

Vol. X.

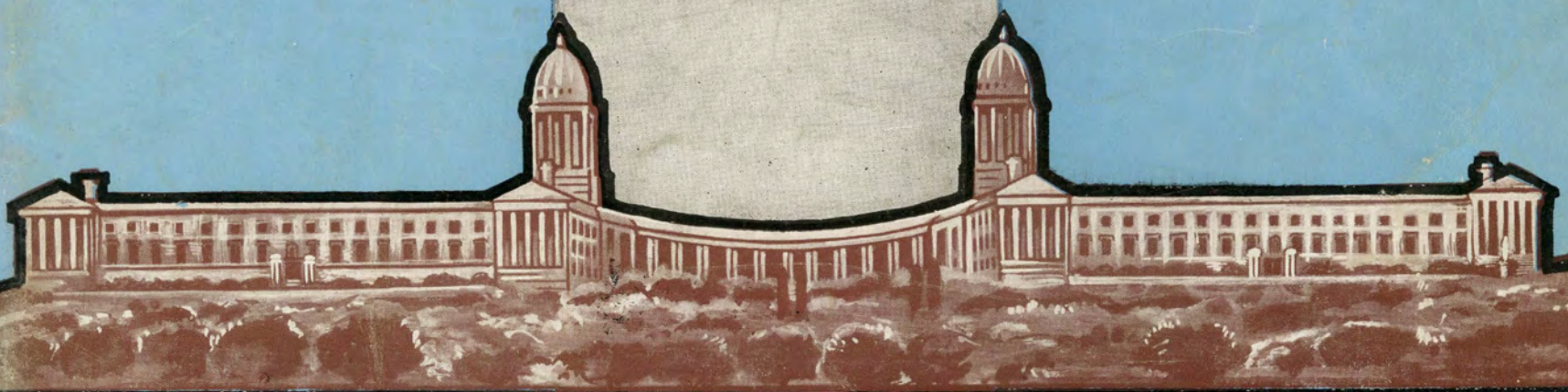
No. 66.

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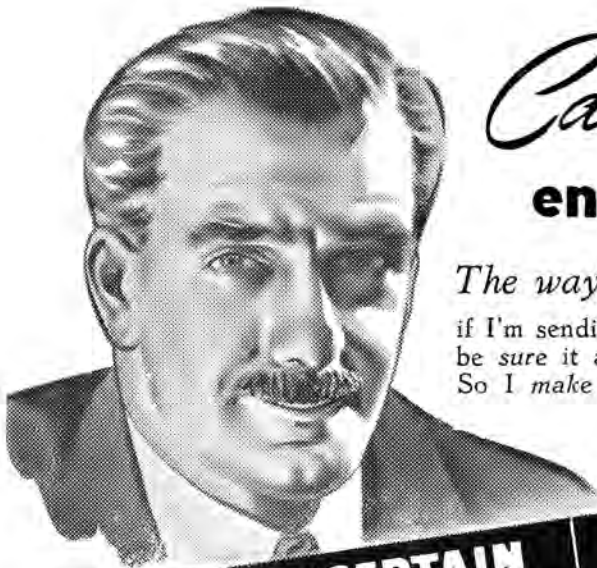
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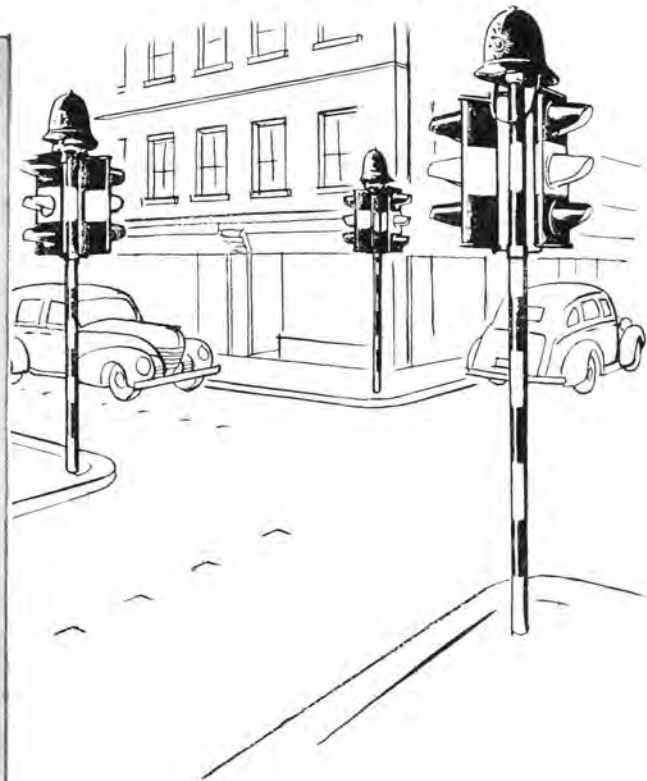
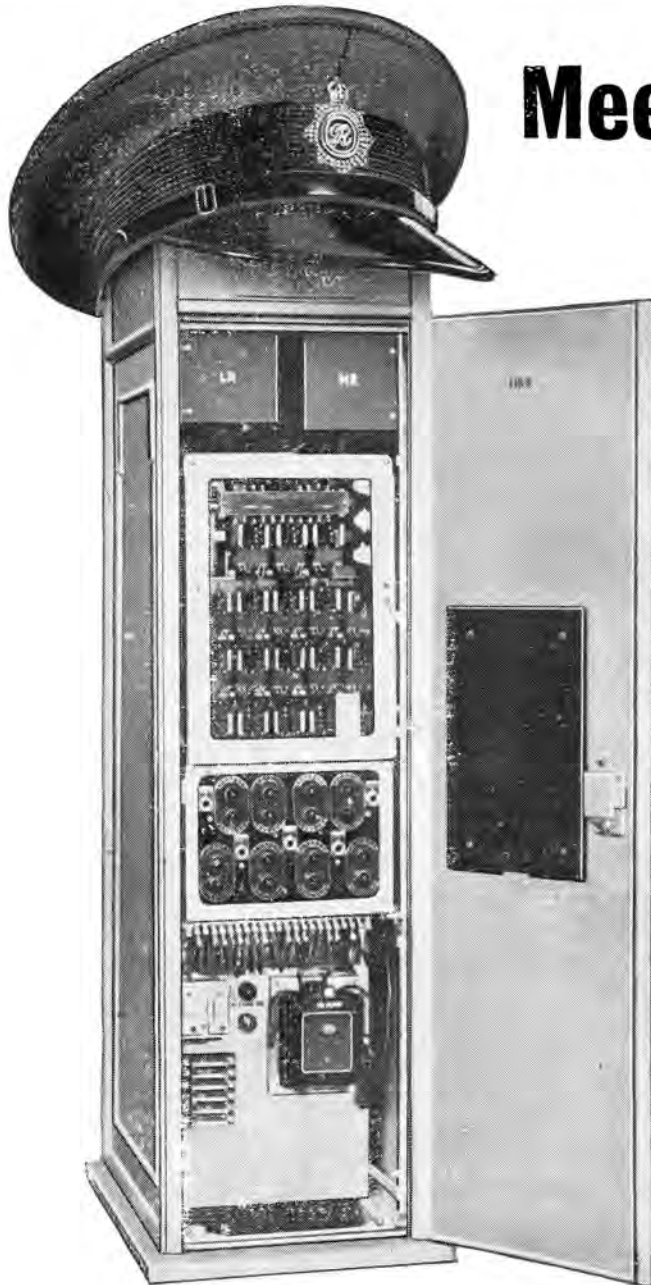
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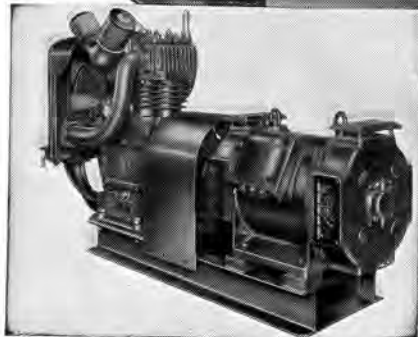
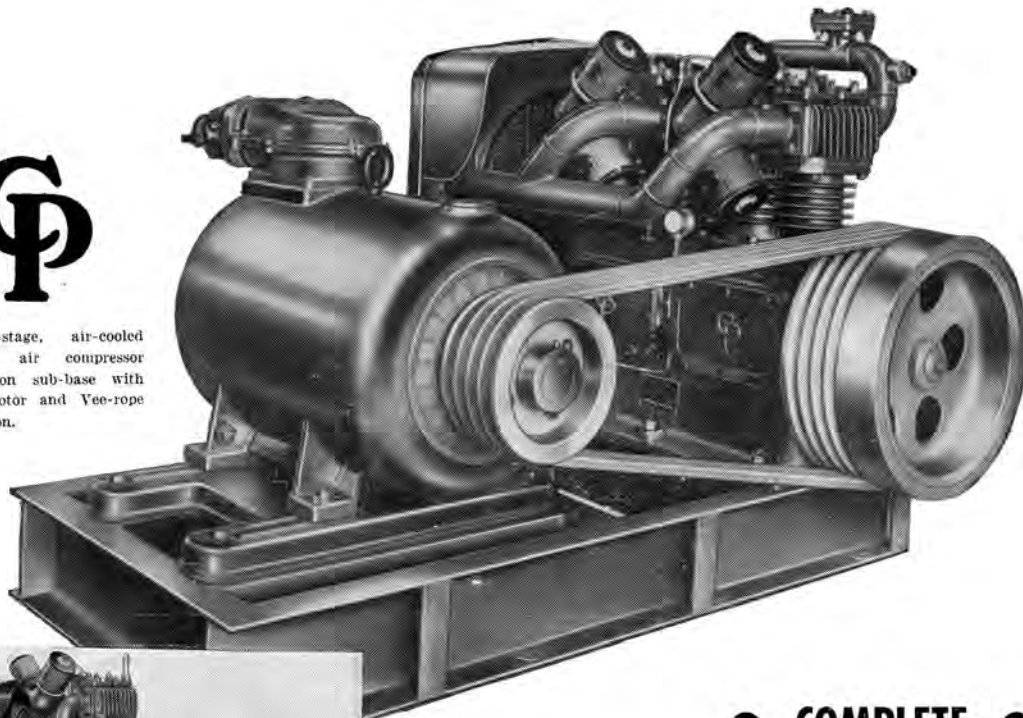
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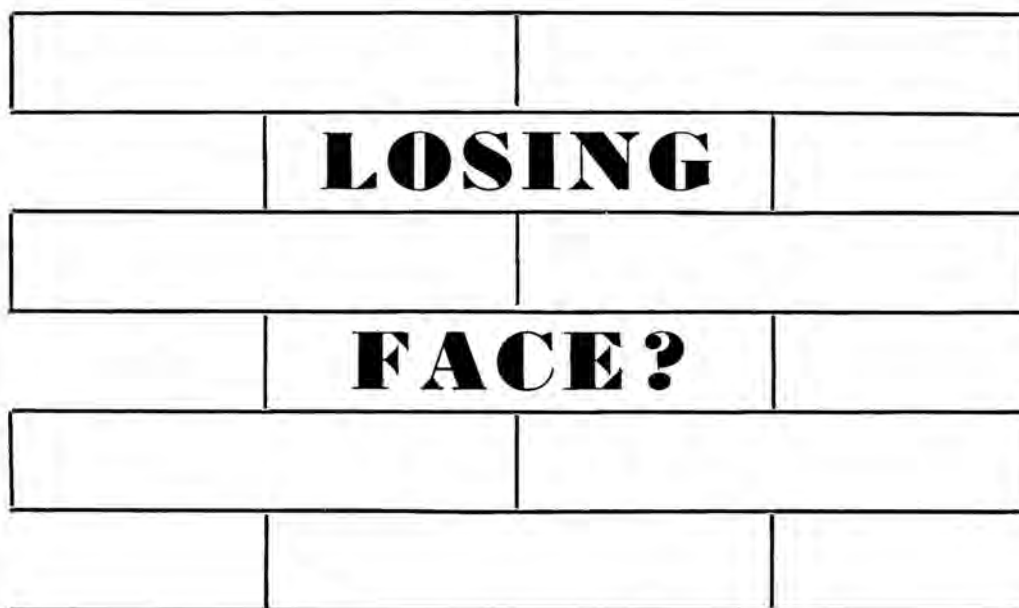
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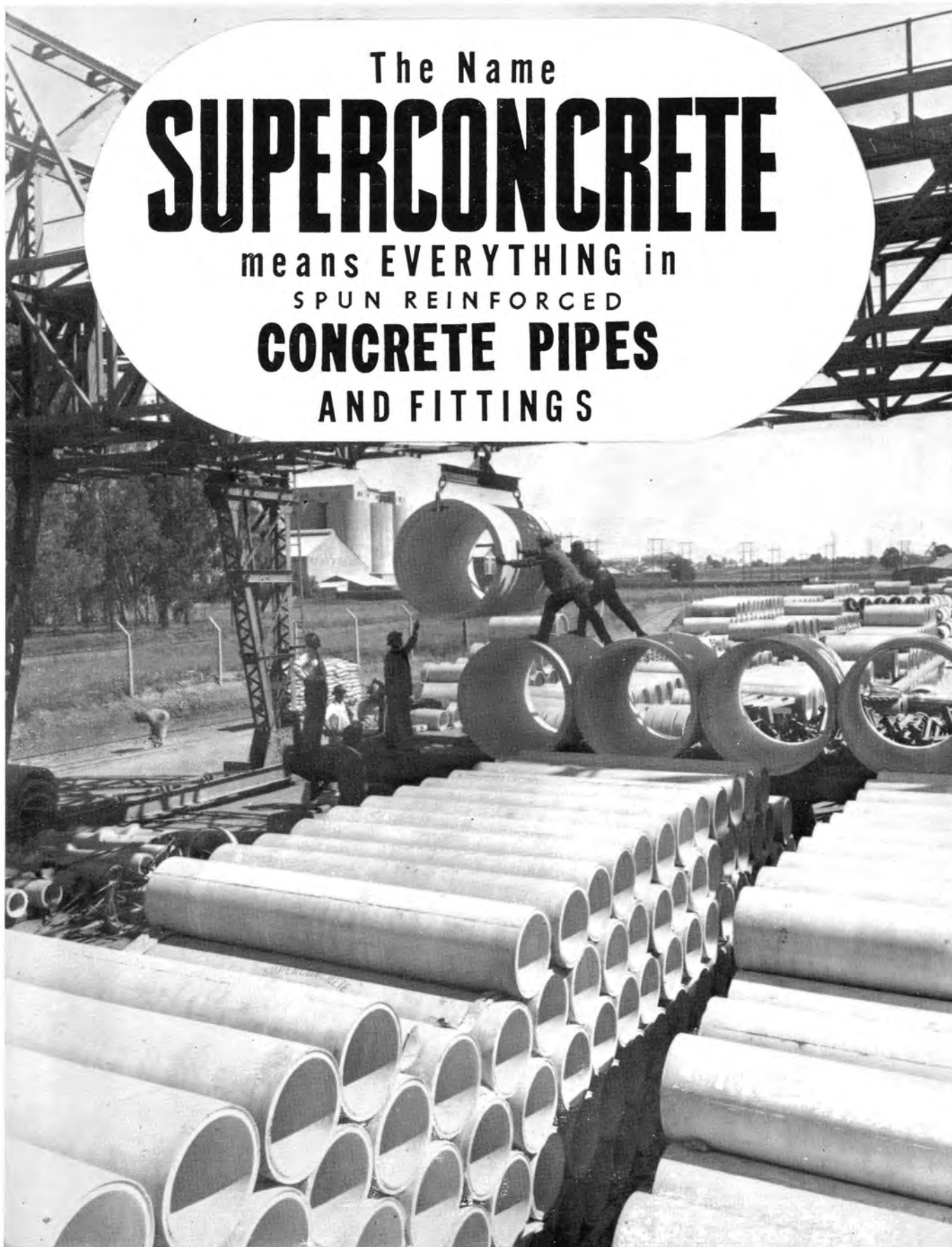
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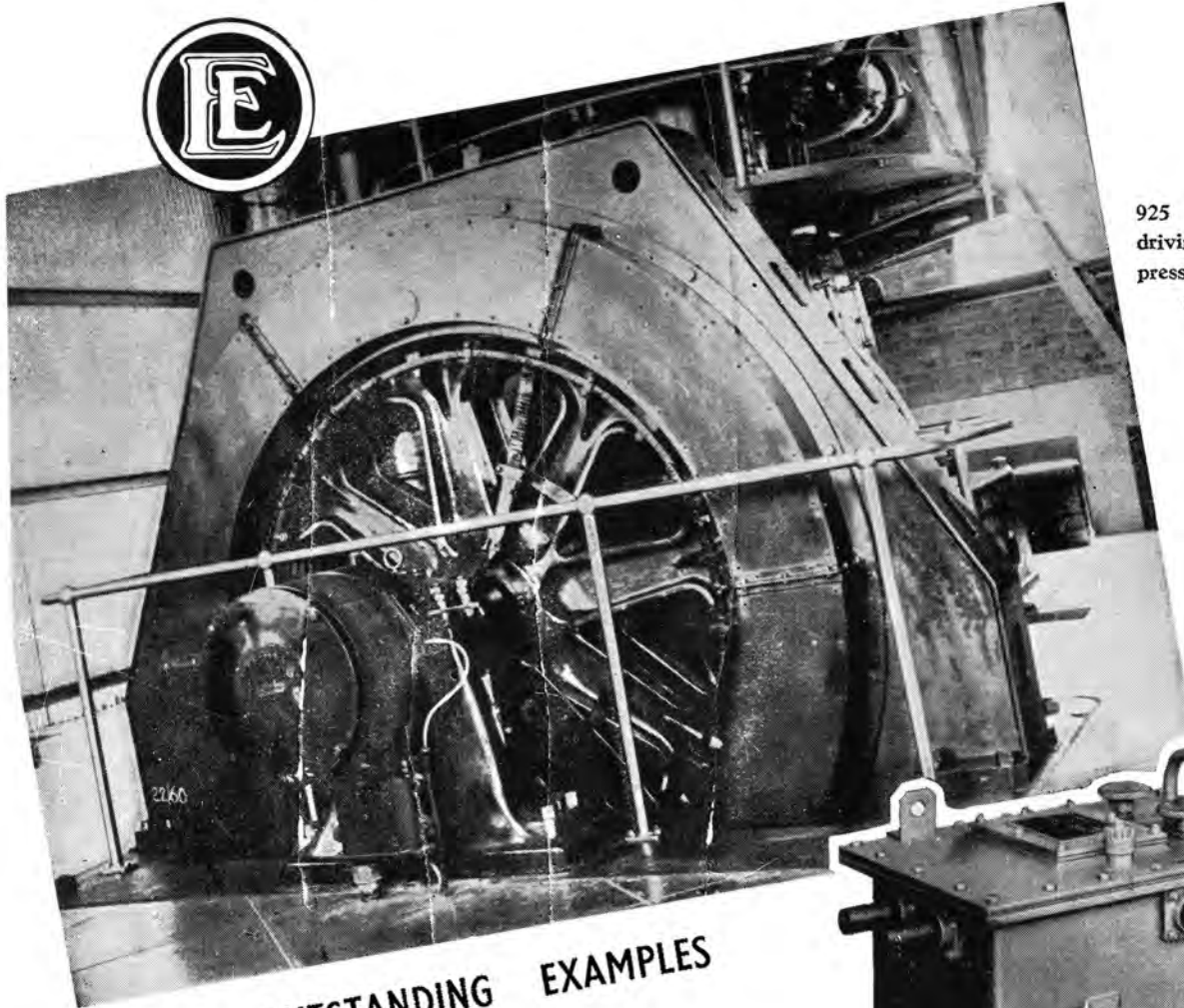


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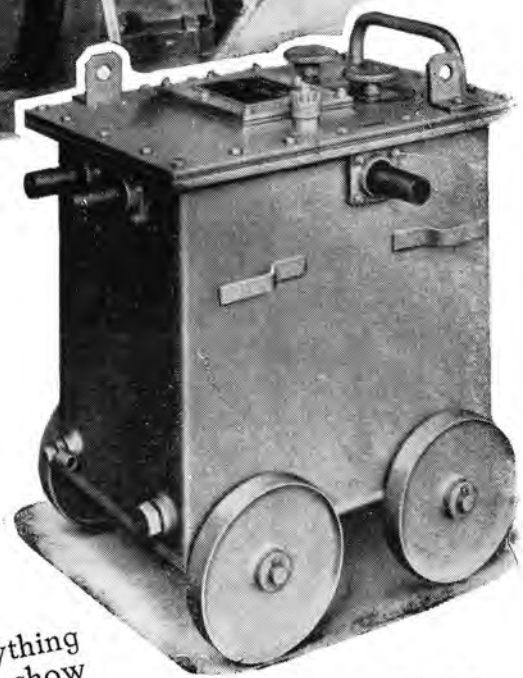


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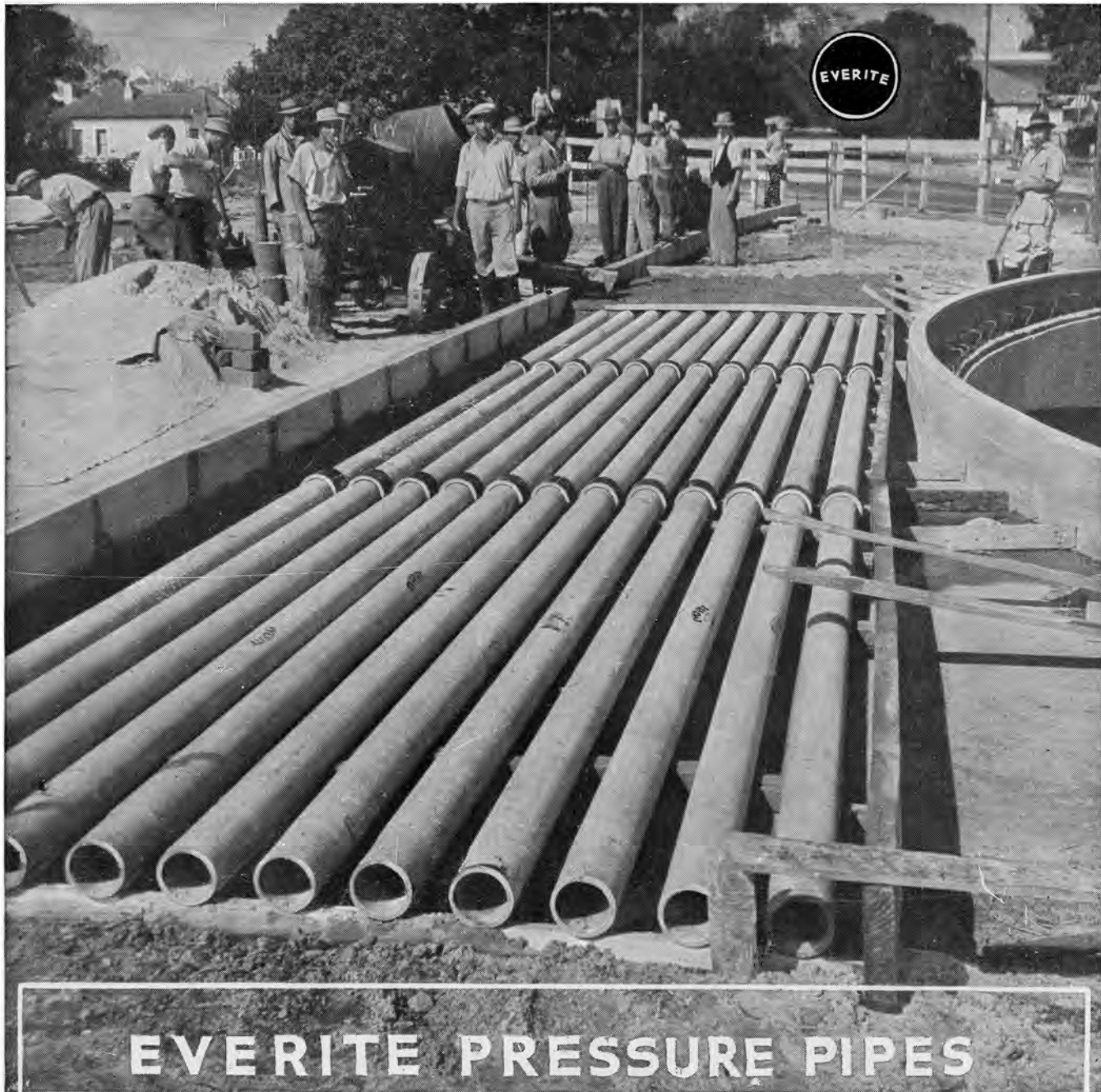
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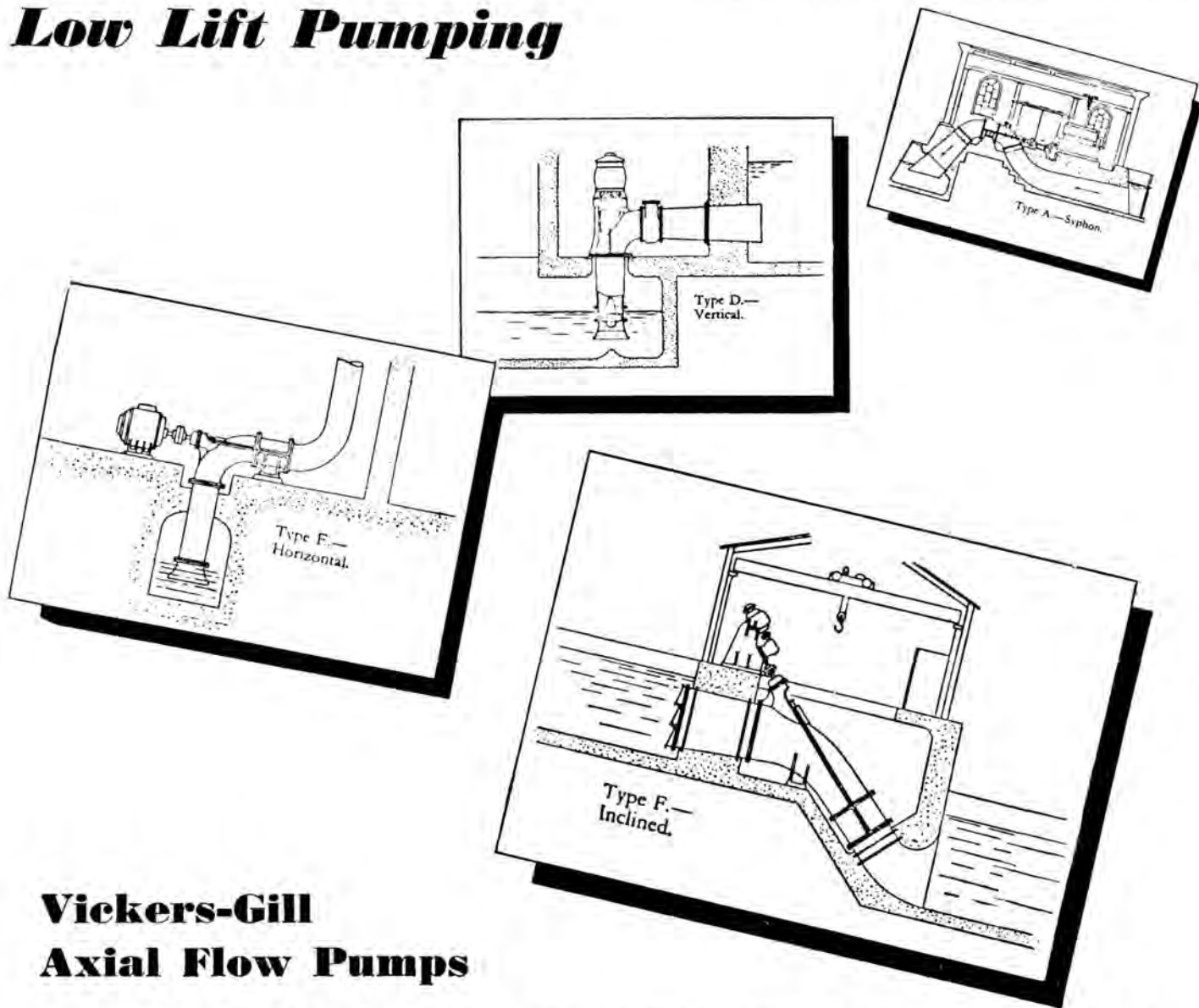
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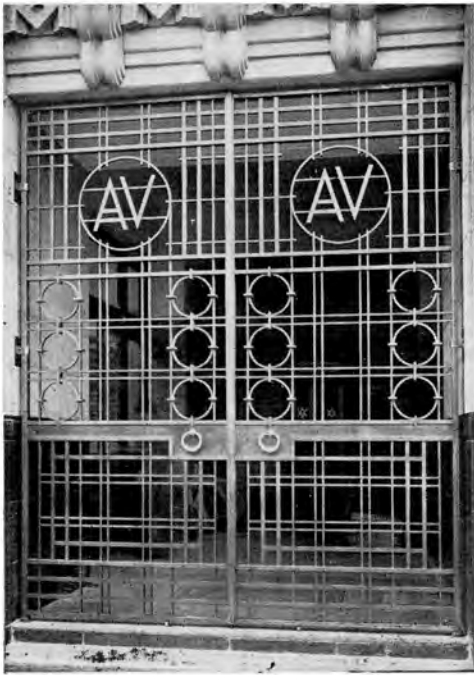
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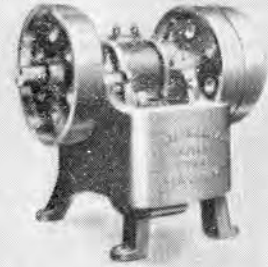
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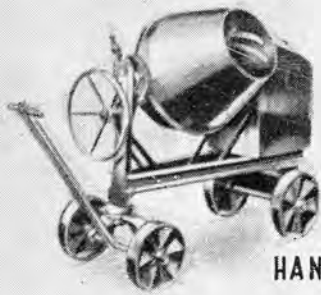
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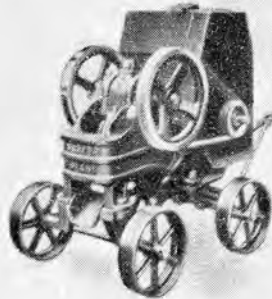
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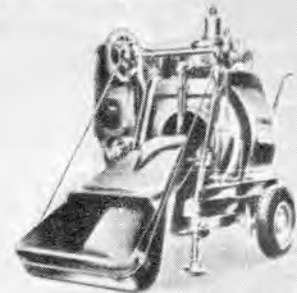
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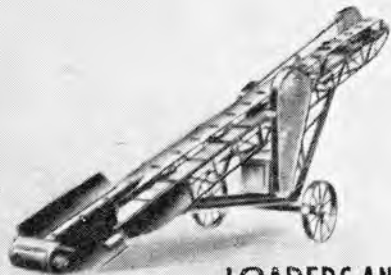
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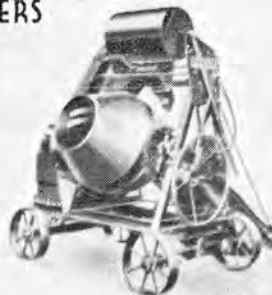
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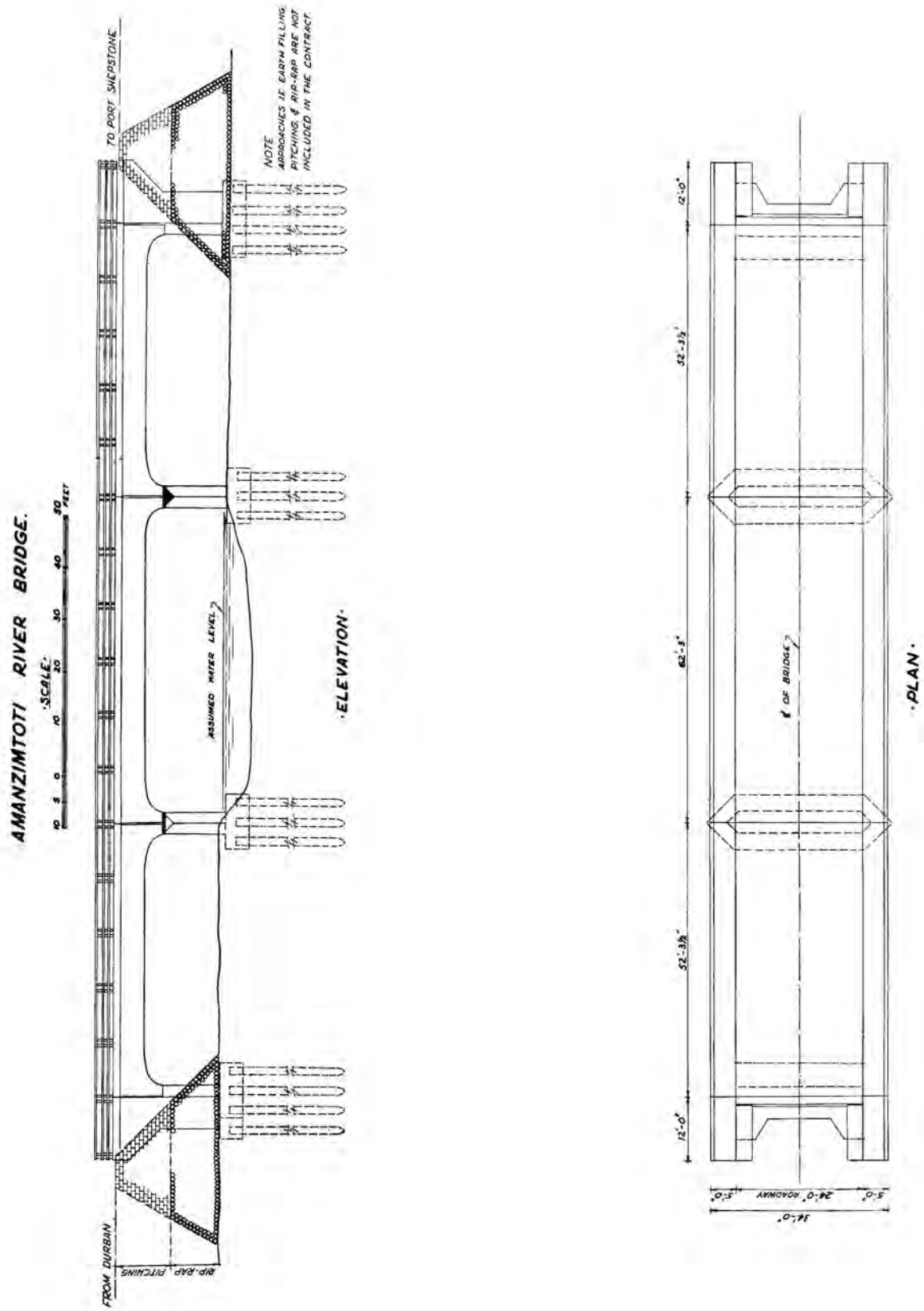
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PUBLIC WORKS OF SOUTH AFRICA, which is published monthly, is intended to keep the public up-to-date in regard to the engineering and building projects of the Central Government, the Provincial and Municipal Governments of Southern Africa and activities overseas.

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CONTENTS

AMANZIMTOTI RIVER BRIDGE
MORE POWER FOR PRETORIA
THE UNION'S WATER RESOURCES
THE STANDARDS COUNCIL
NATIONAL HOUSING AND PLANNING COMMISSION
TECHNICAL NOTES
ABSTRACT OF GOVERNMENT REGULATIONS
PUBLICATIONS RECEIVED
LIBRARY ACCESSIONS
TENDERS INVITED
TENDERS ACCEPTED



AMANZIMTOTI RIVER BRIDGE

By

W. E. VARRIE, B.Sc. (Eng.), A.M.I.C.E.

THE location of the new bridge over the Amanzimtoti River typifies the change which has taken place in bridge design during the last twenty years.

When designs were being investigated for a bridge over this river in 1931, economy was the main consideration owing to the restriction of funds during that period of depression. Consequently, a site was selected where rock foundations were anticipated, and where the river was narrow.

The approach road on the southern side was constructed to a satisfactory grade but the curvature on the bends was far below present-day standards.

The old bridge comprised three reinforced concrete spans, each of 50' 0" span, with a single roadway 10 ft. wide and 2'0" footpaths.

It had become apparent that this bridge would have to be replaced with one complying with modern standards, but it was intended to defer its erection until the new national road had been defined in this locality.

Due to an abnormal flood in April, 1948, the foundation to the south pier was apparently undermined and collapsed, causing two concrete spans to fall into the river. As this bridge was on the main south coast route and since the traffic had to be diverted through a circuitous inland route, it was obvious that an urgent replacement of the bridge was necessary.

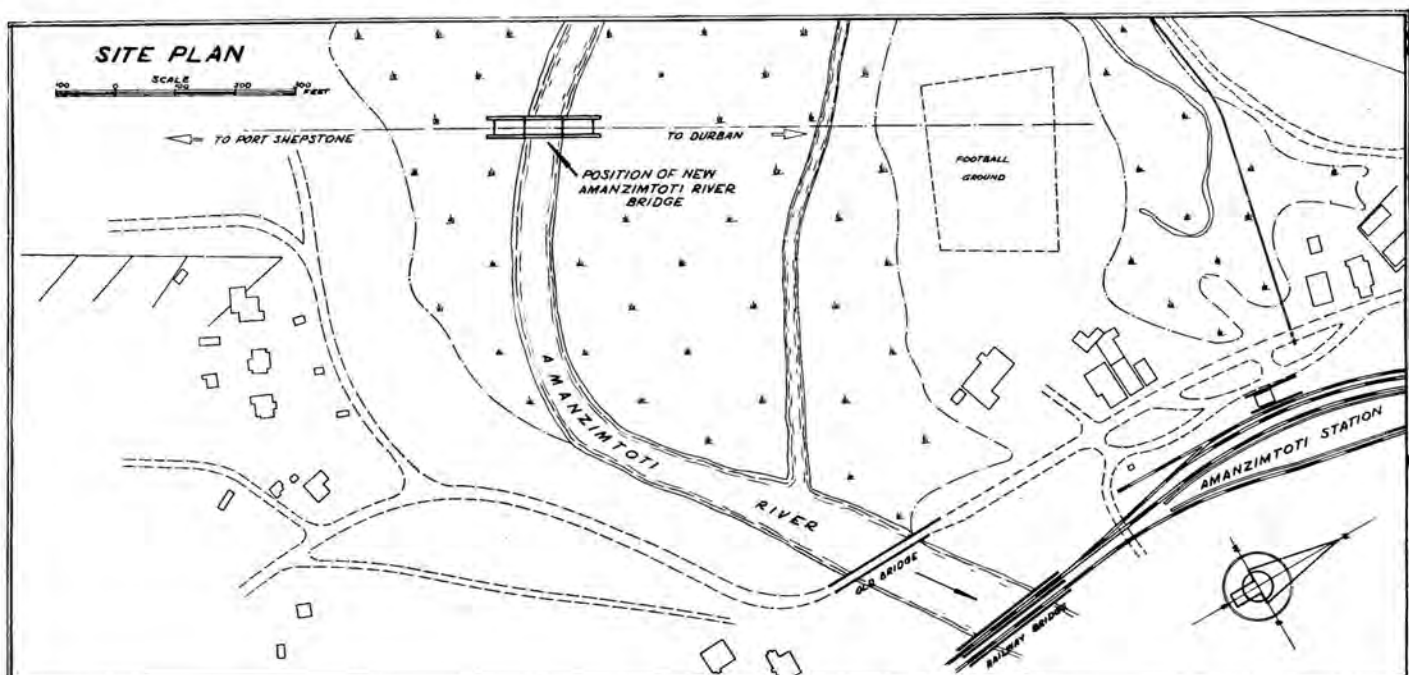
Bearing in mind the success which had been achieved during the war with Bailey bridges, it was considered that this type of bridge would serve the purpose admirably. Eventually, it was discovered that a suitable bridge of this type was available in Potchefstroom Camp, and the defence



The temporary Bailey bridge, erected in ten days.

authorities were prevailed upon to make it available for this service. An officer and a warrant officer were sent to the site to supervise its erection.

When the sections of the Bailey bridge arrived on the site, it was discovered that even after removing the handrails and pilasters of the old bridge it was impossible to secure the trusses to the remaining pier and abutments and that it would be necessary to rest them on the approach banks. It was necessary, therefore, to provide trusses 19 ft. in length for this purpose.



The temporary bridge comprises "double triple" Bailey trusses, with a 12'0" wide timber roadway and projecting footpaths. It was assembled on the north approach bank and fitted with a launching nose. When assembled, it was pushed across the opening by means of a bulldozer, and timber ramps were constructed to give access to it. Due to the fact that untrained personnel only were available, most of whom had never seen this type of bridge, it took about ten days to complete its erection. Since then, it has been in continuous use and will continue to be used until the new bridge is completed.

The New Bridge

As the position of the new bridge was fixed by the location of the approach roads, borings had to be taken to ascertain the nature of the foundations. Rock was encountered at a depth of about fifty feet below ground level on the south side but on the other bank none was encountered up to a depth of 60 ft., which was the limit of the drilling machine used.

After careful consideration of the borings, and guided by experience gained on numerous other South Coast bridges, it was considered that precast piles driven about 32 feet into the sand would prove satisfactory.

In order to provide a bridge of pleasing appearance, it was decided to span the river with two fifty-foot and one sixty-foot reinforced concrete spans (as shown on the drawing). The soffits of the beams were curved and the uitwaters of the piers were splayed in an attempt to make the whole structure appear as one unit.

From an aesthetic point of view the appearance would have been improved if the road level could have been raised but this would have entailed a considerable increase in the amount of earthworks in the approach roads.

The new bridge provides a double roadway, 24'0" wide with two footpaths 5'0" wide. The bridge was designed to carry the full British Ministry of Transport loading. While it was formerly considered that this loading was excessive for this country, it has now become apparent that this loading is being fully required, particularly when heavy transformers, rollers and similar objects which weigh up to 30 tons, are being transported.

The main beams of the sixty-foot span are 5'3" deep and

22" wide, and are reinforced with sixteen 1 3/8" diameter rods. To minimise wastage of steel, an attempt has been made to utilise as many rods of standard lengths as possible.

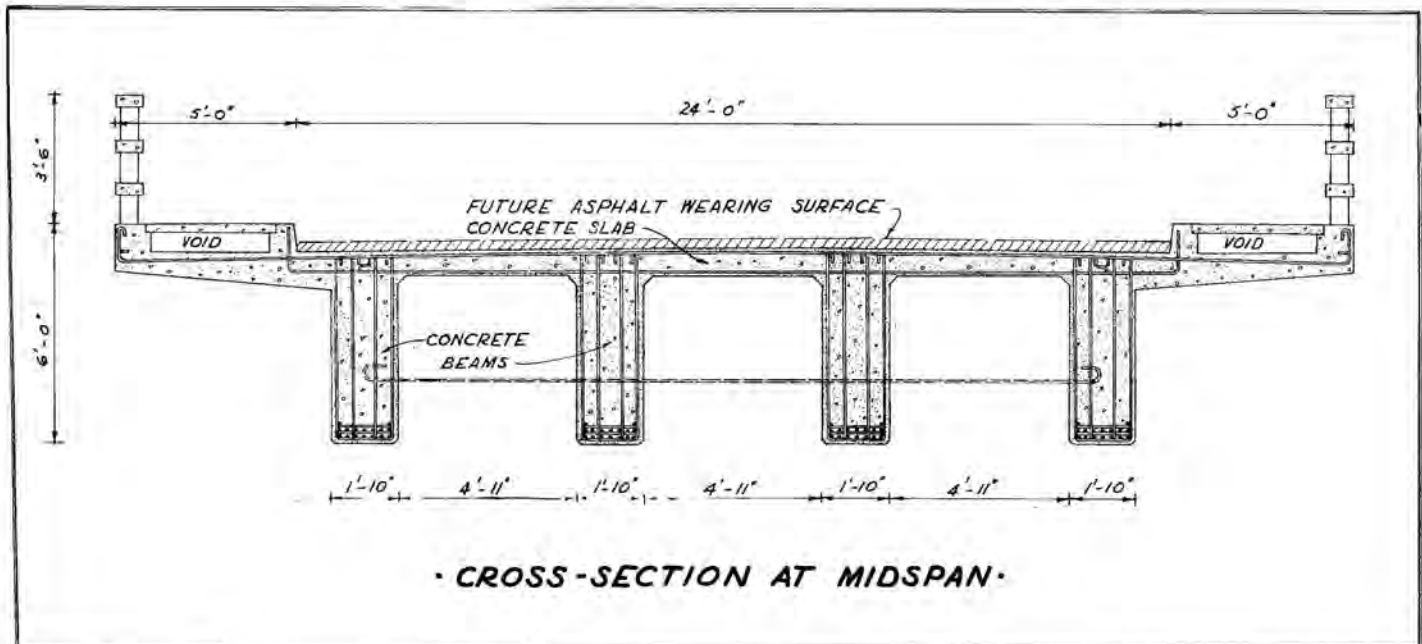
Tenders were invited and, in order to obviate any delays due to the difficulty in procuring cement and steel reinforcement, arrangements were made for these items to be supplied by the Government. The tender of Messrs. Maclaren and Eager (Pty.), Ltd., was accepted and the construction of the new bridge is now in hand.

Originally, it was intended to use 14" x 14" precast piles but an offer by the contractors to substitute 17" diameter cast in situ piles was accepted. The advantage of this type of pile is that a steel tube, fitted with a loose cast iron shoe is driven until the required set, previously determined by the Hiley formula, is obtained. The necessary reinforcement is then lowered into the tube and the concrete is slowly poured into it. As this operation is in progress, the tube is extracted by a succession of upward extracting and downward tamping blows. The result is that the concrete is thoroughly vibrated and consolidated and the exterior of the pile is given a corrugated surface. This surface is claimed to increase the frictional value of the pile which is normally designed to carry about 50 tons. One great advantage of this type of piling is that the steel reinforcement can be supplied to the exact length and there are no delays due to cutting or lengthening as is frequently encountered with precast piles.

It is, perhaps, fortunate that this type of pile was finally adopted on this service as a satisfactory set was obtained only at a depth of about 55 feet and no delays were caused due to the piles having to extend deeper than the 32 feet which was originally intended.

It is not anticipated that any delays will be experienced in the erection of this bridge as particular care was taken by the Public Works Department engineers to make the structure simple to erect.

It is interesting to record that the completed cost of the old bridge was £3,311, while it is anticipated that the total cost of the new bridge will be about £16,000. Cognisance should be taken of the fact, however, that the old bridge was provided with only a 10-foot roadway while the new one has a roadway 24 feet wide.



MORE POWER FOR PRETORIA

RECENTLY the "A" municipal power station at Pretoria was completed by the installation of two English Electric turbo-generators. This addition, which brought the plant capacity up to 94,000 kW., had been ordered in 1941 — a fact well illustrating the delays in delivery during the war and immediate post-war periods.

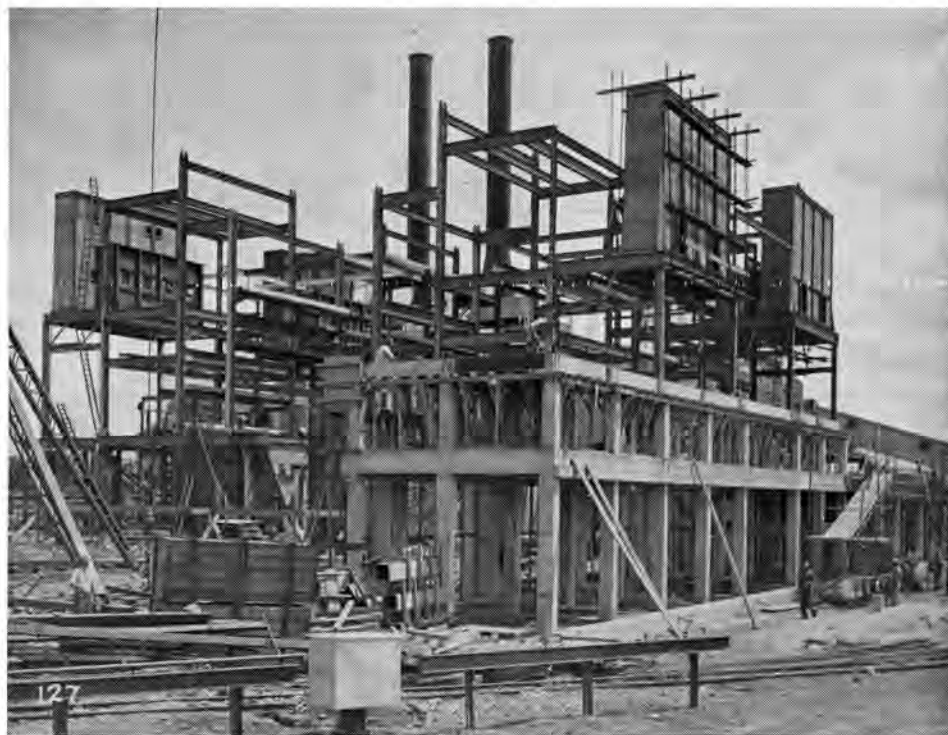
Work has, however, recently begun on the "B" station, close alongside the existing plant. When complete, the two stations will, together, be one of the three biggest municipal undertakings of their kind in the Union. Ultimately, the "B" station will have six 30,000 kW turbo-alternators, nearly double the power capacity of the present "A" plant. Steam for the turbines will be derived from ten x 210,000 lbs. per hour chain grate boilers. As a start two English Electric and four Yarrow boilers have been ordered and, it is hoped, they will be in operation by 1952.

The present water cooling tower, the second largest in the Union and 260 ft. high, with a base diameter of 180 ft.,

will be triplicated. Thus the water capacity will be raised from 3 to 9 million gallons, giving ten degree cooling.

Coal consumption at the "A" station is 250,000 tons per annum — all from the Witbank coalfield. During 1948, throughout its area of supply, the Pretoria municipal power plant distributed 26.6 per cent. of its output to ISCOR, 26.1 per cent. to domestic consumers, 10.9 per cent. for bulk supply to industry, 6.7 per cent. to business houses, 6.3 per cent. to Government buildings, 5.9 per cent. to the South African Railways and 4.6 per cent. to the municipality itself. The balance of 12.9 per cent. was either used in the station, or represented by "lost volts" in transmission. Overall efficiency was around 18 per cent.

This new plant is planned to take care of Pretoria's growing need for electricity up to 1960. The main "bottle-necks," affecting the completion of the first section of the "B" plant by 1952, are high pressure valves and piping. If these can be overcome the work now in progress and illustrated here, will be finished on time.



South-West corner of the new boiler house under construction.



Looking north-east across the site of the new "B" station. The switch house foundations are in the foreground, with the new boiler house on the far side.

View of the new turbo-alternator house foundations from the roof of the "A" station.



THE UNION'S WATER RESOURCES

By

L. A. MACKENZIE, B.Sc., M.I.C.E., A.M. Amer. Soc. C.E.

Director of Irrigation.

In our last issue we published the first part of Mr. Mackenzie's recent Presidential Address to the South African Institute of Civil Engineers in Cape Town. In this number we conclude his remarks.

Industrial and Mining Development

South Africa has gone through two World Wars practically unscathed and in common with other nations has realised the absolute necessity of being self-supporting both agriculturally and industrially, and spurred on by the great advances made during the war period, this has resulted in a much accelerated phase of development, both here and in the adjoining territories.

To-day there is universal unrest all over the world and as we occupy a very important strategical position, lying as we do between East and West, it does not require a great deal of imagination to appreciate the still more important role that we shall be called upon to play if there is another general upheaval.

For that reason alone the present concentration of many of our industries at our coastal ports from Cape Town to Durban, cannot be viewed with anything but misgiving for, so situated, they are extremely vulnerable from the sea.

Decentralisation of Industry

It is therefore advisable that some of these port industries should be taken inland and decentralised, but it is also obvious that before this can be done, it will be very necessary that adequate water and cheap power should be made available to establish them.

When decentralisation of industry has been spoken of in the past, we have been too prone to consider moving or establishing new industries along the Vaal River basin, where cheap power and water have hitherto been available.

In actual fact, we now find that the Vaal River resources are becoming overtaxed, for what with the growth on the Reef, both in mining and in industry, the new development taking place in the Free State along the Vaal valley, it is unreasonable to expect any relief from this area which is fast reaching saturation point.

Where then are we to look for suitable areas for our new development?

In the Transvaal it has been established that we have a very large coal area in the Waterberg district, but here the available water supplies are not abundant. Further south we have the Witbank to Piet Retief area where coal has been mined for many years and here we are fortunate in having very fair supplies of water.

In Natal we are more fortunate for, if we take the area from the Pongola River to the foot of the Drakensberg escarpment, we find we have not only an abundance of coal but the whole area is extremely well watered, while in addition it is well served by road and rail communications and its strategical position renders it very suitable for the establishment of industries on a large scale.

The use of water here would not come into competition with irrigation development but would be complementary to it.

In the Orange Free State all development will be dependent on the use of water from the Vaal and Orange Rivers and as a heavy burden will be thrown initially on the former it will be necessary at a later stage to introduce water from the Caledon River.

Lastly, the Cape Province will be dependent on the Orange River System in the north and on the coastal rivers in the south, where a spreadout of industries is desirable to relieve the possible future over-congestion at our coastal ports.

The Cape Province is unfortunately not blessed with any workable coal measures and the cost of power generation here cannot compare with the more fortunate areas in the north.

Oil Supplies in War

With the demand for natural power oils and fuels for the purpose of war it is quite likely that our present sources would dry up completely and this would lead to somewhat chaotic transport conditions and the cessation of many of our industries which to-day are dependent on oil fuel.

At present we derive most of our petrol and oils from the Persian Gulf, Iran and Arabia, supplies not being available from the U.S.A. as that country requires her production for her own internal consumption.

Drilling for oil in South Africa has so far proved abortive and as our present requirements are about 24 million gallons per month, the question arises: Can we do anything to meet our needs locally?

As has been shown, we have large and widely distributed coal measures and if we are to be at all self-supporting and independent then it is essential that these measures should be exploited to their fullest.

It is felt that this can be done by the introduction of oil from coal and although this has been started on the Vaal River, additional units could be sited in the areas referred to earlier, and as water is essential to the process it will have to merit a certain priority over other uses.

River Pollution

With the increase in our new industrial and mining development, together with the disposal of town effluents, it can be appreciated that we are now reaching a stage where

grave consideration will have to be given to the problem of river pollution.

If the Union had large streams with good perennial flows, the removal of trade and mining effluents would be merely a matter of the correct degree of dilution whereby the rivers could be kept reasonably free from harmful and objectionable substances.

As we are not so fortunate, considerable care will have to be exercised in the near future in the siting and location of certain industries known to have obnoxious effluents as for example, pulp and paper factories, woolwasheries, tanneries and suchlike.

As certain industries, by virtue of their dependence on the crops grown in a particular area, cannot be moved, care must be exercised by the authorities concerned to see that there is safe disposal of the waste products so as not to foul the natural drainage lines of the locality.

When we come to the exploitation of mineral wealth we are up against a larger and more serious problem, because we are geographically bound to the area that is being mined. We also find that the bulk of our minerals are located in the summer rainfall area with the long dry winter months, when little or no rain falls, thus causing a period of concentration of the chemical impurities.

This is particularly so along the narrow belt of the Witwatersrand and in the Middelburg-Witbank areas, where the initial freshets drain the waste products in concentrated form into the rivers and the degree of dilution is insufficient to render them harmless, with the result that fish, animal and vegetable life is frequently destroyed.

In coastal areas it is a somewhat simple matter to get rid of effluents to the sea, but in inland areas it is likely to be an ever-increasing problem to the engineer and chemist, for many of the remedial processes are both expensive and in some cases ineffective.

Water Purity Problems

Although certain government departments and local authorities have the statutory right to lay down standards of purity there appears to be no means whereby we can police our streams and enforce the regulations and standards of purity which have been laid down from time to time.

The matter is being dealt with at present and it is not unlikely that in the near future definite standards will be laid down and legislation passed to see that these are kept and maintained by all sections of the community.

In this connection it is felt that the time is not far distant when engineers will have to give earnest consideration to the re-use of clarified sewage effluent even if it means having to separate purely domestic from sewage disposal water by duplication of pipelines.

The utilisation of clarified sewage water will also have to be used as cooling water where power is generated, and although it is realised that many difficulties are likely to be encountered, these should not be beyond the ingenuity of the engineer and chemist to solve.

Water conservation and economy will have to be rigidly practised and the engineer will be called upon to devise ways and means of bringing these about.

Hydro-Electrical and Electrical Development

From time to time we see articles in the press advocating large-scale hydro-electrical development of our national rivers and great stress is laid on what has been done in the U.S.A. in this respect by the Tennessee Valley Authority.

As engineers we all admire, and in fact envy, our brother engineers in the States their fortune of having such colossal natural resources to handle and harness, but we are, for all that, not blind to the restricted limitations of our own resources, and more particularly when we have to deal with water.

Any large-scale hydro-electrical power development is quite out of the question for, if coupled with irrigation, an almost necessary essential, the water for irrigation must be used seasonally or when required, that is, intermittently, whereas power development on any scale must be continuous and the load factor kept within reasonable limits.

This would mean that in order to develop the full irrigation requirements and convert these to electrical power we would have to install large standby units driven by means other than water and this would be prohibitively costly.

On some of our rivers small-scale generation of power by water is possible and, to quote an example, we have on the Mooi River, in Natal, two suitable storage basins situated above falls where we can operate irrigation-cum-hydro-electric units but only to the extent of producing about 40 million electrical units per year or equivalent to one month's supply for Durban based on the present-day demand of the city.

The variation of the minimum with the maximum mean annual run-off of any of our rivers is so great that for continuous operation any plant to be successfully operated without a standby would have to be small.

We have seen on the other hand that South Africa is rich in coal and although much of it is low-grade, it is possible by means of steam-turbo-electrical stations to use this coal and at present we generate power by this means at a cost per unit which is the envy of the world.

Recently^(*) legislation was passed whereby it will be possible through the Electricity Supply Commission to spread the net-work of power lines to the rural areas and this will enable many small rural towns and villages to enjoy power amenities which until now were only the privilege of the more fortunate townsman and this development must bring with it the establishment of a number of small industries.

One aspect of this will mean that a considerable amount of irrigation development may take place where water is available, in that farmers will have a cheap and reliable source of power to operate pumping plants and irrigate by this means small and rich patches of alluvial soil along the banks of our rivers.

This form of irrigation will be particularly suitable to areas where hitherto it has been too costly to get water on the land by means of diversion weirs and furrows.

Municipal Water Supplies

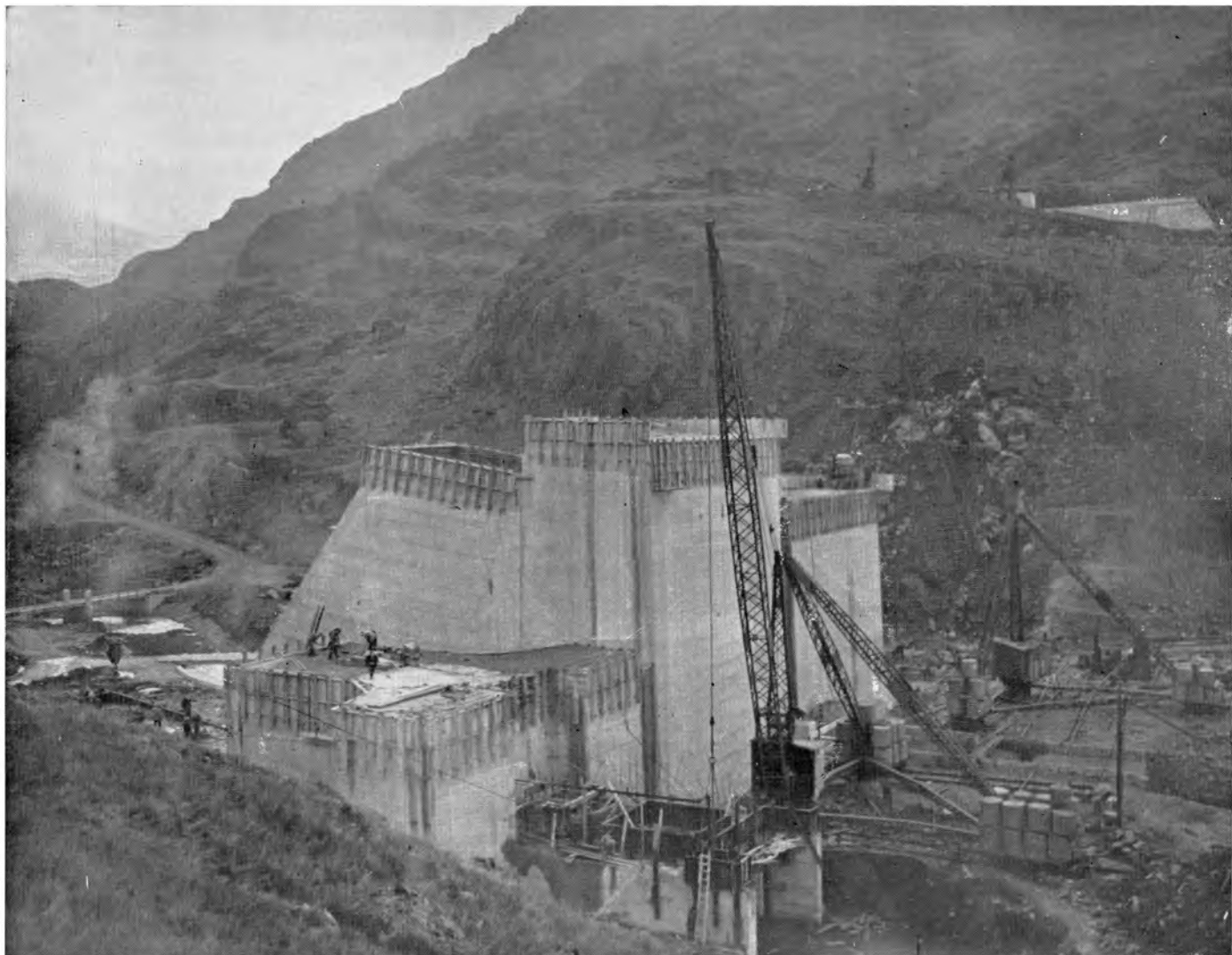
Although our larger cities and towns have been able to supply their inhabitants with adequate and pure water supplies for all purposes, many of the smaller rural places have not been so fortunate, in fact, most of the water services are either absent or elementary in the extreme with the result that the health of the community has been adversely affected.

Generally the first modern amenity demanded is electric light and no thought is given to the necessity or desirability of a good and adequate water supply by which water-borne sewerage could be introduced, with the result that the primitive bucket systems of sanitation are still a feature of our small towns.

Even towns with good water supplies still continue with

(*) Electricity Amendment Act No. 44 of 1947.

HYDRO-ELECTRICITY IN THE HIGHLANDS



The growing dam of the Loch Sloy scheme in the Highlands, west of Loch Lomond. This project, one of twelve now in progress will, when completed, hold 1,200 million cubic feet of water. The dam, which will be 1,200 feet long and 160 feet high, will require 200,000 cubic yards of concrete. Power will be supplied by four hydro-generators feeding 130,000 kW's into the grid.

the old principle of water erven by which farming is carried on in the municipal area itself and as the owners of these erven have acquired certain vested rights to the use of the water, the more progressive members of the community are debarred from moving with the times because there is insufficient water for all needs.

Water erven in towns are a relic of the past and the sooner they are done away with the better as they are a definite handicap to all future progress and expansion.

In order to overcome these backward conditions and bring about a better standard of living, the government, in 1946, introduced a subsidation scheme for urban water supplies, whereby the State contributes one-third of the capital cost on approved municipal water supply schemes.

The effect of this financial assistance has been to throw an additional burden on to the Irrigation Department, but the result has been satisfactory if only from the point of view that all new schemes have had to meet up to present-day standards before they could qualify for the subsidy. Much still remains to be done but with many regional surveys in progress it will only be a matter of time when most of our towns and villages will realise the great advantage of having an adequate and good supply of pure water.

In municipal areas we shall have to pay greater attention to conservation and the economical use of our water supplies. It may not have occurred to many of my municipal colleagues in the smaller towns, that many of their present-day water shortages would be solved if all consumers were forced to draw their requirements through meters instead of a flat rate per erf per month. This practice can only be condemned as wasteful, uneconomical and a decided loss of good revenue.

Regional Development

All through this address you will have noticed that stress has been laid on the limitations of our water resources, the disadvantages of our present-day legislation, the need for reform and the question naturally arises, what are we going to do about it?

The Department of Irrigation for many years, through its various divisions, has been collecting facts and figures about the behaviour of all our rivers and through its research division has been working up the potentialities and possibilities of all our major rivers.

It has become perfectly clear that the development of any area must follow on the lines of seeing that a reasonable use of the water must be permitted to all sections of the community as they are inter-dependent.

In other words, all planning of the development of our natural resources, and particularly water which is in such short supply, must be done on a regional basis and in order to illustrate this let us consider the Vaal River Basin which, up to the present, has only been referred to in a rather casual way.

The building of the storage unit at Vaaldam, 20 miles upstream of Vereeniging, with a present-day capacity of 870,000 acre-feet, resulted in the creation of a multi-purpose scheme in that the water stored there is released to supply:—

(1) The Rand Water Board, which serves through its pumping and huge reticulation system, an area of nearly 4,000 square miles and a population of 1½ millions. It also meets the growing requirements of the various municipalities, mines, industries and the South African Railways.

A couple of years ago the city of Pretoria was also included

in this supply and no doubt other towns will follow in due course.

(2) Through the new intake works and filtration plant at Bothaville, the Government intends supplying the needs of the O.F.S. Goldfields now under development. Here the initial pilot plant will supply 4 million gallons per day, through a fifty-mile pipeline to storage reservoirs at Koppie Alleen, for distribution to the gold mines, Odendaalsrus, Hennenman and other centres.

This supply will rise progressively to about 20 million gallons per day in ten years time provided the anticipated rate of development is maintained.

(3) Since this project was first started various other municipalities and authorities within reasonable distance of the Vaal River have also made application for water and it is very likely that their needs will also have to be met.

(4) Water is also required for the cooling plant in the generation of electrical power for the O.F.S. Goldfields and for the hydro-generation plant which is shortly to be put up.

(5) Under the Vaal-Hartz Irrigation Scheme some 40,000 morgen of land will eventually be irrigated and although it is not anticipated that this area will be increased beyond this limit, it is probable that at a later date the introduction of cheap electrical power will give rise to the introduction of pumping units along the Vaal River bank.

(6) In addition to this, provision has to be made for the water requirements of Kimberley and development in its district.

It will be seen that there is already a heavy burden on this river and as Vaaldam at present stores only half of the mean annual run-off of the Vaal River, the anticipated development will necessitate increasing the storage to 2 million acre-feet.

The tributaries are not likely to contribute much additional water to the parent river as with time it is expected that they themselves will become fully developed, but it is possible to introduce balancing reservoirs downstream of Vaaldam to take advantage of large freshets in the tributaries which cannot be economically stored except in the parent river.

From the foregoing we see that the Vaal River and its catchment is expected to carry a still heavier burden as time goes on and as we are likely to reach the maximum carrying capacity within a measurable period of time, it is very necessary that other sources of supply should be developed in order to relieve this river of its burden.

For this reason, as previously stated, it is very necessary that decentralisation of industry should take place as soon as possible and that new industries requiring large quantities of water should not be permitted to be established in this catchment.

Increased storage has its limitations too, for with an evaporation factor of 60.00 inches per annum it is not possible to carry over the inflow of good seasons to balance drought periods.

Quite possibly the decline in the output of the Reef gold-mines will ease the position on the Witwatersrand but against this we must bear in mind the development of the newer mines to the west in the Transvaal and also those in the Orange Free State.

The days of haphazard development are a thing of the past and unless we as engineers warn the public of the dangers ahead then future generations will be justified in weighing

us up and finding us wanting in vision and foresight.

The Government recently brought into being the (°)Natural Resources Development Act, No. 51 of 1947, a piece of legislation which was long overdue and it is to be hoped that all new development will be such that all sections of the community are catered for and progress made along planned lines.

If we are to accomplish this there must be the closest co-operation between all parties concerned, and at the same time a great deal of spadework and research must be done now, for without the essential background we cannot plan ahead.

Adequately trained staff should be available to make this nation-wide survey of water resources and to systematically correlate and co-ordinate the mass of data that has already been collected, but until it is realised that the public service has to be made attractive to the youth of the land it is doubtful whether the various state departments will ever have sufficient men of the right type to carry on the good work.

Multi-purpose schemes, such as the one we have in the Vaal River valley to-day, are to be recommended as they serve the whole community and are therefore not sectional in character and it is hoped that many more will be built on the same lines with the emphasis on water conservation and utilisation rather than the purley irrigation aspect.

At some later stage the decentralisation of government control could be brought about by the creation of area water boards with statutory and borrowing powers which would go a long way towards making these areas self-supporting

(°) Natural Resources Development Act No. 51 of 1947.

No regional development scheme will be a success unless there is the closest co-operation between the essential state departments, local authorities, industry, commerce and, lastly, the urban and rural populations concerned.

A better distribution of our population is highly desirable and necessary and if this can be economically brought about, areas which to-day are but sparsely populated will come into their own and contribute their quota to the prosperity of the nation.

As regards the cost, we should face up to the fact that we have a moral obligation to our heirs, for when we took over our heritage we inherited a land of fair promise which we have systematically exploited to our own material gain and advantage, and in so doing have in many cases picked out the eyes, discarding much that did not give quick and remunerative returns, and it is only right and just that we should put back a little of the profit for the benefit of those who come after us.

No nation can afford to adopt a "sufficient for the day" attitude and expect to survive, for history is too full of examples from the past for us not to take heed of the warning.

What atomic energy and nuclear fission holds in store for us we can only hazard to guess, but it will be the task of the engineer to harness and control still greater forces of Nature, and it is to be hoped that they will be used for the benefit and not the destruction of what we call civilisation.

The introduction of unlimited cheap power would throw open a vast field of engineering enterprise and the engineer of the future may have reason to smile at our present-day fears, but until that time arrives we are called upon to husband and conserve the natural resources that we have got.

THE STANDARDS COUNCIL

SUMMARY OF THE THIRD ANNUAL REPORT, 1948

APPOINTEED in September, 1945, the Standards Council has recently issued its third report covering the year 1948.

During this period the Council has been enlarged by the appointment of an assessor member of the Department of Agriculture, in an advisory capacity.

By an amendment to the Standards Act, the Council is no longer under an obligation to publish in full, in the Government Gazette, the specifications for particular marks it may adopt for any specific commodity.

Within the Union the Council has established active liaison with a number of Government Departments, State organisations and many of the leading commercial, industrial, professional and public bodies. There has also been established a Standards Industrial Liaison Committee, appointed jointly by the South African Federated Chamber of Industries and the Steel and Engineering Industries' Federation of South Africa. Another liaison committee has been formed by the Association of Chambers of Commerce of South Africa.

There is also very close co-operation between the Council and the South African Standards Institute. Not only do two members of the latter body sit on the Council itself, but there is also a Standards Joint Committee. This last, and extremely

active, body screens applications from manufacturers, consumers and other interested parties for the preparation of standards and also examines and allocates documents received from international standardising organisations. Of these overseas bodies the Council is a member of the International Organisation for Standardisation, founded in 1946; the International Electrotechnical Commission and the International Federation of Documentation, re-established in 1946.

Through another liaison committee the Standards Council ensures that there shall be no duplication of effort with the Council for Scientific and Industrial Research, whose function, as its name implies, is research and not standardisation.

Arrangements have been made through a bureau, established by Die Fakulteit vir Natuurwetenskap en Tegniek van die Suid-Afrikaanse Akademie vir Wetenskap en Kuns, to translate technical documents and codes of practice into Afrikaans.

Standardisation Marks

These have been adopted for five classes of commodity up-to-date. When a particular firm has been granted a permit to use a Council mark, it becomes necessary to test its product from time to time in the laboratories of the Bureau of Standards. To cover the costs of these tests

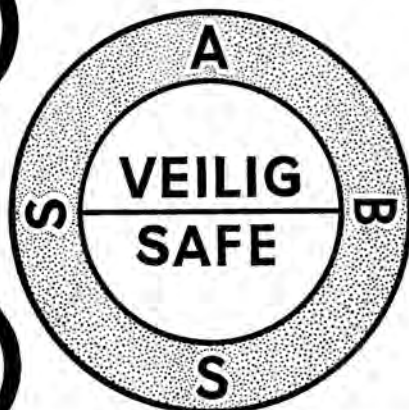
Marks of The Standards Council



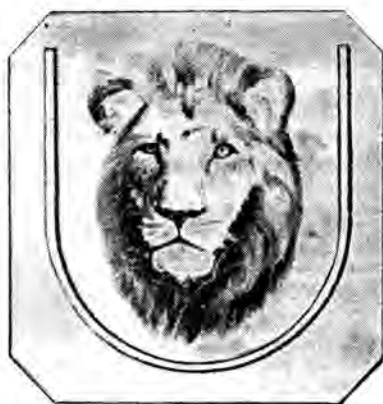
For commodities of a general nature



For commodities for which standard specifications have been declared



For commodities for which specifications have been declared for the purpose of conforming to the safety requirements for electrical equipment



For the marking of articles made of silver



For the marking of articles made of gold

a fee, based on production, is levied upon permit holders. These fees are not assessed arbitrarily but are fixed in consultation with the industry concerned. They are made as low as possible and the resulting revenue will not do more than cover the cost of the necessary periodic check tests. The mark fee is, therefore, not to be regarded as a tax. Indeed, manufacturers may well regard its cost as advertising expenditure since there is no doubt that, once the general public has learned to associate the mark with quality, it will know that an article so marked represents value for money.

The Standards Council has appointed a Permit Committee to examine applications from manufacturers for permits to use the standardisation marks and, where necessary, to inspect their factories and premises.

Need for New Headquarters

There is a pressing need to transfer the Bureau, at an early date, to the Johannesburg area. Despite representations no action has, hitherto, been taken on this important matter.

As a "service station" for the Union's manufacturing and mining industries, a suitable site in Johannesburg area is the only satisfactory locale for the Bureau for the following reasons:—

- (a) A very important function of the Bureau is to carry out routine tests, analyses and calibrations. The chief

mining and other industries of the Union are mainly concentrated in the Witwatersrand.

- (b) Industrialists wishing to discuss matters relating to tests and analyses with Bureau officers, matters which can often be settled in a ten-minute personal interview, are unwilling to spend from two to three hours travelling from Johannesburg to Pretoria and back. Conversely, Bureau officers wishing to consult technical experts in Johannesburg lose valuable time in travelling, to say nothing of the consequent fatigue and inevitable loss of efficiency. It is calculated that the Bureau is losing in travel to Johannesburg approximately 300 man-hours a month. The average actual cost of these man-hours has been assessed at 8s., the annual loss thus being £1,440, to which figure must be added the cost of transport and meals.
- (c) Another serious feature is the fact that the Bureau is represented on technical committees by its more senior officers. Work in the Bureau's laboratories is thus often held up when junior technologists require guidance.
- (d) The mining area promising the greatest future development, the Northern Free State, is immediately south of the Witwatersrand.

In regard to the preparation of specifications, it is felt that Johannesburg should be the locale for the Bureau because:—

- (a) The Bureau has to call upon voluntary aid of technical experts, most of whom are employed in industry in Johannesburg and who are unable to sacrifice their time travelling to and from Pretoria to attend committee meetings. As a result practically all technical committees meet in Johannesburg, and, while the Bureau is thus able to avoid making unnecessary demands on the time of industrial experts, the time spent by its own officers in travelling is wasted.
- (b) Members of technical committees from areas outside the Witwatersrand, such as Durban, Port Elizabeth and Cape Town, prefer Johannesburg as a venue since time not spent at committee meetings can be profitably utilized to conduct other business.

Apart from these considerations, the Bureau premises are so inadequate for its laboratories and offices as to reduce the situation to an almost farcical level. The Council feels that if proper buildings are to be erected it would be a grave mistake to site them in an unsuitable area. For this reason it believes they should be erected in the right area at the outset, the Witwatersrand. It is estimated that £400,000 would be required to buy a site and build new premises. Of this sum £300,000 would be required in the next three years. Details of how it would be expended have already been submitted to the Minister of Economic Affairs.

Progress Made

Steady general progress was made by the Bureau of Standards during 1948. A large number of specifications have been compiled over the last two years. Twelve firms have, so far, applied for permission to use the mark but many more are expected to do so during the present year. The specifications and codes of practice drawn up were listed in our February issue.

The Chemistry Division, which has 13 sections dealing with industrial hygiene; metallurgy; oils, fats, waxes, asphalts and lubricants; paint; textiles and timber, amongst other

subjects, has already helped to prepare some 120 codes and specifications. A Water Standards Committee has been set up to deal with problems such as the sources of drinking water; sewage effluents, including admission to streams, trade wastes, irrigation and discharge into the sea. Standards for sewage effluents have been agreed with the Institute for Sewage Purification. Discussion has also taken place regarding standards for drinking water and the advisability of establishing a central authority to advise upon and prevent the pollution of water.

One of the most important of the Committees is that dealing with Sampling. During 1948 this body considered methods of sampling bitumen roofing material and black bolts and nuts amongst other matters.

A committee has also been set up to frame specifications for plasters and mortars, together with a code of practice to ensure their correct use. This work is, however, suspended until the Standards Institution's specification for lime is available.

Standard specifications for metal and wax stoep polishes are in process of preparation. Some other recently published standards were referred to in our March issue.

Colour Code for Factories

Among the subjects dealt with by the Industrial Hygiene Section of the Bureau are accident prevention, the concentration of toxic substances and protective clothing and equipment. A Workshops and Factories Colour Code is, presently, being printed and will include an independent scheme for the identification of piping systems. Yet another specification, on the verge of publication, prescribes the types of guards required for all kinds of power saws.

In the metallurgy section attention has been directed towards specifications for aluminium alloys, carbon steels, copper base alloys, ferro-alloys, lead, tin base and zinc base alloys.

Bituminous road binders will be the subject, soon, of a

redrafted specification, following further research.

In the Textiles Section various organisations have been invited to nominate representatives to discuss and establish a specification for felt floor coverings.

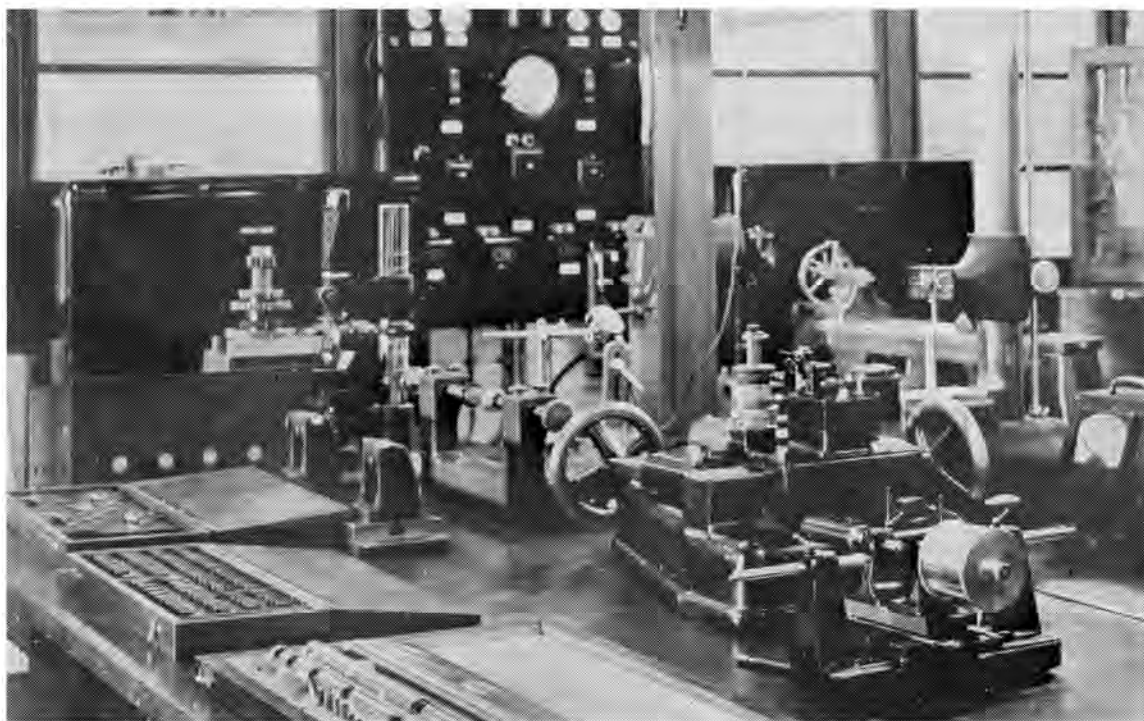
Under the Paint Section a specification for asphalt roofing materials has been prepared. Standards for raw, boiled, alkali and acid refined linseed oils are also under consideration. At the request of a South African manufacturer, who is anxious to establish his product on the world, as well as the home, market, a specification of zinc oxide for paints is being prepared. Another, being drawn up at the request of the South African paint industry, will deal with white lead powder and white lead-in-oil.

The Timber Section has produced a specification for creosoted wooden poles, to which we also made reference in our March issue. A Committee has also been set up to consider the ideal dimensions of sawn timber. Other specifications, to which we have made previous reference and which were published last year, are those for graded S.A. softwood timber and the nomenclature for S.A. Timber. A code, to be published this year, will cover the application of timber preservatives.

In the Civil and Mechanical Engineering Division considerable progress has been made with Building Regulations and Codes of Practice, concerning which we published an article in our February number. To carry out the Standards Council's programme in this direction, sub-committees have been established, dealing with architectural aspects, amenities and facilities, carcass of buildings, comforts and precautions, installation aspects, sanitation and water supply, brickwork, foundations, walls and a number of other cognate problems.

At the request of the Standardising Committee of the Department of Agriculture a committee has been formed to prepare model regulations and codes for farm buildings and structures, such as cowsheds, milkrooms, silos and reservoirs.

Draft specifications for comment have been drawn up to



A corner of the metrology laboratory.



A flame-proof motor, the first to be manufactured in the Union, being tested at the Bureau.

deal with bending dimensions of bars for concrete reinforcement and for gypsum blocks. Our March issue referred to the specification recently issued in connection with standard sizes for doorlocks. With the object of preparing a code of practice for the installation of roof ventilators, a test tunnel has been constructed.

Other objects to which the Bureau is directing its attention are standardised coupling threads for borehole tools; mild steel chains; picks, shovels, spades and forks; stainless steel sinks and steelware dishes for hospital use.

Popularity of Lightning Protection Code

A very large number of orders have been received for the Code for the Protection of Buildings from Lightning, to which our March issue made reference. Work is now proceeding on specifications for electric lamps and for refractories.

The Electric Engineering Division is exploring the necessity for a specification on electric motors. Consideration is

also being given to the question of P.V.C. Insulated Cables and how the Council's mark can be applied to cables conforming to specifications. An advisory committee has been established to assist supply authorities in regard to approval of new electrical products. A Safety Code for Electrical Appliances is in course of preparation.

By far the major portion of the £50,000 annual running expenditures was, naturally, taken up by the preparation of specifications and codes of practice. These accounted for close on £44,000 or nearly 87 per cent. of the Standards Council's current expenditure during the year ending 31st March, 1948. In the Balance Sheet, as at that date, plant, machinery, tools, equipment and scientific apparatus for the laboratories were shown to have cost £30,000. As yet, permits and annual fees account for only a very small fraction of the Council's income, the bulk of which, at present, is derived from Parliamentary grants.



The newly-formed Standards Industrial Liaison Committee holds its first meeting in the library of the Bureau at Pretoria

REPORT OF THE NATIONAL HOUSING AND PLANNING COMMISSION

This summary of the recently published Report of the National Housing and Planning Commission for the year 1946 necessarily suffers from the fact that the report itself relates to a period three years ago and was signed six months prior to publication. Such portions as have been extracted are those believed still to have more than historic interest.

THE early part of the year under review saw the Commission busily engaged in its programme to build 6,000 houses in the principal towns of the Union for letting primarily to ex-servicemen, civil servants and other priority groups.

One of the first steps necessary was the appointment of Regional Representatives in the principal centres. In the early stages of letting the Commission's houses, special committees were appointed at Pretoria, East Rand, Johannesburg and West Rand, Cape Town, Port Elizabeth and East London, to allocate the houses.

Ex-Service Ninety Per Cent. Loans

A scheme for the granting of loans to ex-volunteers for the purpose of erecting their own houses was inaugurated from the 1st March, 1946. Under this scheme ex-volunteers are permitted to apply for loans direct from the Commission without having first to approach the local authority.

Such loans are not to exceed £2,400 and are permitted up to 90 per cent. of cost of building and the land on which the dwelling is to be built. The loans are repayable over a period of 30 years with interest at the rate of 3½ per cent. No limit is fixed on the cost of a dwelling but such dwelling may not contain more than five living rooms, exclusive of kitchen and other appurtenances, plus outbuildings.

Following on complaints by certain local authorities, that the Commission had not observed certain municipal by-laws it was decided to establish a committee for the Reef and Pretoria to advise the Commission on technical matters arising out of its building programme.

The Commission's initial building programme comprised three types of buildings known as A, B and C. The A type consisted of four bedrooms; B type three bedrooms and C type two bedrooms.

Economic Loans

Economic loans to individuals other than ex-volunteers are granted by local authorities and also by the Commission direct in cases where the individual concerned has satisfied the Commission that a local authority has unreasonably refused to grant a loan to him.

A proposal to build a large number of houses in "no fines" concrete having been under consideration, it was decided that a number of these houses should be constructed in various parts of the Union for testing purposes.

Following on the costs of building experienced in the erection of the types A, B and C houses, and with a view to reducing the overall costs of further houses, the Commission decided to proceed with the construction of further types to be known as D, E and F at the following estimated "all-in-costs" :—

D type : £1,500 (similar to type B but with reduced fittings — 1,100 square feet area).

E type : £1,350 (same size and accommodation as D but of a sub-economic type and may be partly or semi-detached houses).

F type : £1,150 (to consist of small blocks of flats or maisonettes two to four dwellings each with two bedrooms — 850 square feet area).

As a departmental guide it was decided that a limit of £700 per dwelling on the cost of sub-economic houses for natives be fixed, the Government's loss not to exceed £30 per dwelling per annum in scheduled and £20 per dwelling per annum in non-scheduled areas.

The Commission was approached by the Secretary for Social Welfare advocating the employment of coloured persons in housing schemes with special reference to superintendents in such schemes. Although the matter was considered outside the scope of its functions the Commission decided that where matters were referred to it by local authorities for advice or confirmation of such employment, the Commission will give them very sympathetic consideration.

Housing Policies

Recommendations were submitted to the Commission by the Director relating to future policy in regard to European housing. The Commission accepted the recommendation to the following effect :—

That the Commission should restrict its building activities within the municipal areas of large cities that must overflow in the near future to surrounding areas, and direct its main attention on the creation of garden villages on the outskirts, provided suitable and cheap transportation is available.

This process will mean that the Commission may have to provide its own services.

The Commission had before it for consideration its future policy relating to Native housing, when it was accepted that steps should be taken to train Natives to undertake building work for Natives in Native areas, such Native areas to be regarded as including a location and Native village and any area approved by the Minister of Native Affairs for the residence of Natives.

It was also decided to adopt a recommendation that mass production methods by competent firms using concrete be encouraged.

ECONOMIC HOUSING

Provision of Funds

The amount to which the Government was committed, in respect of economic housing at the beginning of 1938, stood at £5,000,000. The whole of this amount having been allotted, steps were taken with a view to obtaining further funds. The total amount to which the Government is committed has subsequently been increased and now stands at £7,500,000.

The following statement classifies the amount of loans approved and dwellings involved during the year under review differentiating between schemes and dwellings by local authorities and utility companies and individual housing loans and reflects also the number of dwellings intended for occupation by Europeans and non-Europeans respectively :—

	European.		Non-European.		Total.	
	Value of Loans. £	No. of Houses.	Value of Loans. £	No. of Houses. £	Value of Loans. £	No. of Houses. £
Schemes and dwellings by local authorities and utility companies	1,286,053	712	—	—	1,286,053	712
Individual dwellings approved	462,305	351	6,115	5	468,420	356
Total	1,748,358	1,063	6,115	5	1,754,473	1,068

During 1946 the sliding scale and loan limits hitherto operating in regard to dwellings erected out of economic housing funds, have in respect of the Transvaal and Cape Province been revised and on the recommendation of the National Housing and Planning Commission the Administrators have accepted the limits £2,600 and £2,200 in respect of both the cost of dwellings and the amount of loans in scheduled and non-scheduled areas respectively.

National Housing — Assisted 3¼ Per Cent. and ¾ Per Cent.

A. National Housing — assisted 3¼ per cent.

Arising out of a series of joint meetings of the United Municipal Executive and the Government the National Housing Assisted 3¼ Per Cent. Scheme was adopted as a basis of agreement between the Government and local authorities, in terms of which Assisted ¾ Per Cent. Housing was superseded by Assisted 3¼ Per Cent. Housing with retrospective effect. Under the new provisions the Government advances money to local authorities at an economic rate of interest, viz. 3¼ per cent. repayable over 40 years and shares the loss of schemes in the ratios of 3 to 1, if the total rental is above 5 per cent., or less of the capital cost; 5 : 2 where the rental is above 5 per cent. but not more than 6 per cent., and 2 : 1 where the total annual charge on a scheme not to exceed 10 per cent.

Certain limitations have been imposed under the 3¼ per cent. scheme, namely the monthly income of a tenant may not exceed £25. The Treasury has subsequently agreed to this figure being increased to £30 and where a system of differential rentals is in operation to £43. The cost of a dwelling constructed from 3¼ per cent. or ¾ per cent. funds should be limited to £1,400 (inclusive of everything) for areas to which the provisions of the Wage Act, No. 44 of 1934, and the Industrial Conciliation Act, No. 36 of 1937, have been applied and £1,200 (inclusive of everything) for other areas.

Schemes Approved

During the year under review 48 new schemes (including two loans for the purchase of land and one for the restoration of 17 dwellings in the old Malay Quarter at Cape Town) for loans totalling £3,504,150 and involving 4,929 dwellings were approved as well as loans totalling £831,395 for the completion and/or extension of existing schemes and for 25 additional dwellings. Twelve schemes for loans totalling £1,445,585 and involving 3,142 dwellings were converted from the ¾ per

cent. basis, giving therefore, a total of 60 National Housing assisted 3¼ per cent. schemes approved on the recommendation of the National Housing and Planning Commission; schemes approved on the recommendation of the Natal Housing Board are reported on separately by that body.

An analysis of the statement on pages 9 and 10 shows that allocations for National Housing assisted 3¼ per cent. funds during the year under review amounted to £6,548,363, divided among the four provinces as follows:—

Cape Province, £1,485,021; Natal, £1,940; Orange Free State, £119,600; and Transvaal £4,941,802. Approved loan applications out of the above allocations amounted to £5,781,230 and involved 8,096 dwellings and other structures.

Housing of the aged, poor and totally unfit persons (1s. per cent.).

Loans Granted and Dwellings Involved

During the year under review loans totalling £40,860 for 66 dwellings or other structures were approved. Allocations from 1s. per cent. funds for the housing of the aged, poor and totally unfit persons during the year, amounted to £26,060 divided among the four provinces as follows: Cape Province, £17,680; Natal, £1,000; Orange Free State, £7,380; and Transvaal, nil.

The Government stands committed to a sum of £350,000 in respect of the housing of the aged, poor and totally unfit persons, out of which commitment a sum of £50,000 was made available on the estimates of the financial year 1946-47.

Allocations amounted to £318,213 from the commencement of this type of housing loan up to 31st December, 1946.

Out of the above total allocation of £318,213 twenty-four schemes involving 578 dwellings representing loans totalling £235,565 were approved up to the 31st December, 1945.

Activities in respect of all types of Housing under the Housing Act during 1946 in respect of schemes approved on the recommendation of the National Housing and Planning Commission

During the year the value of approved loan applications totalled £8,919,613 involving the erection or enlargement of 10,802 dwellings, compared with loans totalling £7,265,897 involving 9,861 dwellings during 1945.

The following are the details of loans approved and dwellings involved in respect of European and non-European housing during the year under review:—

Service.	Value of Loans.			Number of Dwellings.		
	European. £	Non-European. £	Total. £	European.	Non-European.	Total.
<i>Economic Housing—</i>						
Schemes and dwellings (4 per cent.†)	1,286,053	—	1,286,053	712	—	712
Individual loans (4 per cent.†)	462,305	6,115	468,420	351	5	356
*National Housing — assisted 3¼ per cent.	1,138,222	4,643,008	5,781,230	728	7,368	8,096
National Housing — assisted ¾ per cent.	566,218	776,832	1,343,050	651	921	1,572
Housing of aged, poor and totally unfit persons (1s. per cent)	21,780	19,080	40,860	44	22	66
Total Union	3,474,578	5,445,035	8,919,613	2,486	8,316	10,802

The following statement summarises activities in respect of all types of housing under the Housing Act No. 35 of 1920,

as amended, from its commencement on 16th August, 1920, upto 31st December, 1946 :—

Province.	European. £	Non-European. £	Total. £	Loan Issues. £	Completed.	Under Con- struction.	Not yet Com- menced.	Total.	Total for Euro- pean Occupation.	Total for Non- Euro- pean Occupation.
A—Economic Housing—										
Cape	2,767,454	712,717	3,480,171	3,056,278	8,376	165	337	8,878	3,678	5,200
Natal	665,284	276,269	941,553	741,663	1,250	2	229	1,481	616	865
Orange Free State	1,142,142	20,618	1,162,760	805,610	2,593	29	213	2,835	1,195	1,640
Transvaal	3,994,444	293,412	4,287,856	3,770,817	6,083	155	521	6,759	4,254	2,505
Total	8,569,324	1,303,016	9,872,340	8,374,368	18,302	351	1,300	19,953	9,743	10,210
*B.—National Housing Assisted 3¼ Per Cent.—										
Cape	297,984	2,378,270	2,676,254	†	1,507	916	1,897	4,320	286	4,034
Natal	105,443	623,397	728,840		106	67	63	236	91	145
Orange Free State	101,400	115,300	216,700		—	140	147	287	70	217
Transvaal	2,197,885	4,908,850	7,106,735		3,355	2,072	5,631	11,058	1,421	9,637
Total	2,702,712	8,025,817	10,728,529		4,968	2,195	7,738	15,901	1,868	14,033
C.—National Housing Assisted ½ Per Cent.—										
Cape	2,230,790	6,977,167	9,207,957	†7,100,541	15,465	1,031	5,073	21,569	3,640	17,929
Natal	23,324	1,818,178	1,841,502	1,597,465	2,145	40	1,830	4,015	20	3,995
Orange Free State	167,758	63,375	231,133	61,972	135	115	167	417	153	264
Transvaal	1,363,945	3,154,402	4,518,347	6,224,566	9,843	693	1,441	11,977	1,468	10,509
Total	3,785,817	12,013,122	15,798,939	14,984,544	27,588	1,879	8,511	37,978	5,281	32,697
D.—Housing of Aged Poor—										
Cape	78,049	40,721	118,770	78,150	326	12	94	432	208	224
Natal	25,000	6,000	31,000	25,000	50	23	—	73	50	23
Orange Free State	53,555	—	53,555	42,325	77	—	14	91	91	—
Transvaal	72,100	1,000	73,100	34,800	21	2	25	48	38	10
Total	228,704	47,721	276,425	180,275	474	37	133	644	387	257
Total A, B, C and D	15,286,557	21,389,676	36,676,233	23,539,187	51,332	5,462	17,682	74,476	17,279	57,197

* Includes conversions from ½ per cent. to 3¼ per cent.

† Included in issues for (C) National Housing assisted ½ per cent.

**The Elimination of the Slums Act No. 53 of 1934
as amended by Act No. 24 of 1937**

This Act was promulgated on the 21st June, 1934, and has subsequently been extended to the 53 centres scheduled hereunder :—

Cape Province		Orange Free State	
Beaufort West	Cape Town	Bethlehem	Kroonstad
Ceres	Cradock	Bloemfontein	
East London	Fort Beaufort		Transvaal
George	Graaff-Reinet	Barberton	Middelburg
Grahamstown	Kimberley	Benoni	Nelspruit
Kingwilliamstown	Mossel Bay	Boksburg	Peri Urban Areas Health Board.
Oudtshoorn	Paarl	Brakpan	Pietersburg
Port Elizabeth	Queenstown	Edenvale	Pretoria
Simonstown	Somerset East	Ermelo	Randfontein
Steynsburg	Stellenbosch	Germiston	Roodepoort-Maraisburg
Somerset West	Uitenhage	Hercules	Springs
Malmesbury	Middelburg	Johannesburg	Vereeniging.
Walmer	Worcester	Krugersdorp	
Natal			
Durban	Tongaat	During the year under review the Act was extended to six of the above-mentioned centres, viz. Ceres, Malmesbury, Edendale, Tongaat, Peri Urban Areas Health Board and Rustenburg.	
Pietermaritzburg	Edendale Public Health Area		

TECHNICAL NOTES

IN his remarks at the opening of the new Masonite factory at Estcourt, to which we made reference in our March issue, Mr. Havenga referred to the small savings generally made when local manufacture was dependent upon imported raw materials. This new undertaking, however, did not fall within this category. On the contrary, it made use of waste wood and could, therefore, help South Africa to husband her slender timber resources. In addition, it would save the Union up to a million pounds worth annually of imported material.

The manufacture of Masonite in this country, he considered, was something of great value to the building trade which had become so important in modern times that industrial endeavour and prosperity were largely measured by it. The warning that no local industry could face overseas competition, when its products were not up to standard or if its production methods resulted in high costs, was not necessary in this instance. The fact that the new enterprise was backed by the finance and skill of the Masonite Corporation of Chicago showed that production methods and quality would be of the best.

Mr. Havenga expressed the hope that America would continue to supply the technical skill and capital necessary to develop the large variety of raw materials abundant in the Union.

RAILWAY DEVELOPMENTS

The work on the Hex River Tunnel on the main line between Johannesburg and Cape Town will be continued without interruption.

Expenditure up to the present amounts to £351,000 including £95,000 on machinery and equipment. The main tunnel, of which the south portal has been opened up, will be nearly eight miles long.

A bird's eye view of the old Wanderers site where Johannesburg's new station is now taking shape. On the extreme left is the covered parcels depot and in the centre, running from east to west of the station, the main parcels subway. The little squares in the centre of the picture mark the positions where the main concrete supports for the Rissik Street bridge will shortly be erected.

When the tunnels are completed, the distance from Johannesburg to Cape Town by rail will be shortened by $4\frac{3}{4}$ miles, while a considerable saving in curvature and reduction in rise and fall will be effected.

New Johannesburg Station

Stage one of the construction of Johannesburg's new railway station is nearly finished. The permanent Harrison Street bridge, which forms part of the new Johannesburg Station Plan, has now reached a stage where construction work has had to be suspended until such a time as the existing sub-way for the city's motor traffic can be closed. The excavations and construction of new platforms on the old Wanderers site are being pushed ahead as much as possible and it is hoped to transfer the railway lines from the existing to the lower level during the first half of next year.

Originally it was hoped to complete this work towards the end of this year, but owing to shortage of material and especially of cement, it will be impossible to work to the original schedule.

Approximately six months before the transfer of the railway platforms and track from the existing lower level, the Harrison Street subway for motor traffic will be closed and the traffic diverted from the sub-way to the existing temporary bridge running into Harrison Street on the northern side of the railway lines. This will be necessary in order to continue with the work on the permanent bridge. As soon as this part of the work is completed, the temporary bridge will be demolished.

The Wanderers Street bridge, on the eastern end of the "bottle-neck," is nearly completed.

As soon as the existing platforms and track have been transferred to the lower level, a start will be made with Stage Two of the Station Plan, i.e., the excavation of the existing



Photograph: S.A. Railways.

station area to the same level as the adjoining Wanderers site. This latter part of the station will on completion, cater for suburban traffic, while the northern section of the station, which is now being constructed on the old Wanderers site, will be reserved for main-line traffic. In both main-line and suburban sections, separate provision will be made for European and non-European passengers.

NEW EARTHMOVER.

The "Model D Roadster Tournapull" a new, small-sized unit for high-production earthmoving on small yardage projects has been added to the line of earthmoving equipment manufactured by R. G. Le Torneau, Inc., Peoria, Illinois. Designed for self-loading, this one-man operated, high-speed Tournapull is especially suited for use in the pit and quarry field. Powered by a 100-h.p. diesel engine, this prime mover, which travels at speeds up to 25 miles per hour, is used with the E-9 Carryall scraper, a 9-ton or 7 cu. yd. heaped capacity unit.

A feature of this new Tournapull is the complete control of all steering and scraper operations by individual electric motors. The operator steers, and handles all scraper controls by means of toggle switches located on the control panel. Also incorporated in this machine is a torque-proportioning differential which automatically supplies power to the wheel on the firmest footing. Because of this both wheels are kept pulling at all times and neither wheel will spin independently of the other.

Multiple disc air brakes, on four wheels, provide 3,132 sq. in. of braking surface, adding to safe operation. The D Roadster is mounted on 14 x 32 tapered bead tyres, which provide flotation on soft material and enable this machine to travel on paved surfaces without damage.

The representatives for all Le Tourneau equipment in South Africa are B. M. S. Limited, P.O. Box 50, Cleveland, Transvaal, and who have Branch offices at Durban, Cape Town and Port Elizabeth; also B.M.S. Engineering Company (Rhodesia), Limited, Salisbury.

SPEEDY PORTABLE ELEVATOR FOR BUILDING CONSTRUCTION

A portable elevator for hoisting bricks, mortar, concrete and other building materials, has just been made available for export by Mercator Corporation, Reading, Pa., U.S.A.

It is said that the elevator is the speediest and sturdiest ever developed. Made by the OK Clutch and Machinery Co., of Columbia, Pa., it will handle materials at a speed of 200 feet per minute up to a height of 100 feet. Of sturdy all-welded construction, it has a base section 6½ feet high, and additional 10 foot sections, all welded into one piece with a jim pole for easy erection.

The elevator is manufactured in three sizes, 10 h.p., 18 h.p. and 28 h.p., capable of handling loads from 800 pounds to 2,600 pounds.

If it is desired to dump materials from any level en route, a ½ cubic yard concrete bucket is available for attachment to the elevator. To attach the bucket, the platform is removed from the carriage, and the bucket is mounted in its place, with attachments on the guide rail to control dumping at any pre-determined height.

New Light Diesel Engine

Nordberg Manufacturing Co., Milwaukee 7, Wis., announ-

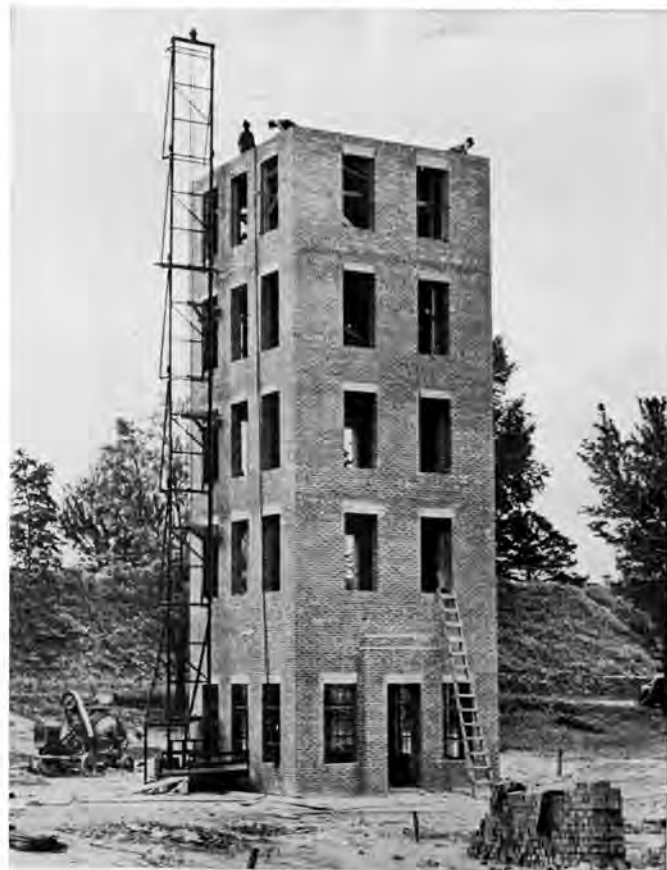


The Model D Roadster Tournapull in action.

ces the introduction of a Nordberg Type 4FS-1 four cycle, one-cylinder, 4½" x 5½" Diesel engine.

This 4FS-1 engine has a rating of 10-15 h.p. at operating speeds of 1,200-1,800 r.p.m. It was developed to meet the need for a simple, compact, dependable engine capable of continuous heavy duty service. It is offered as complete, self-contained, ready to operate units for direct connection or belt drive, as electric generating sets and as pumping units. There are three models of this engine.

This company, which has specialised in the production of diesel engines, can now offer an extensive range from this 4FS-1 up to units of 8,500 h.p., the largest so far constructed in America.



A new portable elevator in operation.

ABSTRACT OF GOVERNMENT REGULATIONS

FOR some years past the flow of government regulations, in South Africa as in other countries, has been voluminous. It is not easy for the professional man to keep abreast of laws, ordinances and regulations which may affect him. In South Africa, too, with four provincial administrations, as well as the Union Government, all, necessarily, issuing orders of various types covering wide fields of activity, the task is particularly difficult. Accordingly, we propose, from time to time, to publish abstracts of new regulations, with references as to where they may be found and read in full by those of our readers who are especially interested.

Industrial Conciliation Act, 1937 — Agreement relating to the Iron, Steel, Engineering and Metallurgical Industry.

Extraordinary Gazette, No. 4140, dated 8th April, 1949.

This agreement, empowered under sub-section (1) of section 48 of this Act came into force on the 18th April, 1949, and will remain binding until 17th April, 1951. It relates to wages and hours of work for a large number of classes of artisans, employed in five specified regions of the Union. All employers and employees of the trades named are bound by this agreement, except ISCOR, AMCOR and industries concerned with the manufacture, fabrication or assembly of metal windows or doors.

Hours of work are laid down as 46 per week and overtime and night shift work rates are specified. Conditions as to short time notice, payment of earnings, premium bonus system, holiday and unemployment pay, special hours, allowances, termination of employment, juvenile workers' certificate and similar matters are dealt with in detail.

Price Control on Timber.

Extraordinary Gazette, No. 4138 dated 1st April, 1949.
Item No. 631 ; pp. 3, 4.

The effect of this notice is to restore price control on timber and to "freeze" the price at February, 1949, levels.

Woodworking Industry, Witwatersrand.

Extraordinary Gazette, No. 4139, dated 1st April, 1949.
Item No. 640 ; pp. 1-11.

This arbitration award, in accordance with War Measure No. 145 of 1942, lays down remuneration, payment, hours of work, overtime rates, annual leave, and other conditions relating to this section of the Woodworking Industry.

The Director of the National Building Research Institute, Council for Scientific and Industrial Research, P.O. Box 395, Pretoria, would be pleased to receive from building trade suppliers information of building materials and equipment, with particular regard to house construction.

PUBLICATIONS RECEIVED

Public Health in South Africa, by E. H. Cluver, M.A., M.D., Director, South African Institute of Medical Research. 383 pp. including index, published by Central News Agency, 30/-.

The fifth edition of this standard work has been largely rewritten in the process of bringing it up to date. The chapter on sociological medicine, however, which appeared in previous editions, has been omitted. It will, nevertheless, appear in expanded form, presumably as a separate volume, within the next few months.

Of particular interest are the chapters on Ventilation, Water, Housing, Public Health Legislation and Industrial Hygiene. In Chapter III the legal ventilation requirements of the Union, as laid down by Acts of Parliament and the Johannesburg Municipal By-Laws, are outlined.

In the chapter on Housing it is pointed out that "in South Africa, town planning is in its infancy, the existing towns having largely grown as chance and circumstances prompted." Following this statement the set-up of the various township boards is described. This chapter also sets out the headings under which Union Health Departments draw up their reports on local authority areas, especially those not employing a full-time Medical Officer of Health. Slum elimination measures and the various housing schemes are also described.

Under the heading of "Nuisance" the chapter on Public Health legislation deals with unfit dwellings. In the Industrial Hygiene chapter there is a useful section on sanitation in factories. This book should be on the bookshelf of anyone concerned with town planning or building design and erection, for reference when questions of public health are under consideration.

DEPARTMENT OF FORESTRY — Annual Report for the Year ended 31st March, 1948. U.G. No. 79/48. Price 2/6d., from the Government Printer, Pretoria. 22 pp.

This report is largely statistical. There are, however, short chapters on the constitution, and management, of the state forests, on the state sawmills and preservation of plants. The Research Department was much hampered by the retirement from Government service of the Chief Forest Research Officer and the Senior Professional Officer during the year. Two tables show the distribution of main species of trees according to conservancies and age classes.

Report of the Secretary for Public Works for the Period 1st April, 1946, to 31st March, 1947. U.G. 10/49. Price 4/6d. from the Government Printer, Pretoria. 22 pp.

While some part of the report is taken up with domestic staff matters there are portions, dealing with the functions of the department as a whole and of its various divisions as well as with the construction and costs of important major works, which will interest architects and others concerned in the operations of the Public Works Department. The itemisation of tasks and duties in the different divisions of the department is particularly valuable.

Annual Statement of the Trade and Shipping of the Union of South Africa — 1946. Price 2 guineas from the Government Printer, Pretoria. 595 pp.

LIBRARY ACCESSIONS

C.S.I.R. Information, in its present form, is a list of accessions to the Library and Information Division of the South African Council for Scientific and Industrial Research. Many of the publications were received from the Union's Scientific Liaison Offices in London and Washington.

The arrangement of the accessions list is alphabetical under subject headings. As far as practicable these headings have been kept uniform with those used in the **Industrial Arts Index**, a publication familiar to most searchers for technical information. The classification numbers follow the Universal Decimal Classification. Short annotations or abstracts have been added when the titles are not self-explanatory. Certain documents have already been handed on to institutions which have built up collections covering highly specialised fields. In such cases the name of the institution is given in this list, as the document in question is located there. Applications to borrow such items should be sent direct to the institute named, not to the C.S.I.R. Library.

Publications not in constant use by the departments of the C.S.I.R. may be borrowed through the post. **Enquirers should quote the number at the left-hand side of each item (e.g. 34/21)** and address their letters to:—

Library and Information Division,
South African Council for Scientific and Industrial Research,
P.O. Box 395, Pretoria.

Documents should be returned to the Library by **registered post, packed flat**.

HEATING. Steam.

34/88 DYE, Frederick W.

Steam heating; a practical treatise describing the different methods or systems adopted in warming buildings by steam, low-pressure, vapour, vacuum, high-pressure, reduced pressure, exhaust steam, etc., and embracing the available means of heating water, and cooking by steam; second edition.
London, E. and F.N. Spon, Ltd., 1944.
vi, 203 p. tables, diags.

697.5.

HOSPITALS.

34/90 BUTLER, Charles and Addison Erdman.

Hospital planning . . . New York, F. W. Dodge corporation, 1946.
xix, 236 p. front., illus., maps, diags.
This book deals with hospital planning from the point of view of the architect.

725.51.

HOUSING.

34/91 ASSOCIATION of building technicians, London.

Homes for the people . . . London, Paul Elek, publishers, 1946.
182 p. illus., plates, plans.
"How modern building technique can provide high standard dwellings quickly; how they could be planned and built; what they could look like; and how we can get them."
—Sub-title.

728.693.

34/92 BOWLEY, Marian.

Housing and the state: 1919-1944 . . . London, George Allen and Unwin, Ltd., (1947).
viii, 283 p. tables.
". . . The purpose of this book . . . has been to describe and explain some of the more important conditions which must be satisfied if certain types of housing policy are to be successful . . . This method of approaching the housing question has led me into a discussion of housing policy between 1919 and 1939.

ILLINOIS. University. Auditorium.

34/99 ILLINOIS. University. Engineering experiment station.

. . . The correction of echoes and reverberation in the auditorium, University of Illinois, by F. R. Watson and James M. White . . . Urbana, University of Illinois, 1916. (Bulletin vol. 13, no. 39, May 29, 1916; Engineering experiment station bulletin no. 87.)
20 p. illus., diags.
(In National Building Research Institute.)

Pam. 534.844.4:727.3(773).

INDUSTRIAL HEALTH ENGINEERING.

34/100 BRANDT, Allen D.

Industrial health engineering . . . New York, John Wiley and Sons, inc., 1947.
viii, 395 p. illus., tables, diags. (some folding).
". . . this book has been written to make available to plant engineers, to construction and consulting engineering firms, and to inexperienced industrial hygiene engineers in condensed, practical, and useful fashion a summary of the information and data needed to determine what control measures should be employed and how control equipment should be designed so that when installed it has a fair chance of doing a satisfactory job." — Preface.

613.6.

INVENTIONS.

34/106 HAYES, John E. R.

The nature of patentable invention: its attributes and definition . . . Cambridge, Mass., Addison-Wesley press, inc., 1945.
(vi) 183 p.

608.3.

34/107 MEINHARDT, Peter.

Inventions, patents and monopoly . . . London, Stevens and Sons, Ltd., 1946.
xvi, 352 p.
Bibliography pp: 335-337.
Sections: Inventors and inventions; British patent law and practice; the abuse of patent monopoly; suggestions for patent law reform.

608.3.

JERUSALEM.

34/108 KENDALL, Henry.

Jerusalem: the city plan: preservation and development during the British mandate, 1918-1948 . . . London, H.M. Stationery office, 1948.
xi, 123 p. front., illus. (some col.), plates, plans (some folding).

LAMBETH, London.

34/110 CORNWALL, Duchy of.

North Lambeth and Southwark redevelopment area; study prepared for His Majesty's council of the Duchy of Cornwall; by Holroyd F. Chambers . . . and Louis de Soissons . . . The Duchy of Cornwall, 1945.
[18] p. 16 coloured plans (1 in end cover), tables, diags.

711.4(421).

LIGHTING.

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. . . The provision of electric lighting in dwellings. London, British standards institution, 1948 (British standard code of practice CP 324.101(1948) general series).
18 p. table, diagr.

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. . . An investigation of student study lighting, by John O. Kraehenbuehl . . . Urbana, University of Illinois, 1937. (Circular no. 28).
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(In National Building Research Institute.)

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28 p. tables.
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MATERIALS.

- 34/118 BRADY, George S.
Materials handbook: an encyclopedia for purchasing agents, engineers, executives, and foremen; fifth edition. New York, McGraw-Hill book company, inc., 1944.
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(Not available on loan).
620.2.(03).

METALS.

- 34/120 BOAS, W.
An introduction to the physics of metals and alloys . . .
New York, John Wiley and sons, inc., 1947.
xii, 193 p. illus., tables, diags.
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- 34/121 SEITZ, Frederick.
The physics of metals. . . New York, McGraw-Hill book company, inc., 1943. (Metallurgy and metallurgical engineering series).
xiii, 330 p. tables, diags.
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- 34/122 ILLINOIS. University. Engineering experiment station.
. . . A study of slip lines, strain lines, and cracks in metals under repeated stress, by Herbert F. Moore and Tibor Ver. Urbana, University of Illinois, 1930. (Bulletin vol. 37, no. 40, June 3, 1930; Engineering experiment station, bulletin no. 208).
62 p. illus., tables, diags.
(In National Building Research Institute).
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NAIROBI.

- 34/131 NAIROBI. Municipal council.
Nairobi master plan for a colonial capital: a report prepared for the Municipal council of Nairobi by . . . L. W. Thornton White . . . L. Silberman . . . [and] P. R. Anderson . . . London, H.M. Stationery office, 1948.
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Symposium on paint and paint materials (1947): Philadelphia spring meeting, American society for testing materials, February 25, 1947 . . . Philadelphia, American society for testing materials 1947. (Special technical publication no. 75).
115 p. illus. (photos.), tables, diags.
667.61.

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Protective and decorative coatings: paints, varnishes, lacquers and inks . . . New York, John Wiley and sons, inc., (c1941-1946).
5 vols. illus., tables, diags.
Contents: Vol. I, Raw materials for varnishes and vehicles; Vol. II, Raw materials: pigments, metallic powders, and metallic soaps; Vol. III, Manufacture and uses: colloids, oleoresinous vehicles and paints, water and emulsion paints, lacquers, printing inks, luminescent paints, and stains; Vol. V, Analysis and testing methods.
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PATENT DRAWINGS.

- 34/143 RADZINSKY, Harry.
Making patent drawings . . . New York, the Macmillan co., 1945.
vii, 96 p. illus.
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PIERS.

- 34/146 ILLINOIS. University. Engineering experiment station.
. . . Laboratory tests of three-span reinforced concrete arch ribs on slender piers . . . by Wilbur M. Wilson and Ralph W. Kluge. Urbana, University of Illinois, 1934. (Bulletin vol. 32, no. 32, September 11, 1934; Engineering experiment station bulletin no. 269).
122 p. illus., tables, diags. (some folding).
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- 34/149 ILLINOIS. University. Engineering experiment station.
. . . Tests on the hydraulics and pneumatics of house plumbing, part II, by Harold E. Babbitt. Urbana, University of Illinois, 1928. (Bulletin vol. 25, no. 46, July 17, 1928; Engineering experiment station, bulletin no. 178).
64 p. illus., tables, diags.
Main sections: Tests of trap seals; loss of pressure in faucets; tests on mixing valves of shower baths; tests on plumbing system of a tall building.
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PLYWOOD.

- 34/150 BRITISH intelligence objectives sub-committee.
Pressed wood and plywood plants at Stadthagen, Troisdorf. Mannheim and Wendlingen; reported by . . . C. Greaves . . . CIOS item no. 22: forest products. London, H.M. Stationery office, [1946 ?] (BIOS final report no. 235, item no. 22).
12 p. Mimeographed.
(Copy also in Commerce and Industries.)
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RAILS. Welded.

- 34/168 ILLINOIS. University. Engineering experiment station.
. . . First progress report of the joint investigation of continuous welded rail . . . by Herbert F. Moore. Urbana, University of Illinois, 1939 (Bulletin vol. 36, no. 88, June 30, 1939; Engineering experiment station, reprint series no. 13).
29 p. illus., tables, diags.
Reprinted from Proceedings of the American railway engineering association, vol. 40, pp. 687-713 (1939).
Main sections: Etch tests, metallographic tests and hardness surveys; Mechanical tests of specimens from welded rail rail joints; Tests of welded joints under repeated wheel load; Bend tests and drop tests of welded joints.
(In National Building Research Institute.)
Pam. 625.143: 624.078.3]: 620.17 (047.1).

RIVETED JOINTS.

- 34/169 ILLINOIS. University. Engineering experiment station.
. . . Fatigue tests of riveted joints . . . by Wilbur M. Wilson . . . and Frank P. Thomas . . . Urbana, University of Illinois, 1938 (Bulletin vol. 35, no. 79, May 31, 1938; Engineering experiment station, bulletin no. 302).
116 p. illus., tables, diags.
(In National Building Research Institute.)
Pam. 624.078.3: 620.178.3.

ROOFS.

- 34/171 COLLINGS, George.
Roof carpentry: practical lessons in the framing of wood roofs for the use of working carpenters . . .
London, Technical press, ltd., 1938.
x, 150 p. tables, diags.
69.024: 694.

SLABS.

- 34/176 ILLINOIS. University. Engineering experiment station.
. . . Moments in simple span bridge slabs with stiffened edges . . . by Vernon P. Jensen. Urbana, University of Illinois, 1939. (Bulletin vol. 36, no. 97, August, 1939; Engineering experiment station, bulletin series no. 315).
108 p. tables, diags.
(In National Building Research Institute.)
Pam. 624.21.073: 624.012.3.

TENDERS INVITED

BUILDING, ETC.:

Cape Town Municipality: Erection and completion of catering staff restrooms at Cape Town. On and after 22 April, 1949, tender documents may be inspected at the office of the Resident Engineer, Construction, Cape Town, and the office of the Chief Civil Engineer, Room 27, Railway Headquarters, Johannesburg. On payment of a deposit of £5 5s. (five guineas) a copy of the tender forms, bills of quantities and drawings may be obtained from the office of the Resident Engineer, Construction, Cape Town.

Tenders are returnable to the Chairman of the South African Railways Tender Board, as directed in the "Notice to Contractors" embodied in the tender documents. This tender closes punctually at 9 a.m. on Friday, 27th May, 1949. The lowest or any tender will not necessarily be accepted, nor will any reasons be assigned for the rejection of a tender. Tender No. C.C.E. 157.

Kingwilliamstown, C.P.: Additions to the strong-room of the office of the Registrar of Deeds. Public Works Department, Pretoria. Tender No. P.W.D. 205. Due, 2/6/49.

Amanzimtoti Municipality: Offers for the purchase of various residential sites. Town Clerk, Amanzimtoti. Due, 7/6/49.

ELECTRICAL EQUIPMENT, ETC. :

Kokstad Municipality : Electrical extensions : Supply, delivery and erection where specified, of the plant and materials for the following : Steam raising plant, coal, and ash-handling plant, valves, piping, water tanks and water softener. Contract A. Two 625 k.w. steam turbine-driven generating sets, main and auxiliary switch gear, station transformers, main and auxiliary cables and power station wiring, circulating water piping, pumps and cooling pond equipment. Contract B. High tension and low tension sub-station switch gear, transformers and 11 k.v. cable. Contract C. (Duplicate copies of documents on deposit of £3-3-0—extra copies at 10/6 each). Consulting engineer : George Drewett, Manlin House, 17, Harrison Street, Johannesburg. Due, 27/6/49.

Pietermaritzburg Municipality : 6,600 v. Switch Gear. City Electrical Engineer and Transport Manager, Pietermaritzburg. Contract 253/E. (3 Copies of documents free of charge — extra copies at 5/- each). Due, 14/7/49.

Roodepoort-Maraisburg Municipality : Material for electricity reticulation. Town Clerk, Roodepoort-Maraisburg. Extended, 13/6/49.

Nelspruit Municipality : Hydro-electric plant, penstock and transmission line equipment. Contract E.3/1948. Town Engineer, Nelspruit. Further extended, 18/8/49.

Durban Municipality : Offers for the purchase of the following trucks : 1 only 1941 G.M.C. 2-ton truck with flat platform body — 6 wheels ; 1 only 1941 G.M.C. $\frac{3}{4}$ -ton truck. Further particulars, P.O. Box 96, Port Shepstone. Electricity Supply Commission, Natal Undertakings, P.O. Box 2408, Durban.

Johannesburg Municipality : Electrical cable. Tender No. 321. Tenders will be received by the Chairman of the Tender Board, Room 715, P.F.A.C. Buildings, 15, De Villiers Street, Johannesburg, not later than 9 a.m. 2nd June, 1949. Tender forms, with full particulars, may be obtained from the Chief Stores Superintendent, S.A.R., Park Chambers, Rissik Street, Johannesburg or from any S.A.R. Stores Superintendent.

Electrical line material. Tender No. C.219. Tenders will be received by the Chairman of the Tender Board, Room 715, P.F.A.C. Buildings, 15, De Villiers Street, Johannesburg, not later than 9 a.m. 2nd June, 1949. Tender forms with full particulars, may be obtained from the Chief Stores Superintendent, S.A.R. Park Chambers, Rissik Street, Johannesburg, or from any S.A.R. Stores Superintendent.

ENGINEERING, ETC. :

Cape Town Municipality : 12" reinforced concrete spun pipes : 12" C.I. Specials : Form of Tender A. 31/49. City Engineer, Cape Town. Due, 2/6/49.

Johannesburg Municipality : Radial drilling machine. Tender No. C. 193. Due, 2/6/49 ; Pipe-cutting machine. Tender No. C. 196. Due, 2/6/49 ; Copper plates for loco boilers. Tender No. B. 371. Due, 23/6/49. S.A.R. Tender Board, Room 715, P.F.A.C. Buildings, 15 De Villiers Street, Johannesburg.

POWER PLANT :

Bulawayo Municipality : Supply, delivery and erection in the 13th Avenue power Station, Bulawayo, of one 30,000 plant and auxiliary equipment, which forms part of the k.w. turbo alternator with condensing and feed heating. 2nd extension of the power station. Contract E.53/1949. (3 copies of specification and contract documents on

deposit of £5-5-0 — extra copies at £2-2-0 each). Town Clerk, Bulawayo. Due, 26/8/49.

REFRIGERATION PLANT, ETC. :

Johannesburg Municipality : Refrigerating Plant. Contract 885. Due, 17/6/49. Electric refrigerator. Contract 886. Due, 17/6/49. City Treasurer, Johannesburg.

TELEPHONE EQUIPMENT, ETC. :

Bloemfontein Municipality : Automatic telephone equipment. Enquiry 8/1949. City Electrical Engineer, Bloemfontein. Due, 1/6/49.

Durban Municipality : P.B. X. Switch Board, Plugs, and Cords. Tender P. 306. Telephone Exchange, Durban. Due, 10/6/49.

Johannesburg Municipality : Telegraph line material. Tender No. C. 206. Due, 23/6/49 ; Telephone cables. Tender No. C. 133. Due, 30/6/49 ; Telephone cable. Tender No. C. 326. Due, 14/7/49 ; Telephone cable. Tender No. C. 132. Due, 14/7/49. S.A.R. Tender Board, Room 715, P.F.A.C. Buildings, 15, De Villiers Street, Johannesburg.

WATER :

Johannesburg Municipality : Centrifugal pumps. Tender No. F. 359. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 2/6/49.

Pretoria Municipality : Engine-driven borehole pumping plant. Tender Irr. 544. Due, 2/6/49 ; Supply of insulators and fuses. Tender Irr. No. 527. Due, 26/5/49 ; Tender forms obtainable from Controller of Stores, Irrigation Department, P.O. Box 277, Pretoria.

MISCELLANEOUS :

Roller Bearings : Tender No. B.213. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 16/6/49.

Concrete Poles : Tender No. C. 266. S.A.R. Tender Board, Room 715, S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 27/5/49.

Steel Poles : Tender No. C.327. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 16/6/49.

Light Steel Poles : Tender No. C.328. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 27/5/49.

Track Jacks : Tender No. A. 348. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 27/5/49.

S.A. Manufactured Pneumatic Tyres and Tubes : Tender No. F. 244. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 27/5/49.

Circular Saw Bench. Contract 884. City Treasurer, Johannesburg. Due, 17/6/49.

Supply of General Hardware Material : Tender No. P.W.D. S. 312. Public Works Department, Pretoria. Due, 25/5/49.

17,000 ft. 4-core, .003 sq. in. per core, low voltage rubber-insulated cable. Specification 338. Controller of Stores and Buyer, Pretoria West. Due, 3/6/49.

Two electrically-operated Traversers : Tender No. C. 8599. S.A.R. Tender Board, Room 715, 15, De Villiers Street, Johannesburg. Due, 25/8/49.

Abrasive Cleaning Plant : Tender No. C. 104. S.A.R. Tender Board, Room 715, 15 De Villiers Street, Johannesburg. Due, 2/6/49.

TENDERS ACCEPTED

AIR CONDITIONING AND CENTRAL HEATING :

Two Air Conditioning Plants for Public Works Department Laboratory, Pretoria. Tender 24/1/1316 P.W.D./314 : S.A. General Electric Co., Ltd., Johannesburg. £140 19s. 9d. each.

Four Central Heating Boilers for G.P.O. Annexe, Pretoria ; Tender 24/1/1353 P.W.D./D.P.W. 306 : Safex Engineering Co. (Pty.), Ltd., Johannesburg. £223 each.

BUILDINGS AND ALTERATIONS, ETC. :

Erection to Native Shelter and additions and repairs to Public Offices, for Public Works Department, Kestell, Orange Free State ; Tender 24/1/1988 P.W.D./D.P.W. 145. H. Navarro, Bethlehem, £2,027.

Building Material to the Tarka Conservation Area, Hofmeyr ; Tender 25/1/1533 S.O. 3111 : Sam Newman, Ltd., Cape Town. E. R. Pollak, Ltd., Johannesburg. Hillman Bros., Pretoria. Ballantine Ltd., Pretoria. Genplum (Pty.), Ltd., Durban. W. R. Boustred, Ltd., Johannesburg. A. Schauder and Sons (Pty.), Ltd., Port Elizabeth. Herbert Evans and Co., Ltd., Pretoria.

Bricks and Tiles to the School of Industries, Queenstown. Tender 25/1/1501 S.O. 48 Central Agencies and Import Co. (Pty.), Ltd., East London. J. J. Kirkness, Ltd., Pretoria.

New Post Office, Bethal, for the Department of Public Works. Tender 24/1/729. P.W.D./D.P.W. 162 : H. L. van Slingeland and Co. (Pty.), Ltd., Bethal. £32,825.

Automatic Exchange Extension, Malvern (Durban) for the Department of Public Works ; Tender 24/1/689. P.W.D./169 : A. W. Johnson Builders (Pty.), Ltd., Durban. £5,398.

Structural Steelwork for South African Railways ; Tender 8384. Dorman Long (Africa) Ltd. £21,483 3s. 6d.

Reinforcing Steel for South African Railways ; Tender 8545. S.A. Consolidated Agencies. £149,806 1s. 9d.

Construction of six Houses at Retreat for South African Railways ; Tender C.C.E. 140. Schep and Nathan. £12,888.

Erection of Rest Rooms and Rondavels at Mtubatuba for South African Railways ; Tender, H. Metcalfe. £7,500.

Sub-Station Building : Selborne Road, for Durban City Council. Tender B.1576 : Messrs. L. Donkin and Co., Durban. £1,375.

COOKING EQUIPMENT, ETC. :

Three Storage Cookers for Technical High School, Oudtshoorn ; Tender 24/1/673 P.W.D. 167. M. Green and Co. (Pty.), Ltd., Cape Town. £1,433 7s. Erection, £75. Provisional sum, £20.

One Heat Storage Cooker for Langenhoven Commercial School, Oudtshoorn ; Tender 24/1/1403. P.W.D. 166. M. Green and Co. (Pty.), Ltd., Cape Town. £481 2s. 4d. Erection, £25. Provisional sum, £20.

ELECTRICAL EQUIPMENT, ETC. :

Four Cutter Moulding Machine for Electricity Department, Johannesburg Municipality. Tender No. 748. Messrs. Rogers-Jenkins and Co. (Pty.), Ltd. £1,447.

Four Automatic Radio Direction-Finding Apparatus for Transport, Pretoria. Tender, 25/1/1537. S.O. 3229. Telecommunications and Electronics (Africa) Ltd., Johannesburg. £628 11s.

Conduit Tubing and V.I.R. Cable. Tender 13/1/26. Irr. 465. Johnson and Phillips, S.A. (Pty.) Ltd. Johannesburg. Lancashire Dynamo and Crypto S.A. (Pty.), Ltd., Johannesburg British General Electric Co., Ltd., Johannesburg.

Three 33 k.v. Vertical Rotating Outdoor Type 3-Phase Gang Operated Switches, 200 amperes, with arcing horns. Contract E.2195 Item (a) : Messrs. Kilburn and White (Pty.), Ltd. Durban. £395.

Six 11 k.v. Outdoor Type, 3-Phase, Gang Operated Air-break Switches, 200 amperes, with arcing horns, for Durban City Council. Contract E. 2195, Item (b) : Messrs. Dowson and Dobson, Ltd. £310.

Electric Passenger Lift in the Central Telephone Exchange, Durban. Contract B. 1651 : Messrs. Waygood Otis (S.A.), Ltd. £2,986.

ENGINEERING EQUIPMENT, ETC. :

Earthworks : Mackerentan Avenue and Civic Centre : Virginia Estate, for Durban Municipality. Contract B. 1653. J. M. Newcombe Bond. £4,611 9s. 9d.

Stormwater Drainage : Montclair and Ronald Roads, Montclair, for Durban Municipality. Contract B. 1654. Messrs. Benedetti and Cocciantè. £5,040 16s. 4d.

Centrifugally Cast (Spun) Iron or Asbestos Cement Pressure Pipes for Durban Municipality. Contract W. 481. Messrs. Vincent and Pullar, Ltd.

New Carrier Repeater Station, Paarl, Cape Province, for the Department of Public Works. Tender 24/1/237. P.W.D./160. Messrs. W. Holtzhausen and Hugo (Pty.), Ltd., Cape Town. £13,420.

Nine 3" Inlet Double Air Valves for Department of Irrigation. Tender 13/1/257. Irr. 416. Messrs. H. Inledon and Co., Ltd., Durban. £8 each.

Fourteen 2" Bore Double Discharge Air Valves for Department of Irrigation. Tender 13/1/257. Irr. 416. Messrs. Stewarts and Lloyds of S.A. Ltd., East London. £86 12s. 6d. the lot.

Power Control Unit for Native Affairs Department, Umtata. Tender 25/1/922. S.O. 3273 ; Messrs. Thos. Barlow and Sons (S.A.) Ltd., Johannesburg. £335.

Workshop Machinery for Public Works Department, Pretoria. Tender 24/1/1316. P.W.D. S.269. Messrs. Koppel Engineering (Pty.), Ltd., Johannesburg. General Spares and Accessories (Pty.), Ltd., Pretoria. The Griffin Engineering Co., Ltd., Johannesburg.

Steam Dairy Boilers for the Natal Agricultural Research Institute, Pietermaritzburg. Tender, 25/1/1785. S.O. 3274. Hubert Davies and Co., Johannesburg.

Lattice Steel Tower and Associated Equipment for Division of Civil Aviation and Telecommunications. Tender, 25/1/1537. S.O. 3295. Pan American Airways, Johannesburg.

Sewage Pumping Plant for Scott Athol Pumping Station. Contract No. 724. Griffin Engineering Co., Ltd. £1,448 10s.

Sludge Disintegrator for Cape Town Municipality. Tender A7/49. Messrs. Ash Bros. and Hudson (Pty.), Ltd. £290. Spare belt. £15 10s.

Air Compressor for Cape Town Municipality. Tender A 2/49 : Messrs. Carspares, Ltd., £115.

Twelve Fabricated Mild Steel Moulds for Cape Town Municipality. Tender 230/1949. Messrs. Marsden, Ltd. £9 16s. each.

3" Steel Wire Rope for Brackenfel Quarry, Cape Town. Tender 305/49. Messrs. Dowson and Dobson. £200.

2" Reinforcing Steel for Brackenfel Quarry. Tender 300/49. Messrs. A. S. Joffe and Co. (Pty.), Ltd. £106.

C.I. Pipes and Specials for No. 2 Pumping Station, Paarden Eiland. Tender A 14/49. Messrs. Incedon and Co., Ltd.

ROADS :

Supply and Delivery of Road Bitumen for hot spraying. Works Committee, Durban City Council. Contract S. 2959. Messrs. Shell Company of South Africa, Ltd.

TELEPHONE EQUIPMENT, ETC. :

Private Inter-Communication Telephone System for Mayoral Suite, Durban. Contract No. P. 305. Messrs. Rogers, Jenkins and Co. (Pty.), Ltd. £542 10s. 0d.

SURGICAL AND HOSPITAL EQUIPMENT :

Thirty-five Electric Fans to the West End Hospital, Kimberley. Tender, 25/1/1799. S.O. 3139. Messrs. Airco Engineering, Ltd., Durban. £7 8s. 10d. each.

WATER SUPPLY AND IRRIGATION EQUIPMENT :

Boring for Water : Department of Irrigation, Ladybrand. Tender 13/1/229. Irr. 487. W. J. Lombaard, Bloemfontein.

Boring for Water at Seed Production Research Station, Ermelo. Tender, 13/1/229. Irr. 478. C. D. v. d. Linde, Hendrina.

Boring for Water at Magistrate's Residency and High School, Louis Trichardt. Tender 13/1/393. Irr. 477. J. P. Nell, Pietersburg.

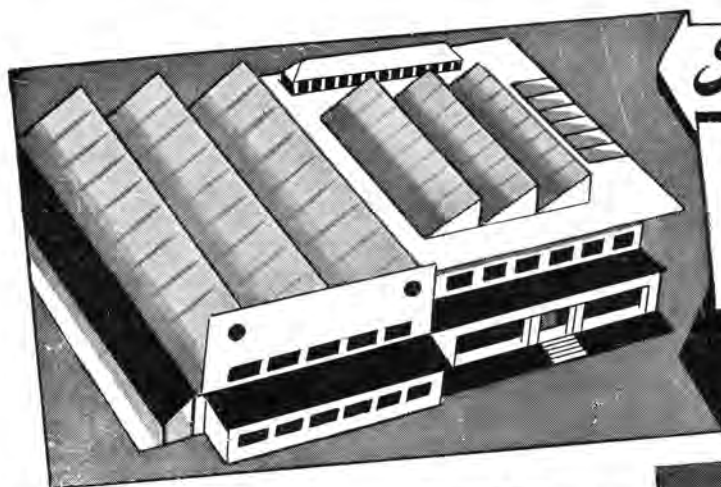
Boring for Water at Volksrust Gaol, Volksrust. Tender 13/1/229. Irr. 485. F. P. Visser, Lindley.

Boring for Water at Mashawo No. 470, Leeuwkop and Jack Pump, Letaba. Tender 13/1/229. Irr. 480. N.P. Prinsloo, Morerood.

Water Meters, Department of Irrigation. Tender 13/1/154. Irr. 427. Sturrocks (S.A.), Ltd., Johannesburg. George Kent (S.A.), Ltd., Johannesburg.

Canvas Hose for Durban Municipality. Contract W. 483, Item (a) : Messrs. Union Engineering Supply Co., Ltd. £343 18s. 3d.

Canvas Hose for Durban Municipality. Contract W. 483, Item (b) : Messrs. H. Alers Hankey, Ltd. £365 12s. 6d.



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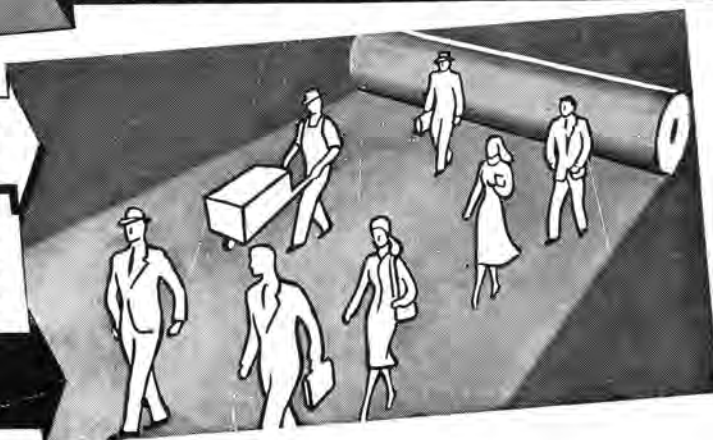
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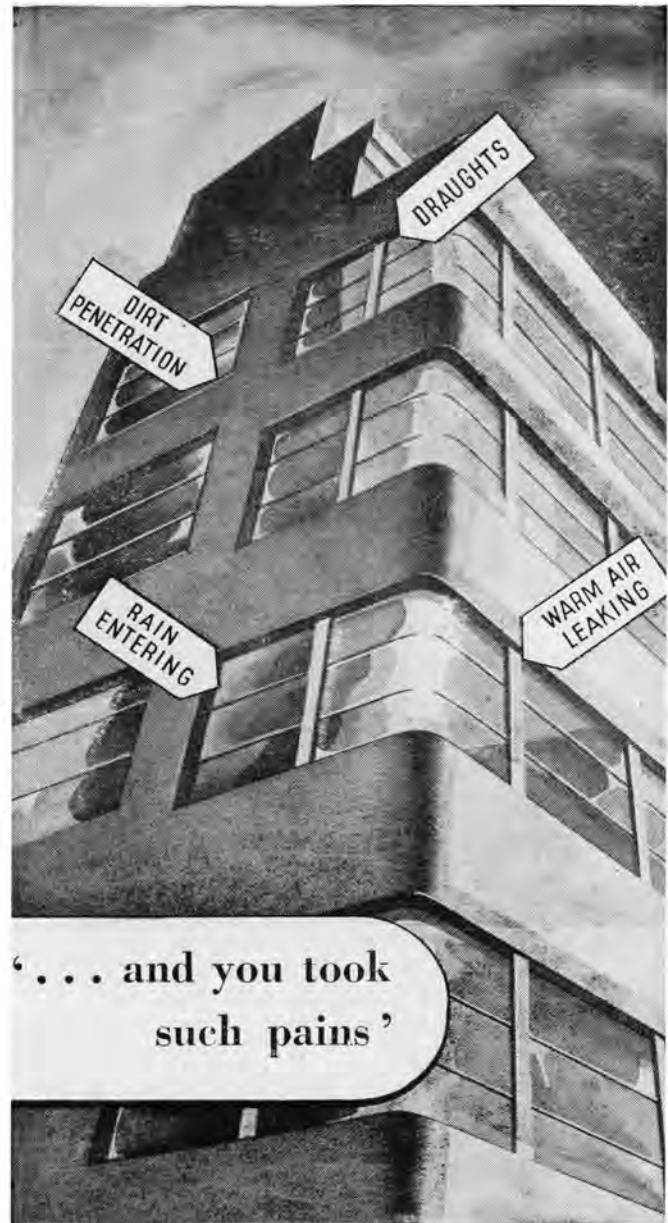


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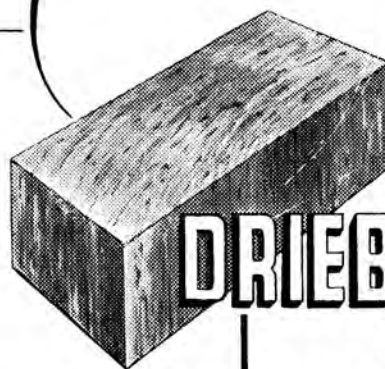
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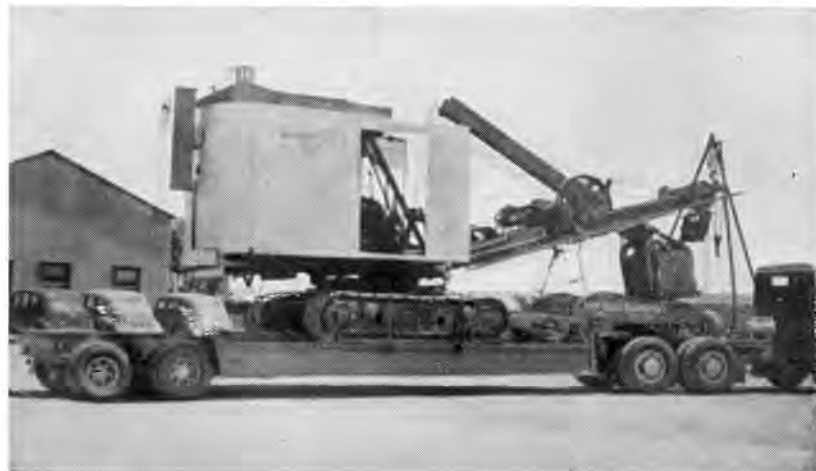
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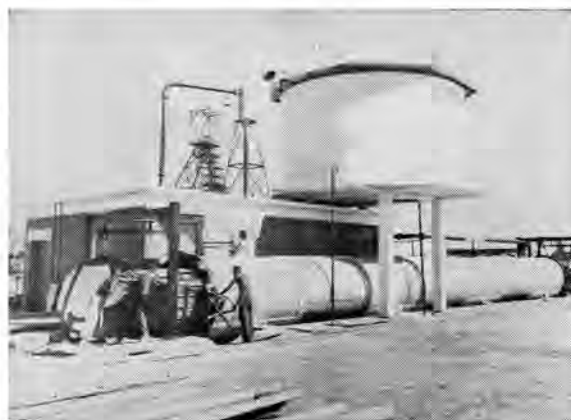
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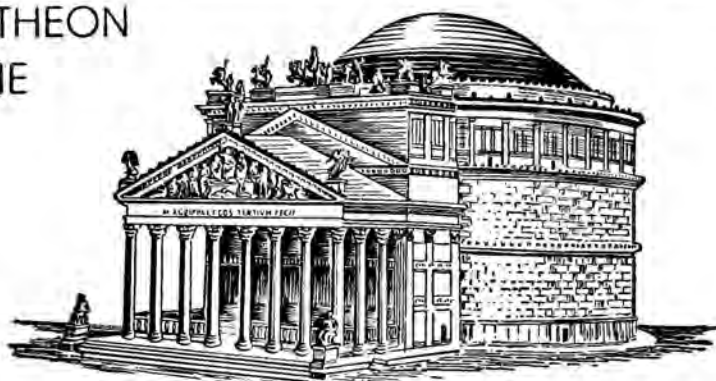
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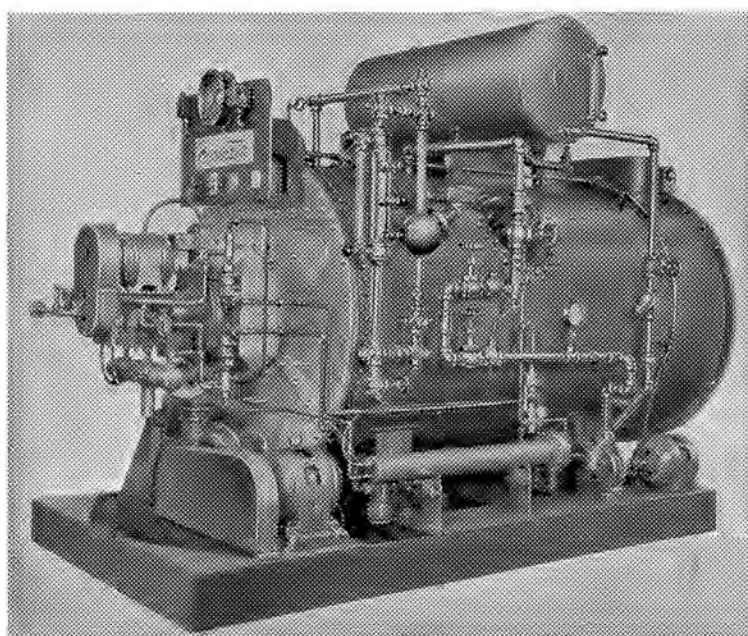
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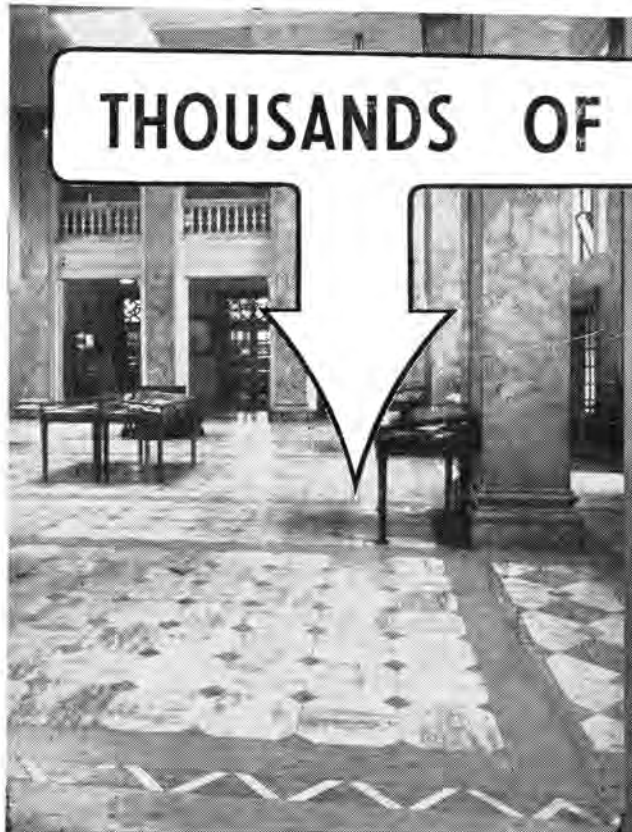
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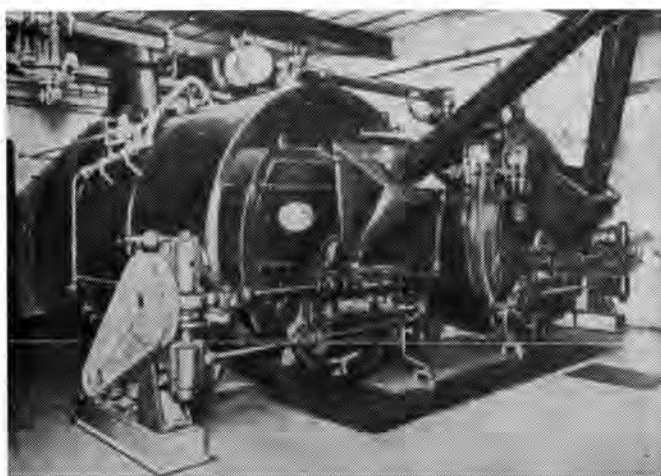
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iv.

INFORMATION SHEET

ISSUED BY THE NATIONAL BUILDING RESEARCH INSTITUTE
OF THE SOUTH AFRICAN COUNCIL FOR SCIENTIFIC
AND INDUSTRIAL RESEARCH.

Deformed Bars as Concrete Reinforcement

16. Q: What are the advantages of "deformed bars" over "plain bars" as reinforcement in concrete?

A: The advantages of using "deformed bars" depend on the type of deformed bars. Some commercial deformed bars which have been sold in the past showed very little advantage over plain bars but deformed bars of better design are now available. Their advantages may be summarized below:—

- (1) The risk of "bond" failure is reduced, particularly where high grade concrete and high steel stresses are used.
- (2) Cracking in the concrete structure is reduced: this is partly due to higher bond strengths and partly to the more abundant and uniform distribution of the hair cracking in the tension zone.
- (3) Deflections are reduced because tension cracking is no longer localised in a few sections.
- (4) Economies are effected as a result of more economical design, the requirement of less shrinkage reinforcement and the omission of special bond provisions such as hooks, etc.

Substitution of Lime for Cement in Building

17. Q: To what extent can lime replace cement in building?

A: Cement is widely used in building in concrete, mortars and plasters. The possible substitution of lime for cement in each of these will be discussed briefly.

As concrete is mainly used in those building components where strength is the primary requirement, lime cannot be substituted to any great extent. The addition

of lime to concrete in an amount not exceeding 5 per cent. has been found to increase its workability somewhat, though generally at the expense of strength.

In mortars, where strength is not considered to be of paramount importance, the partial substitution of lime for cement is considered not only acceptable but generally desirable. Mortar made with cement and sand only, generally has a degree of strength in excess of its structural requirements and tends to lack workability which makes bricklaying more difficult. The blending of cement and lime in mortar makes it spread rather more easily and a better balance of the physical properties required in a mortar results. The following mixes proportioned by volume are considered satisfactory for most work:—

Sand.	Lime.	Portland Cement.
5	$\frac{1}{2}$	1
6-7	1	1
8	$1\frac{1}{2}$	1
10	2	1

For internal plasters a straight lime-sand plaster is recommended except in kitchens and bathrooms where the use of a straight cement sand plaster or a lime plaster containing cement is considered advisable.

External plasters should always contain cement in addition to lime.

The following mixes proportioned by volume are considered satisfactory for plasters:—

Sand.	Lime.	Portland Cement.
15-20	0	4
	1	3
	2	2
	3	1
	4	0

Generally speaking the addition of lime to plasters containing cement reduces cracking and crazing.

It is recommended that all materials used in making concrete, mortars and plasters be tested against an appropriate specification and that no material which does not conform to a suitable specification be used in any building work.

Foundations for Internal Partition Walls

18. Q: When may foundations to internal partition walls in houses be safely omitted?

A: The primary function of a foundation is to transmit loads to the ground in such a manner as to prevent deleterious movements of the structure.

Loads due to internal partition walls are normally very small and on sand, gravel or similar incompressible ground, where solid floors are used on an adequately consolidated filling, the foundations for partition walls may be safely omitted.

On stiff clay soils, however, where movements due to changes in moisture are to be expected, provision must be made to carry the foundation loads to some depth below the ground surface in the same ways as adopted for external walls.

Utilisation of Solar Energy

19. Q: For what purposes may solar energy be utilised in South Africa?

A.: South Africa, generally, is favoured with greater insolation than most parts of the earth's surface. This natural and abundant supply of energy can well be used as a cheap source of heat for domestic and other purposes.

A solar heater capable of supplying adequate hot water for a family of 4 or 5 people would cost perhaps 10 to 20 per cent. more than a slow combustion stove, but this extra outlay is compensated by the unit having no operating costs and requiring very little supervision. In most parts of South Africa a solar water heater could supply adequate hot water for domestic purposes on most days of the year. This would be particularly advantageous in isolated places and rural areas such as the Karroo and Orange Free State where a domestic hot water installation is considered a luxury, chiefly because of the scarcity of fuel.

Other possible uses of solar energy include the pre-heating of water for boiler feed or hot water service for flats and hotels, the storing of solar heat in water or chemical compounds for space heating, the generation of steam by means of parabolic mirrors which concentrate the sun's rays, for use in small steam engines, high temperature ovens or for water distillation, and the generation of electricity by making use of the thermo-electric properties of various metals.

With further development such applications of solar energy may well offer opportunities for exploitation in South Africa.

The Causes of Damp-Staining

20. Q: What are the causes of damp-staining near the ceiling on chimney breasts and similar locations?

A: During long spells of wet weather the exposed brickwork of chimneys may become saturated, and if damp-proof courses have been omitted, the moisture may penetrate to below ceiling level where it causes discolouration on the plaster. In every chimney it is advisable to have a damp-proof course built in at the level of the roof-flashing, and stepped with the flashing. Alternatively, a band of hard, well-baked, impervious brick may be built into the chimney, above and below the roof-flashing, to prevent moisture in the saturated brickwork above the roof from seeping down into the dry brickwork beneath.