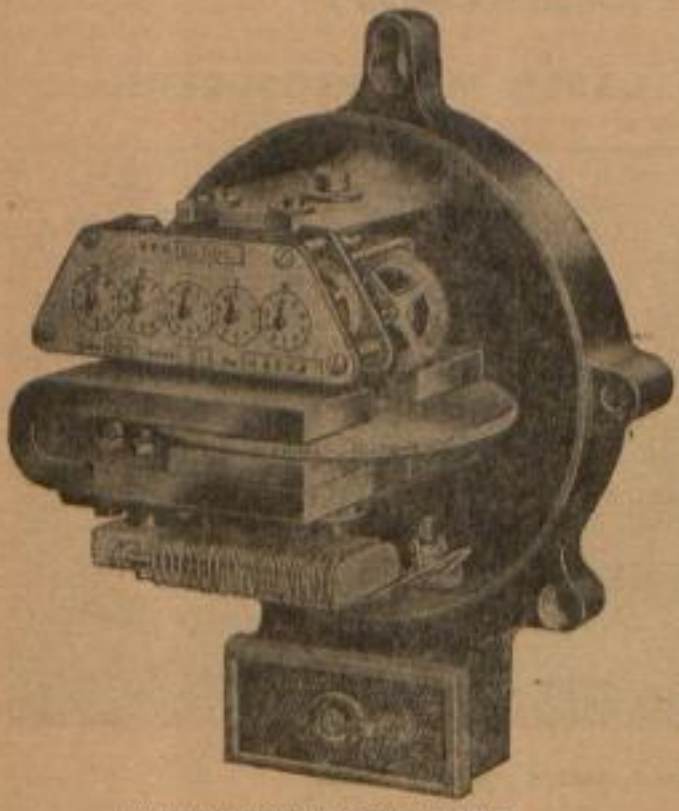

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JOHANNESBURG.

Telegrams: "THREEPHASE."

ation of the electric furnace has opened up huge possibilities for local industries, and has made a commercial success of that which four years ago was considered a commercial impossibility. The rapidity with which the development of the electrolytic and electrothermic processes are advancing is such that one cannot predict the ultimate results that will be obtained. The existing dormant resources of this country will offer great possibilities for the uses of the electric furnace, which, being a large consumer of electrical energy, should be of particular interest to all electrical societies and particularly to those of its members who are responsible for the efficiency of electric power supply plants. The various types of electric furnaces in service to-day are as follows:—

Heroult, 3 phase; Gronwall, single and 3 phase; Hinnerfelt, 3 phase; Nathusuis, single and 3 phase; Greaves Etchells, 3 phase; Booth Hall, 2 phase 3 wire; Ludlum, 2 phase; Moore, 3 phase; Induction, single phase; Resistance, single phase; Von Baur, 2 phase 3 wire.

Some of the advantages claimed for the electric steel furnace are as follows:—

1. Better quality metal than that produced from crucible steel at a lower cost.

2. Adaptability. Tool steel to-day and casting steel to-morrow.

3. Varying cycle successive heats to-day, one or no heats to-morrow.

4. A simple arrangement of standardised equipment requiring comparatively small floor space.

5. Comparative low installation and maintenance costs.

6. Simple effective control equipment.

7. Ease and certainty of control with resultant high-class product.

8. No danger from explosion or shocks.

9. Reducing atmosphere of furnace enables charge to be held almost indefinitely without change in analysis.

10. Equipment can no longer be considered experimental.

11. From the power company's standpoint a balanced 3-phase high power factor load with load superior to motor loads.

12. From the consumer's standpoint the aditional power consumption enables him to purchase power at lower rates for his whole plant.

The Induction type of electric furnace is used chiefly in the manufacture of steel and has been successfully installed in Johannesburg for the manufacture of shoes and dies for mine stamps. Considering that the whole plant was manufactured and erected at a time when material was practically unobtainable, it speaks highly for the energy and determination of those concerned. Large quantities of these worn-out shoes and dies have been melted down and re-cast, and as the cost and life compares favourably with the imported articles, consideration as to the possibilities of producing the whole requirements of the Union is amply justifiable.

The Carbon Electrode type of furnace is used in the manufacture and production of Steel, Ferro Alloys, Calcium Carbide, Sodium, Magnesium, Aluminium, Carborundum, Carbon Bisulphide, and in the fixation of Atmospheric Nitrogen.

This type of furnace is in use in Johannesburg and district and also at the Falcon Mine, Rhodesia for the manufacture of calcium carbide. Considerable trouble was first experienced in the manufacture of the carbon electrodes in sizes large enough for the furnaces installed, i.e., 9in. diameter. Success has at last been achieved and the regular production of both carbon and calcium is assured, although the quantity capable of being produced with the present furnaces is very small compared with the total requirements of the Union, which are between 5,000 and 6,000 tons annually; there is plenty of room for a further development in the manufacture of so valuable an article. The results of experiments

carried out at the Falcon Mine, Rhodesia, will be found in an article by Mr. H. W. Geare, printed in the 1918 report of the Rhodesia Munitions and Resources Committee. The South African Journal of Industries for November, 1917, also gives some very useful information.

South Africa, apart from its enormous mineral wealth, is naturally an agricultural country, and the development of agriculture is of interest to electrical engineers. The production of fertilizers to supply the needs of South Africa is a big proposition. One firm in the Transvaal is producing about 1,000 tons per month, and several firms are making smaller quantities; another source of supply is promised during this year from Kynocks, Amanzimtoti, but the demands are still far in excess of the supplies and it is thought that municipalities could greatly assist in the production of this needful article by offering electric current at the lowest possible rate. The value of fertilizers imported into South Africa amounts to about £200,000 per annum in normal times.

Whilst on the question of municipalities assisting local productions, some reference to the manufacture of disinfectants should prove of interest to municipal electrical engineers, particularly to those from towns which have suffered during the recent epidemic. At such a time the Public Health department of any municipality is expected to cleanse the whole town by the waving of a wand, but although medical officers of health are not blessed with the power of Aladdin, they can at least get assistance from the electrical engineer in the production of sodium hypochlorite, which is an excellent disinfectant. Sodium hypochlorite can be produced by a simple process at any electric power station, and those interested in the subject are advised to read the article by Mr. H. W. Geare in the 1918 report of the Rhodesia Munitions and Resources Committee, entitled "The production of Sodium Hypochlorite by the Electrolysis of Salt Solution."

COAL.

We should be thankful for the plentiful supply of coal in this country, but does Nature's method of storing heat, light and energy receive the consideration that it ought to when we consider that for every 100 tons of coal consumed, 90 tons are more or less wasted? Coal is produced so cheaply to the consumer that very little consideration has been given to the wonderful sources of revenue obtainable from its by-products. England and America have come to the conclusion that something must be done; in fact, America has gone so far as to insist upon all plants using coal having a thermal efficiency of at least 10 per cent. England, by its concentration of power schemes on the the coal fields, will be able to produce huge quantities of chemicals which have hitherto been liberated to the winds. In its new industries South Africa has enormous demands for the by-products obtained from coal. The cost of fuel, light and power used for industries in the Union during the year 1916 was £1,246,379. The annual output of coal by the Union is 10,007,502 tons, which taken as coal value only represents £2,739,665. If this amount of coal were used solely for the purpose of steam raising with an average thermal efficiency at say 10 per cent., 9,006,752 tons, whilst being consumed would be non-productive, whereas the same amount of coal if treated in a modern by-product oven would produce enormous quantities of chemicals so essential to the industries of this country. The writer has no data of results obtainable from South African coal, but the following figures (taken on a low average) show what can be produced from a quantity of coal equal to the Union's output in other countries:

10,007,502 tons of bituminous coal produces: — Ammonia Sulphate, 20lbs. per ton equals 100,075 tons. Crude Oil, 2.5/or 2½ gallons per ton equals 25,018,755 gallons. Tar, 6 gallons equals 60,045,012 gallons. Gas 4,500 cubic feet per ton equals 45,033,759,000 cubic feet.

The whole question of the conservation of fuel is so enormous

that the writer does not attempt to deal with it at any length, but has merely touched on the subject to show what can be done by proper methods.

OILS.

The supplies of oils both mineral and vegetable have been sorely taxed during the last three years. Mineral oils exist in this country, but no great efforts appear to have been made to expedite its production for the market. The production of vegetable oils, such as castor, linseed, cotton seed, olive, etc., should receive every encouragement, for in their production huge quantities of food for cattle can be obtained as a by-product. Castor oil has a particularly large field as a lubricant for internal combustion engines, especially aero engines.

One other industry which merits further consideration is the preserving of fruits, either by canning, bottling, or in the form of jams. Recent reports from overseas prove that the samples sent from here compare very favourably with those of other countries in quality but not in quantity. California exports annually about £14,000,000 worth of fruit. The one pronounced drawback is apparently the want of a plentiful suply of containers at reasonable prices. This being so, one would naturally think that the advisability of manufacturing tin plate and glass locally should receive some consideration. The production of tin plate, whilst in itself a new industry, would open the market for our locally produced iron and refined tin. The starting up of blast furnaces already referred to will produce a considerable amount of slag from which it should be possible to make glass in big quantities suitable for fruit jars and chemical containers.

The progress of industries in South Africa will depend a great deal on transport facilities. The coast towns with the return of normal times will probably be well served with shipping, but the inland areas will have to look to the railways for inter-communication. The development of the railways has advanced rapidly during the last few years, but there are still many huge areas awaiting railway facilities. The electrification of certain railway lines is at present being considered by the Government. The advantages of railway electrification were ably illustrated by Mr. Kirkland of the General Electrical Company at the last Congress. In constructing electric power lines for the railways, one would like to suggest the feasibility of arranging for a supply to existing industries and towns on the line of route, also to make provision for the development of other industries which are only awaiting a source of power. Further, the development of agricultural machinery is advancing with leaps and bounds, and it is quite within the range of possibility that electricity in the near future will replace the tedious and slow methods of transport by oxen so often seen when travelling through this country. Modern electrical equipment and control gears have reached a high standard of efficiency, so that a combined supply of power for the railway and industrial concerns in the vicinity might be well worthy of the consideration of those who have the matter in hand.

In concluding this paper, which is admittedly far from complete on such an important subject as "The Local Manufacture from South African Products," the writer has only touched on a few subjects which, although not strictly electrical, adds his small quota to the vital questions affecting South Africa to-day. The whole world is calling for increased production, and the speech recently made before the South African Institue of Electrical Engineers by the Hon. F. S. Malan, in his capacity as Acting Prime Minister, goes to show that the Government is alive to the possibilities of industrial development. Mr. Malan said:—"We must look to your Society to give the line of development. The application of cheap electricity to the industrial development of the country is the last word that will make South Africa an industrial country. If the possibilities of South Africa in that

connection with our vast resources of coal, our unexploited water power, not to mention the winds that sweep across our wastes, could be developed, if all that could be turned to electricity applied to the production of nitrates for the fertilisation of our agricultural propositions, see what a tremendous advance that would be. The Government works, the whole country looks to the technical societies, to men who have had the opportunity of developing their minds, to give us a lead in this direction. I trust that your society will continue to flourish, and that it will play an ever-increasing part in the establishment of those industries which are essential for the welfare of the country and the attaining of that high ideal which is in all our hearts."

Capital and labour are of course the two essential factors for successful production, but there is one other factor which must not be overlooked and that is the co-operation between capital and labour; the one is essential to the other.

The great question of the unemployed, although bad enough before the war, will for some considerable time be greatly accentuated. Great efforts are necessary to find work for all, and the only satisfactory solution will be in the full development of the resources of this country. Much talk is heard about the high rate of wages, which after all is only commensurate with the present unjust prices of the essentials of life, namely food and clothing. Systematic efforts are needed to produce a plentiful supply of good foodstuffs and clothing at reasonable prices, which will not only create a market for electrical appliances but also tend to make the workers more content and partially remove the necessity for demanding higher remuneration for their labour.

It is essential that the Government should endeavour by legislation to encourage the producer by transporting his raw material and finished articles at the lowest possible rate, also to see that the local markets are not flooded from overseas by introducing a moderate form of protection until such time as our industries have developed to the extent of being able to look after themselves.

The word MECCA, which has long been significant of ambition, should be our motto, for by the united efforts of the different bodies represented in its constituent letters, this country may become one of the most prominent industrial centres of the world.

M.—Mechanical.
E.—Electrical.
C.—Chemical.
C.—Capital.
A.—Amalgamation of Labour.

DISCUSSION.

Mr. Val Davies (Cape Town) criticised the paper very severely. He urged members to look the facts squarely in the face, when they would be forced to the conclusion that the industries of the country after all did not amount to a "row of beans." Mr. Davies declared that the South African producer of foodstuffs and other necessities of life was a profiteer, and, taking several items one after the other, endeavoured to point out to Mr. Everett, while he admitted and tributed the resource behind them, that the articles manufactured at Johannesburg were after all only making shift, turning one disused thing into another.

Mr. Stewart (Bloemfontein) declared that South Africa was not naturally a manufacturing country and never could be, since immediately skilled labour had to be procured and paid for the price went up to a prohibitive figure. The general experience, he said, was that the consumer did not get the benefit of any locally produced articles.

Mr. Councillor Crawford (Bloemfontein) pointed out that South Africa was still a young country with many of its possibilities

hidden. Everything, he said, had to have a small beginning. To his mind the great drawback to the manufacture of many articles was that the several raw materials were located at great distances one from the other, and could not be brought together except at prohibitive cost.

Mr. Vowles (King Williamstown) said that the general tendency of the debate showed a tone of pessimism. They would never achieve anything at that rate (Hear, hear).

Mr. Councillor Doull (Pietermaritzburg) thought this struck the right note, and he appealed for greater optimism.

The President said he was going to have the temerity to support Mr. Everett in his views. He also was an optimist, and he ventured to say that a body of men such as the special Government Committee would not be there if there was not cause for optimism. They had had a great deal of discussion in Port Elizabeth about bastard industries, but he told how Germany had developed her wool trade from what was at first a bastard industry.

Mr. Mordy-Lambe, in a few general remarks, thanked Mr Everett for his paper as they all did. All Mr. Everett's critics had emphasised that they were sincere and honest, and Mr. Lambe appealed to those who would deliver papers next year to aim at making them conducive to criticism. In that way only would good result. (Hear, hear).

Mr. Everett, replying, said the whole object of his paper was to provoke discussion and criticism, which he accepted in good part. South Africa at the present time was his adopted country though not the land of his birth, and he thought it behoved all those people who came from overseas to live here to do their best for the country. They had to study the families they would leave behind, and they had to consider the question of finding employment for the children who would remain when they themselves had passed over.

VOTES OF THANKS.

On the motion of the President, seconded by Mr. Stewart, votes of thanks were accorded the following, all of whom had entertained the Convention:—

The Mayor and City Council of Port Elizabeth.

The Mayor and Town Council of Uitenhage.

Messrs. Pyott Bros., Edworks, Ltd., Bagshaw & Gibaud.

Mr. Freemantle and all donors of Motor Cars.

Mr. E. Poole, Hon. Secretary and Treasurer.

President St. George's Club.

Midland Manufacturers' Association.

Mr. W. Duncan, S.A. Railways, Uitenhage.

Mr. R. R. Perrott, Divisional Supt., Port Elizabeth.

APPRECIATIVE REMARKS.

Councillor D. A. Thomson (Mayor of Bloemfontein), in thanking the Convention for the opportunity of being present, regretted that more Municipalities had not seen fit to send delegates. He hoped that in the future they would show more interest. With regard to the new President, he felt sure he would not take second place to his predecessors in office.

Councillor Fairclough endorsed these remarks. Mr. Sankey acknowledged them asking members to try to persuade more of the Councillors to come to the next Conference—at any rate all the members of their Committees. He also appealed to them to take any opportunity that presented itself of bringing these sentiments home to members of neighbouring Municipalities. He hoped their stay had been both pleasurable and profitable.

This concluded the meetings of the Convention and the following morning (Saturday) the members and delegates accepted the hospitality of the Administration of the Railways and Harbour Department who placed a tug at their disposal for a trip on the Bay.

The Association of Municipal Electrical Engineers (S.A.)

LIST OF MEMBERS AS AT FEBRUARY 15th, 1919.

Messrs. B. SANKEY, Port Elizabeth (President).
Col. DOBSON, D.S.O., Johannesburg (Past-President).
JOHN ROBERTS, Durban (Past-President).
T. C. WOLLEY-DOD, Pretoria (Vice-President).
W. BELLAD-ELLIS, Queenstown (member of Council).
G. A. STEWART, Bloemfontein (member of Council).
E. T. PRICE, Johannesburg (member of Council).
A. S. MUNRO, Pietermaritzburg (member of Council).
E. POOLE, Durban (Hon. Secretary and Treasurer).
M. McDONOUGH, Bethlehem.
G. H. SWINGLER, Capetown.
W. H. BLATCHFORD, Greytown.
T. MILLAR, Harrismith.
F. T. STOKES, Johannesburg.
P. H. NEWCOMBE, Aliwal North.
C. J. EVERETT, Johannesburg.
C. K. TURNER, Kimberley.
R. D. COULTHARD, Oudtshoorn.
N. D. ROSS, Potchefstroom.
R. W. FLETCHER, Krugersdorp.
T. JAGGER, Ladysmith.
L. L. HORRELL, Pretoria.
P. FINLAYSON, Pietermaritzburg.
L. B. PROCTOR, Boksburg.
A. E. VAL DAVIES, Capetown.
J. VOWLES, King Williamstown.
E. J. HAMLIN, Stellenbosch.
C. W. McCOMB, Springs.
H. BRITTLE, Cradock.
R. A. STOKER, Kroonstad.
W. DOUGLAS, Ermelo.
J. MORDY-LAMBE, East London.
G. MERCIER, Bethel.
W. A. HODGE, Winburg.
R. McCAULEY, Bloemfontein.
W. J. PRIOR, Bloemfontein.