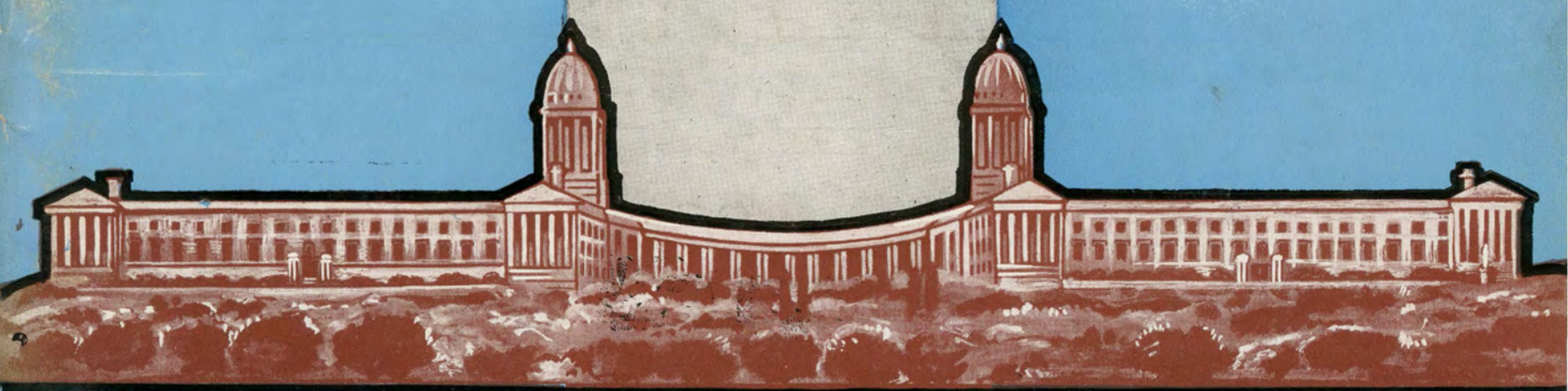
Vol. X. No. 68. JULY : 1949.

PUBLIC WORKS OF SOUTH AFRICA

MERENSKY-BIBLIOTEEK
UNIVERSITEIT VAN PRETORIA.
Klasnommer 69(68)
Registernommer P.W.S. 10/68



Registered at the General Post Office as a Newspaper.

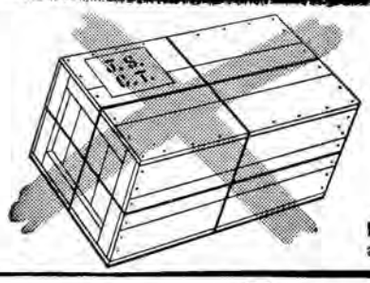
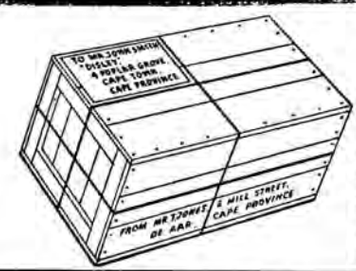
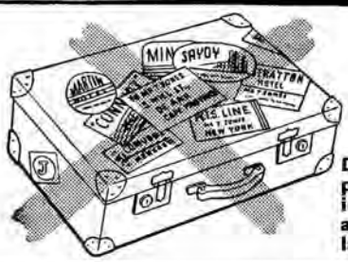
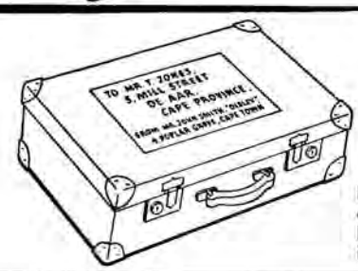
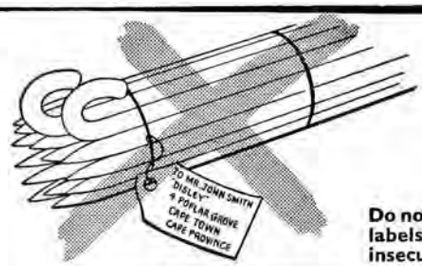
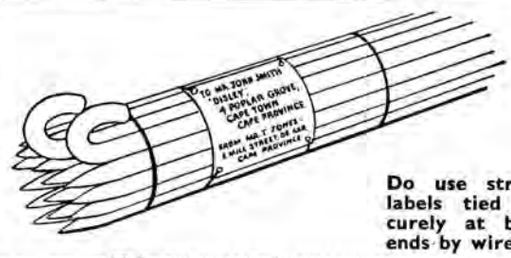
Price per Copy : 1/6

Subscription : 15/- per annum.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Careful Addressing—
ensures correct delivery

Half a job is no job. What I mean is this—after packing a parcel thoroughly so that it can make the journey safely, it's only commonsense to address it CLEARLY so that it gets to the person you're sending it to. That's why I never have any trouble with my parcels nowadays. First, I pack properly; then I finish the job by *addressing* properly.

This is UNCERTAIN	This is SAFE
 Do not use abbreviations.	 Do paint or stencil all names and addresses distinctly and in full on the package itself, where possible.
 Do not send packages bearing old names and addresses or labels.	 Do remove or obliterate all old labels or markings.
 Do not use flimsy labels tied on insecurely.	 Do use strong labels tied securely at both ends by wire.

DO REMEMBER TO RETAIN YOUR CONSIGNMENT NOTES

If your package is worth sending, it's worth sending safely. Pack carefully, bind securely, address fully and clearly. We'll do the rest.

This is the second in a series of suggestions, inserted by the South African Railways, aiming at the safe transport and prompt delivery of traffic.

The Railways are yours—claims are paid with your money

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

WANTED

A Busy Traffic Intersection—

taking up many hours of police constable time every day. Electro-matic engineers will submit a scheme showing how the crossing can be automatically controlled, thereby releasing valuable police man-power for those duties in which the human element is essential.

EVA ELECTRO-MATIC VEHICLE ACTUATED SIGNALS

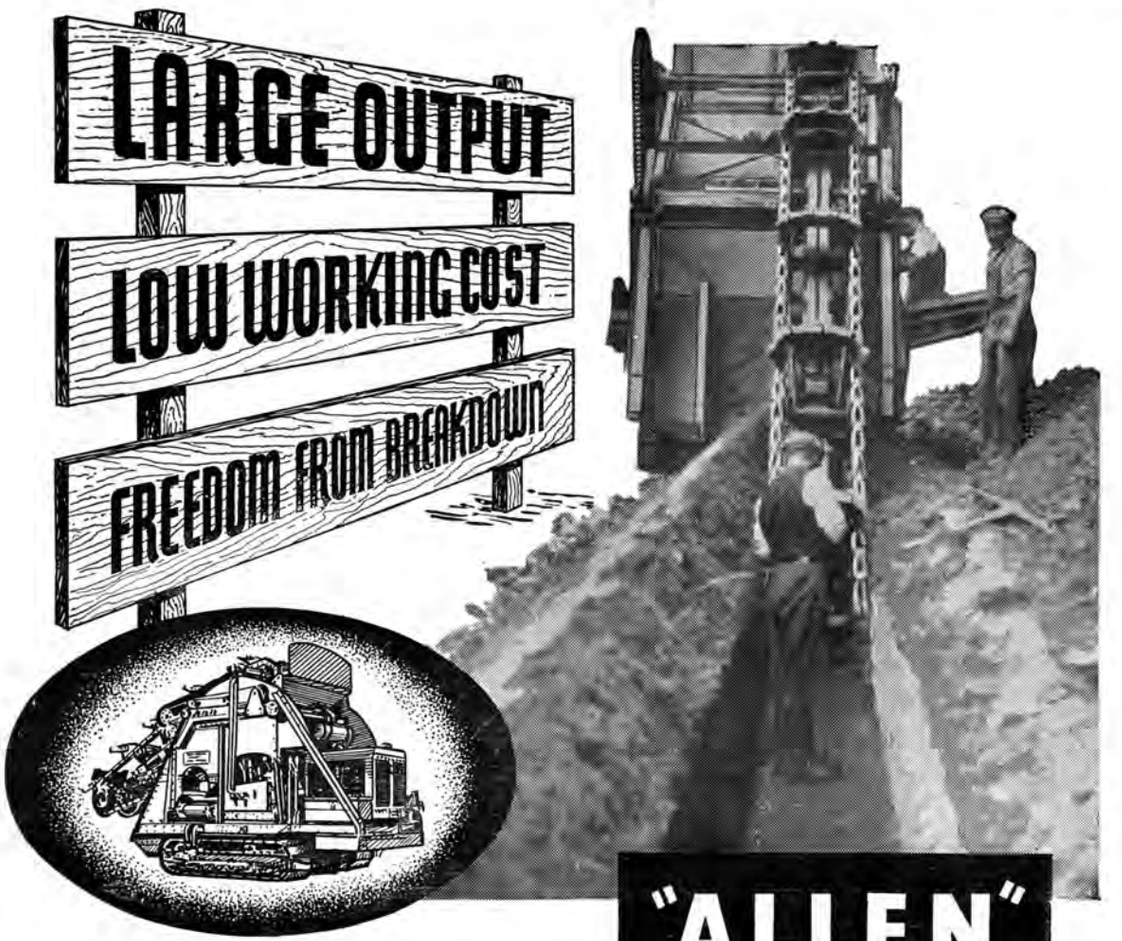
save Police Man-power

AUTOMATIC TELEPHONES (SOUTH AFRICA) LTD.

Kelvin House, Corner Hollard & Marshall Streets, Johannesburg. (P.O. Box 6687). Telephone: 33-2911. Cables: Strowger, Johannesburg. Associated Distributing Company for Automatic Telephone & Electric Co. Ltd., London & Liverpool, England.

A10221-A401

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



-important matters at any time, and much more so in the present circumstances, yet all three are features of the " ALLEN " MODEL 16-60 TRENCHER

"ALLEN" MODEL 16-60 TRENCHER

For the cutting of trenches to a maximum size of 5-ft. wide and 14-ft. deep, there is no doubt that this is the BEST MACHINE obtainable — the number of REPEAT ORDERS received is proof of this.

BRITISH BUILT BY :— JOHN ALLEN & SONS (OXFORD) LTD., COWLEY, OXFORD, ENGLAND.

Catalogue on request from :

SOLE AGENTS FOR SOUTHERN AFRICA

HUDACO — MECHANICAL ELECTRICAL AND CIVIL ENGINEERS

Hubert Davies & Co., Ltd.

Branches at :

P.O. Box 1386 — HUDACO HOUSE, JOHANNESBURG — Phone 33-1061

Johannesburg, Durban, East London, Port Elizabeth, Cape Town, Bloemfontein, Salisbury, Bulawayo, N'dola, and London.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

SAYLE & ROSSAAK (S.A.) (Pty.) Ltd.

JOHANNESBURG

The Reinforced Concrete Engineers

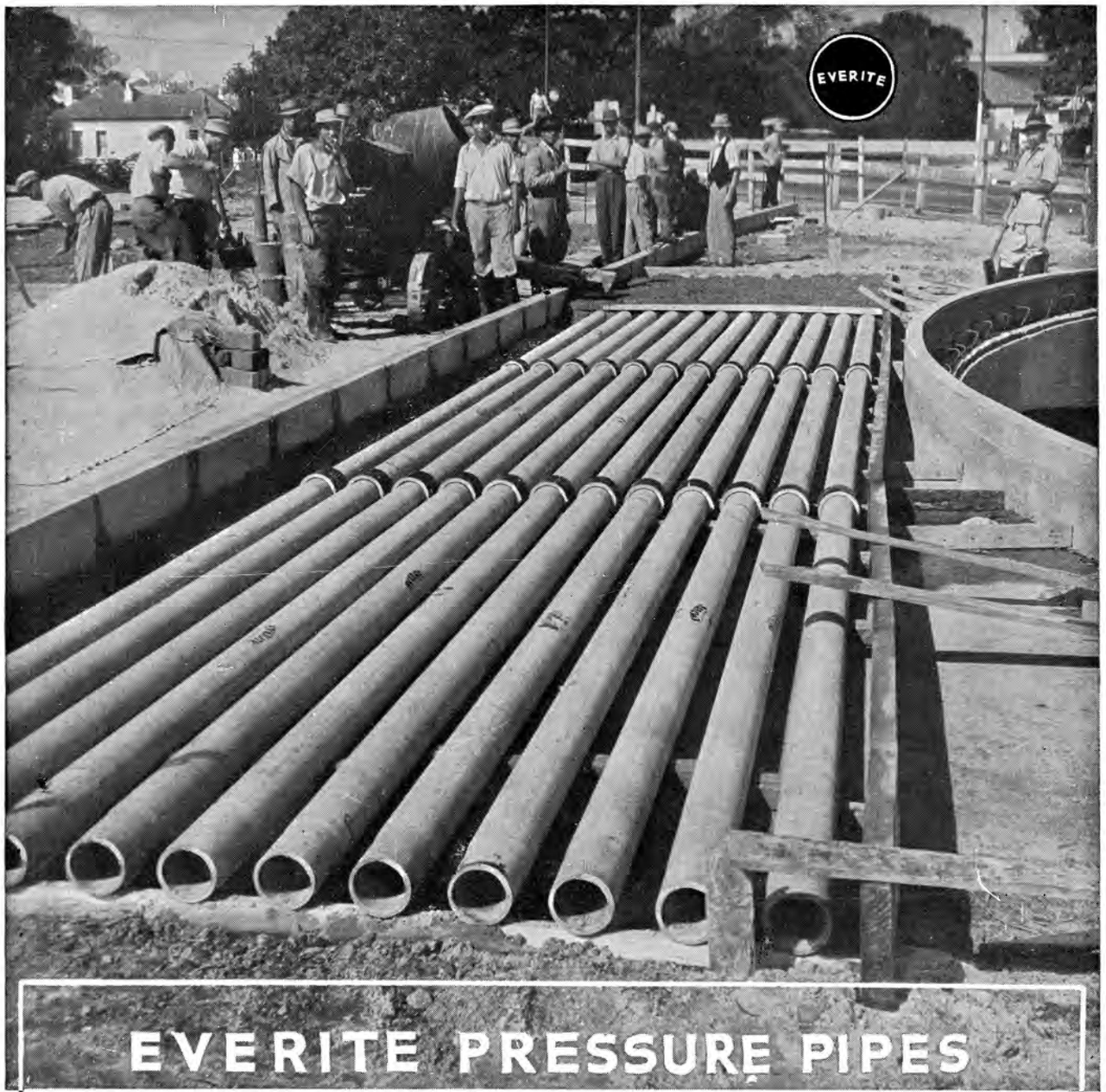
SPECIALISTS IN ALL DESCRIPTIONS OF REINFORCED CONCRETE CONSTRUCTIONAL WORK

AND

SAYLE & ROSSAAK (Natal) (Pty.) Ltd.

DURBAN

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



EVERITE PRESSURE PIPES

CLASSES "A" TO "D" FOR WORKING PRESSURES
FROM 100 TO 400 FEET HEAD OF WATER
AND CLASS "J" FOR LOW PRESSURES

●

NON CORRODING, NON INCRUSTATING, NON CONDUCTIVE
DURABLE, STRONG, LIGHT IN WEIGHT, ECONOMICAL.

●

USED BY GOVERNMENT, MUNICIPALITIES, INDUSTRY
AND AGRICULTURE FOR FRESH AND SALT WATER
GAS AND SEWAGE MAINS, IRRIGATION AND CABLE DUCTS.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Weld and have AC power at the same time with this P&H Portable DC Welder

The most useful small welder ever built, this P&H model gives you a traveling welding service for inside and field jobs. Easy to tow, economical to operate, it has a Welding Service Range from 30 to 260 amperes, and at the same time has an AC power supply for lights and powering tools.

Ask about this unusual P&H Arc Welder that does everything. Ask also about other P&H portable and stationary DC welders and transformer type AC arc welders.

P&H ARC WELDERS

P&H WELDING ELECTRODES

Use the electrodes big industry and small shops alike prefer for all welding jobs — P&H Electrodes. All sizes and types for welding all metals and for building up and hard-surfacing broken and worn parts. Get information and prices.

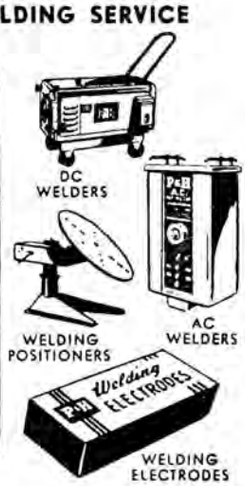
P&H **ARC WELDERS**
Main Offices and Plants:
Milwaukee 14, Wis., U.S.A.

HARNISCHFEGER CORPORATION
ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · P&H MOTORS · HOISTS · WELDING ELECTRODES

Established in 1884

A COMPLETE ARC WELDING SERVICE

P&H WELDING EQUIPMENT DISTRIBUTORS



Barlow's

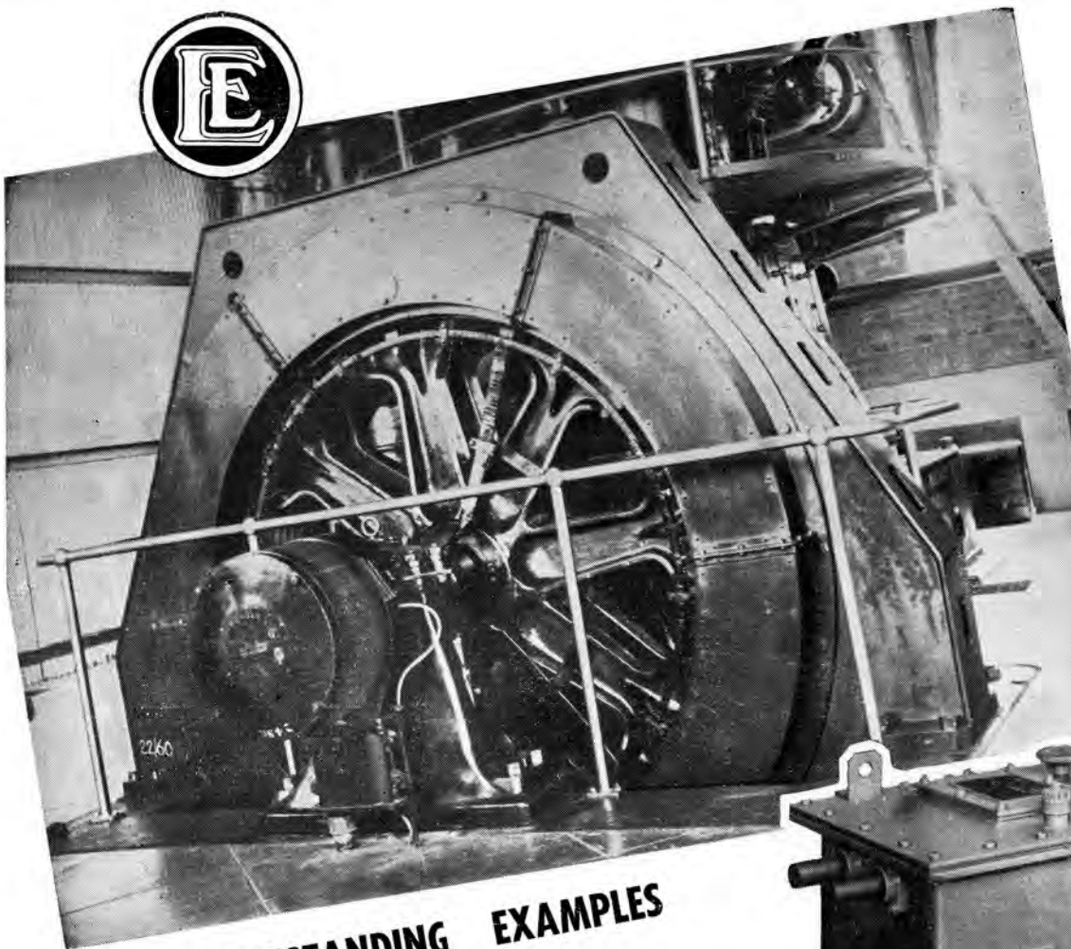
JOHANNESBURG
Thos. Barlow & Sons (S.A.) Ltd., 7, Simmonds Street.

DURBAN
Thos. Barlow & Sons (Natal) Ltd., 328, Sydney Road.

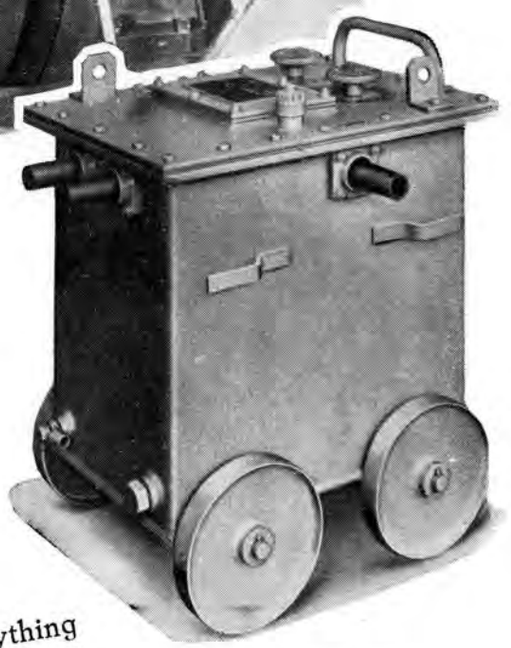
PORT ELIZABETH
Barlow's (East Province) Ltd., 111, Grahamstown Road.

CAPE TOWN
Barlow's (Cape) Ltd., Voortrekker Road, Maitland.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



925 H.P. Motor driving an air compressor at Vlakfontein G.M.



Type FWC 210 (or FWC 250) 210 (or 250) Ampere, portable A.C. Arc Welding Equipment.

TWO OUTSTANDING EXAMPLES OF

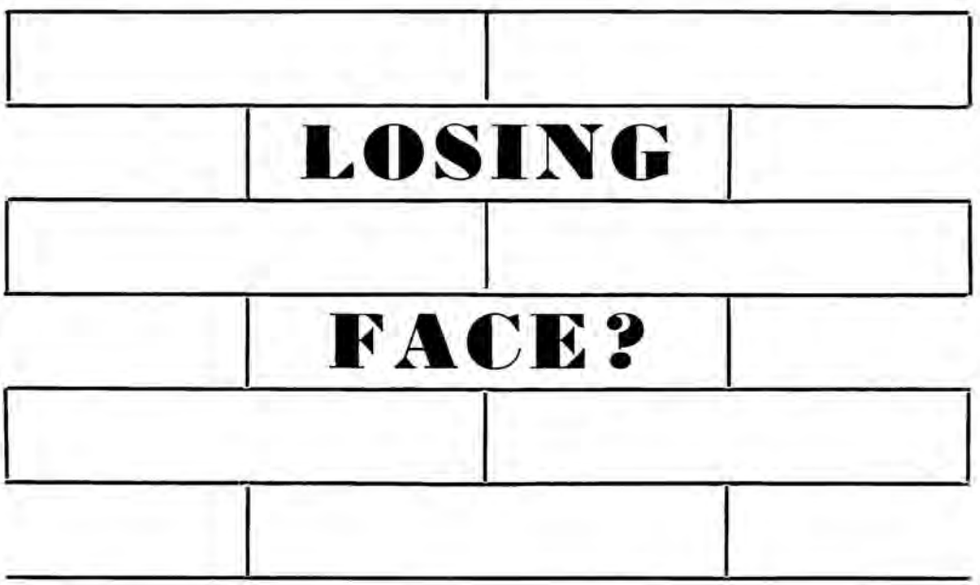
Electrical Engineering

English Electric virtually make "everything in electricity," and these two samples show by their sizes and applications the diversity of the range. These are of especial interest to Public Works Authorities.

THE ENGLISH ELECTRIC COMPANY (SOUTH AFRICA) LIMITED

P.O. BOX 2387 • 628/41 MARITIME HOUSE LOVEDAY STREET • PHONE 33-2641
JOHANNESBURG

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



You can quite easily, if the final job hasn't that finished look, for no matter how skilled the builder and the architect, there is no substitute — even in their skill — for a good facing brick.

FACING BRICKS

may be your worry; but are our speciality.
Let us show you what we mean.

CONSULT:

Primrose Brickworks (1936) Ltd.

P.O. BOX 49, GERMISTON.

TELEPHONE 58-1311/2/3. TEL. ADD.: "PRIMBRICKS."

REPRESENTATIVES:

Orange Free State and Kimberley: W. R. Pollock & Co. (Pty.) Ltd., Maitland Street, Bloemfontein.
Cape Eastern Province: Central Saw Mill, P.O. New Brighton, Port Elizabeth.
Border: C. Katz, 6 Belgrave Crescent, East London.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

MANUFACTURED JOINERY

We are equipped to undertake quality production joinery contracts for the Building and Woodworking Trades. We manufacture to Architects' own specifications.

- ✦ WOOD BLOCK FLOORS
- ✦ MACHINED TIMBER
- ✦ MOULDINGS
- ✦ TIMBER SUPPLIES
- ✦ SAWMILLING
- ✦ WALLBOARDS
- ✦ PLYWOOD
- ✦ STEEL WINDOWS
- ✦ MASONITE

We specialise in supply and lay, polished complete, high-class floors of all descriptions, including Asphalt and Cork Tiles.

A. BLAIKIE & CO. LTD.

130 WILLIAMS ROAD, DURBAN

P.O. Box 936 Phones 21585/21586

Tel. Add.: " ALEXBLAIK "

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Dowson & Dobson's

DOWNRIGHT HARDWALL PLASTER

HAS HIGH TENSILE AND COMPRESSION STRENGTH ELIMINATING CRAZING AND CRACKS

CAN BE TROWELLED TO SMOOTH, HARD FINISH, SUITABLE FOR PAINTING WITH OIL

HAS UNIFORM STRENGTH

CONSISTENT SETTING

Also Agents For.

SPRAYED "LIMPET" ASBESTOS.
ACOUSTIC TILES, ETC.
INSULATION, HEAT AND COLD (HOUSING).
HAYWARDS BRONZE COLLAPSIBLE GATES, ETC.
FLOORING.
BURMABRIGHT METALS.
NEWALLS PAXFELT BLANKETS, ETC.
BETONAC STEEL COMPO FLOORS.
DOWNRIGHT FAST NAILS.
FERODO STAIR TREADS.
ALUMINIUM TIP-UP GARAGE DOORS.

Estimates will be submitted on request

Dowson & Dobson, Limited

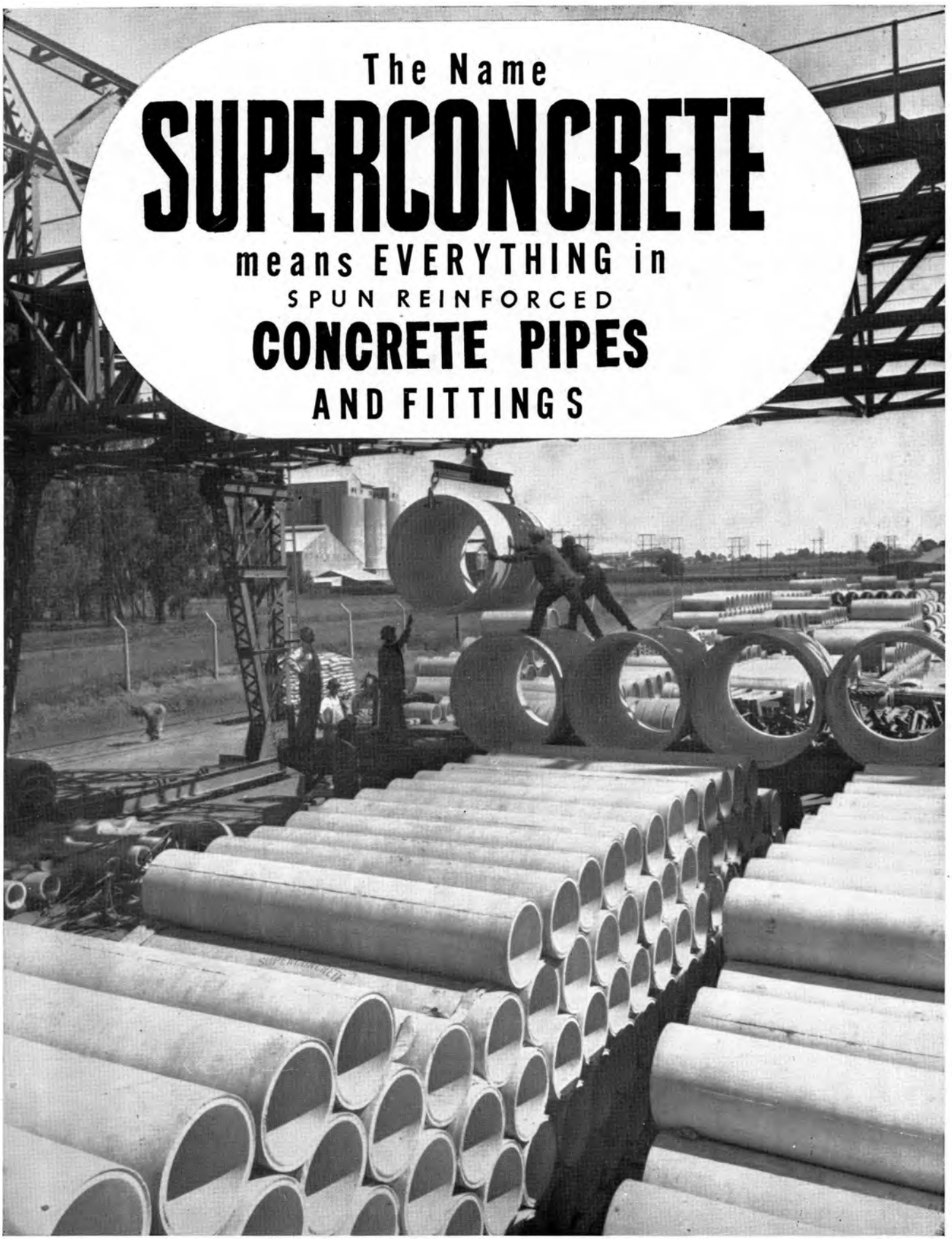
ENGINEERS, MERCHANTS & CONTRACTORS

Cape Town .. .. Box 424
Port Elizabeth .. Box 1040
East London .. .. Box 123
Durban .. .. .. Box 978

DOWSON & DOBSON BUILDINGS,
WEBBER STREET, SELBY,
JOHANNESBURG

Telephone:
33-5041 (Nine Lines)
Telegrams,
"DOWNRIGHT" (All Branches)
P.O. BOX 7764

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



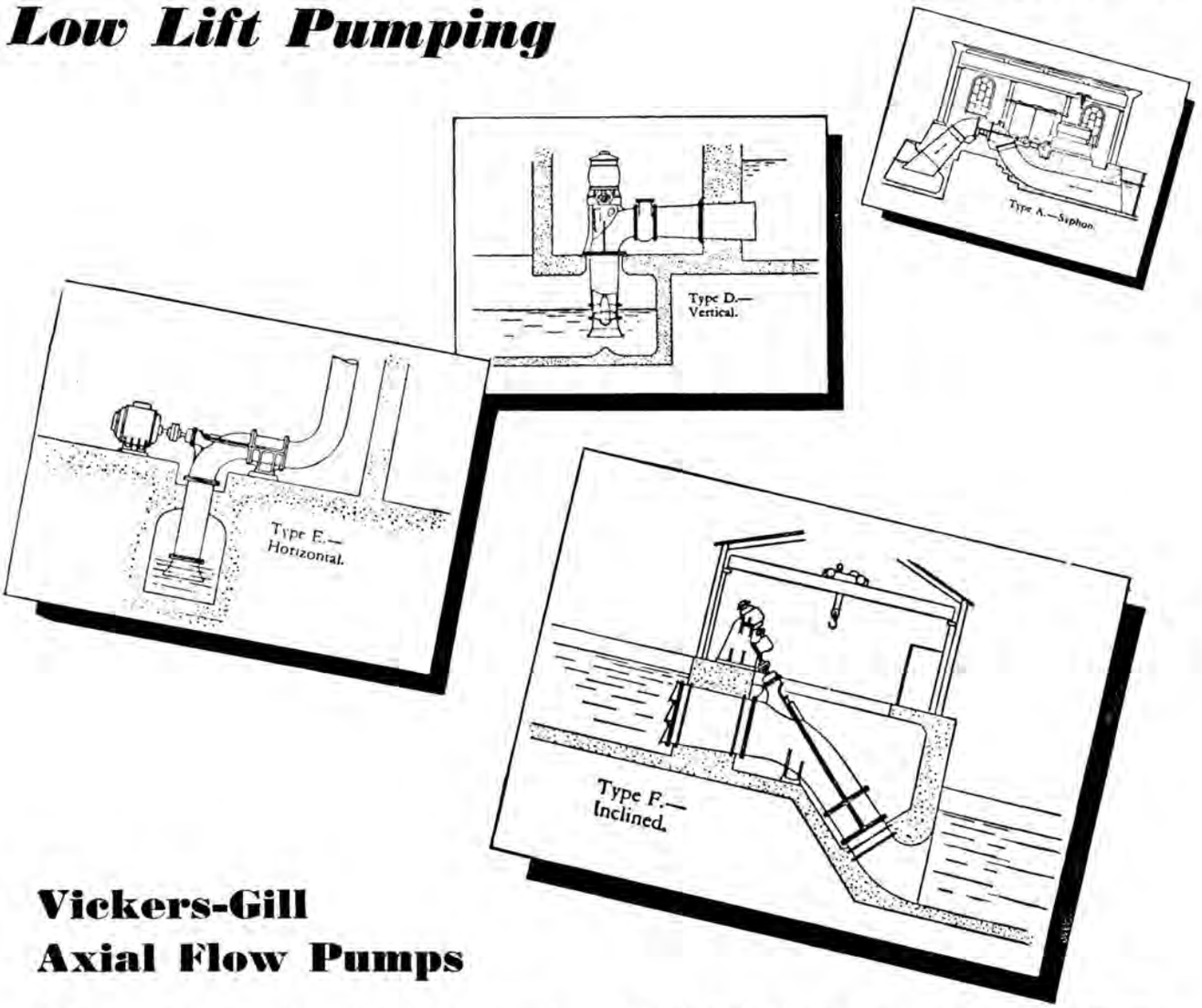
For Quotations, Specifications and Trade Enquiries, write to:

SUPERCONCRETE PIPES (S.A.) LTD.

P.O. BOX 92
ROODEPOORT

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Low Lift Pumping



Vickers-Gill Axial Flow Pumps

These pumps are manufactured in single and multi-stage units capable of dealing with large volumes of liquid against heads up to, approximately, 60 ft. The above diagrams show a few applications designed to achieve the most economical operating conditions.

In addition to LAND DRAINAGE & IRRIGATION SCHEMES, this type of pump has been installed throughout the World for the following duties:—

Waterworks Services, Large Volume Flow Boosting, Condenser Circulating Water, Dock Impounding & Dry Dock Pumping, Stormwater & Sewage Disposal, Hydraulic Jet Propulsion for vessels operating in shallow or weed-infested waterways, Floating Pontoons for Irrigation Schemes.

IMPORTANT FACTORS: This type of pump is entirely and inherently SELF-REGULATING, i.e., at a constant speed of revolution any fall in head below the maximum specified condition, while accompanied by an increased discharge, will result in a decreased B.H.P., thus avoiding overloading the Prime Mover.

COMPACTNESS of design ensures utmost economy in pump housing and foundations, etc.

ECONOMICAL — as pump operates at higher speeds than those possible with Centrifugal Pumps.

HIGH EFFICIENCY — due to path of liquid flow being direct, internal losses are avoided.

NO PRIMING required when pump impeller is submerged.

Vickers-Armstrongs Limited

VICKERS HOUSE, BROADWAY, LONDON, ENGLAND.

Included in the wide range of equipment supplied by Vickers-Armstrongs to users throughout the world are :—Duralumin Skips and Mancages, Coal Handling Plant, Mechanical parts for Electric Mine Winders, Condensing, Evaporating and Feed Heating Plants for Power Stations and Cement Making Plant.

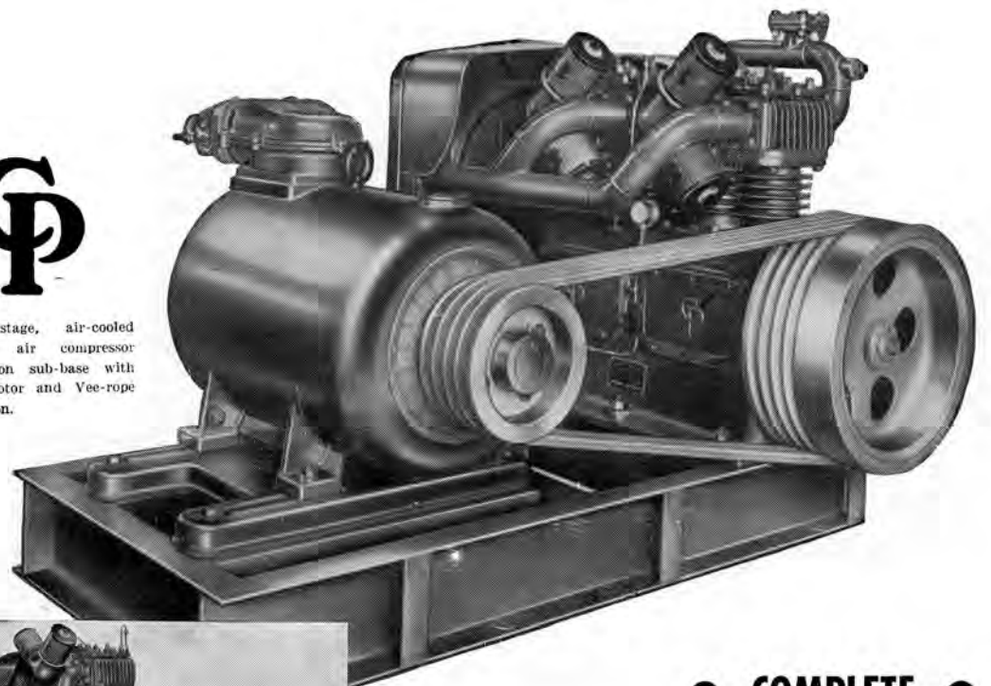
Agents : VICKERS & METROPOLITAN CARRIAGE (S.A.) LIMITED. P.O. BOX 1137, JOHANNESBURG *Telephones:* 34-2981. *Telegrams:* "VICKERSAF"

Sub-Agents : RHODESIA : J. CLACK & CO., LTD., BOX 638, BULAWAYO ; BOX 409, SALISBURY ; BOX 25, N'DOLA

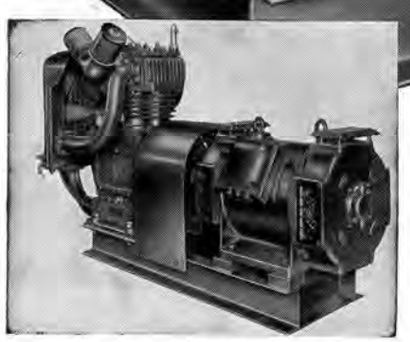
NATAL : VICKERS & METROPOLITAN CARRIAGE (S.A.) LTD., P.O. BOX 417, DURBAN. PORT ELIZABETH : MORRIS & MARTIN, LTD., P.O. BOX 1102, PORT ELIZABETH

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Compression WITHOUT Complication



CP two-stage, air-cooled stationary air compressor mounted on sub-base with electric motor and Vee-rope transmission.



CP two-stage air-cooled stationary air compressor directly driven through flexible coupling by electric motor.

● COMPLETE ● COMPACT

Apart from the noted constructional features of CP two-stage, air-cooled air compressors, they have distinct advantages in simplicity of installation and continuous trouble-free performance. These units can be supplied with electric motor drive ready for immediate operation and, being air-cooled, do not require complicated systems of water cooling pipes, pumps and tanks.

Phone 34-2351
P.O. Box 4921

CONSOLIDATED PNEUMATIC TOOL CO. S.A. (PROP.) LIMITED

1 ROGERS ST.
SELBY,
JOHANNESBURG

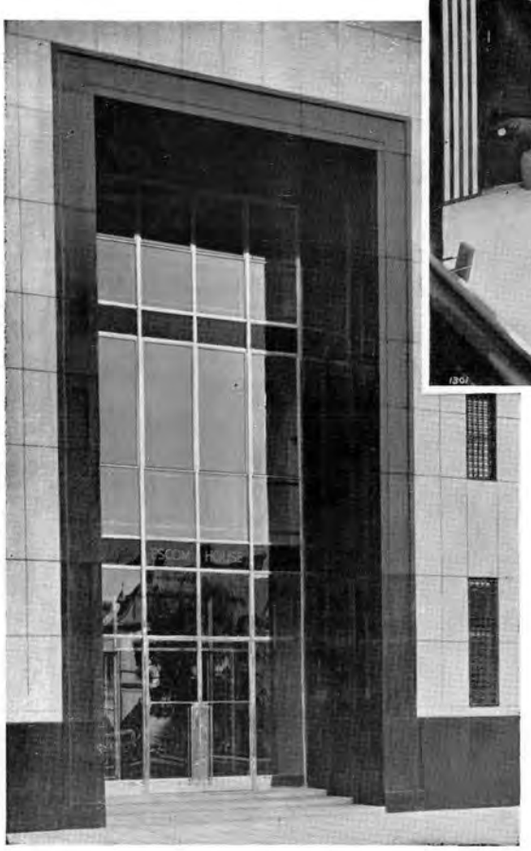
AGENTS:

R. L. Weir & Co. (P.E.), (Pty.), Ltd., P.O. Box 148, Port Elizabeth.
Rogers-Jenkins & Co. (Pty.), Ltd., P.O. Box 1425, Cape Town.
Engineering Supply Co., 10-12 Oxford St., East London.
J. Clack & Co., Ltd., P.O. Box 638, Bulawayo.
J. Clack & Co., Ltd., P.O. Box 409, Salisbury.
J. Clack & Co., Ltd., P.O. Box 25, Ndola.
Adriana Maia (Suc. & Ca. Lda., P.O. Box 354, Lourenco Marques).

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

by

SAGE



ESCOM HOUSE

- Main Building Entrance and Entrance Doors to Banks, in " Staybrite " Stainless Steel.
- Hall of Achievement Panelling in Black Glass with " Staybrite " Finishings.
- Handrailing, etc.

FREDK. SAGE & CO. (S.A.) (PTY.) LTD.

CRAFTSMEN SHOPFITTERS
AND METAL WORKERS

10 Heidelberg Road, JOHANNESBURG

P.O. Box 777 **Phone 22-7555**

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

ADAPTABLE TO YOUR PLANNING *because of*

STANDARDISED VARIETY OF DESIGN

Sixty-five years of experience has enabled us to pass beyond all preliminary experimental stages and to concentrate on the manufacture of a great variety of thoroughly practical designs.

These designs, which are capable of inclusion in almost all types of industrial, commercial and domestic architecture and building techniques, are made up from standard sections made to precise measurements. Other Crittall-Hope qualities are, of course, well known to you.

CRITTALL-HOPE STEEL WINDOWS

CRITTALL-HOPE METAL WINDOWS (S.A.) LTD.

Office: 830 Maritime House, Loveday Street. P.O. Box 3047. JOHANNESBURG

Factory: Edison and Watt Streets, LANGLAAGTE

P.O. Box 2908, CAPE TOWN P.O. Box 1494, DURBAN P.O. Box 119, PORT ELIZABETH

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

PUBLIC WORKS OF SOUTH AFRICA

PROPRIETORS: PUBLIC SERVICES PUBLICITY (PROPRIETARY) LIMITED, EDITORIAL OFFICES AND PUBLICITY DEPARTMENT: FIRST FLOOR, 92, MAIN STREET, JOHANNESBURG. TELEPHONES: 33-9606, 33-1505.

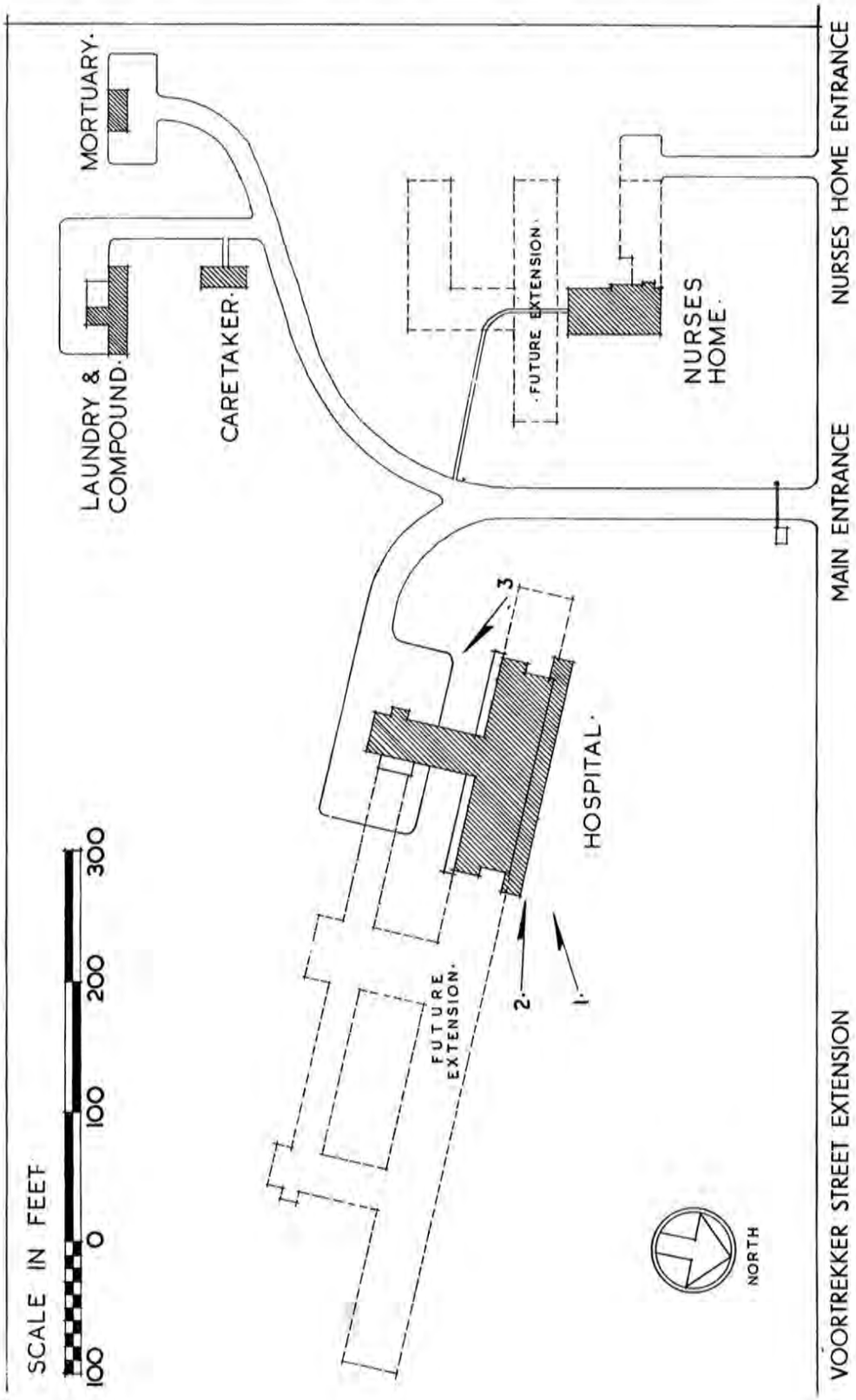
EDITOR:
W. R. GORDON, O.B.E. M.I.I.A. M. Inst. F.

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.

VOLUME X • NUMBER SIXTY-EIGHT • JULY 1949

CONTENTS

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



Site Plan of the Beaufort West Tuberculosis Sanatorium. Although not shown, the actual site extends some 420 ft. to the east. The arrows indicate the positions from which the photographs, illustrating the article, were taken.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

BEAUFORT WEST TUBERCULOSIS SANATORIUM

WHEN the Department of Public Health decided in 1943 to build a Tuberculosis Isolation Hospital for convalescent patients at Beaufort West, two sites were considered.

Perhaps the more attractive site, overlooking the dam, would have involved the expenditure of approximately £1,000 for a borehole, while road construction would have been a heavy item. It was emphasised that as this Hospital would be an extra burden on a small Municipality, the cost of the Institution and its maintenance should be the deciding factor in choice of site.

The site chosen, therefore, south of Kopje is level and the soil is deep and fertile, giving scope for the production of vegetables and flowers, a valuable amenity to the patients and a pleasant pastime for those able to work in the gardens.

The road to this site presented no difficulties, while the cost of electrical and water services would only be in the neighbourhood of about £1,400, which was more economical than on other mooted sites. Being some two miles west of the Beaufort West station, a small sewage disposal plant was an economic necessity, but the sludge from this plant could be used on the gardens.

Good dolomite stone and "Sunnyside" sand were available close to the site. It is rather amazing to look back and find that local stock bricks were available at 38s. 6d. per 1,000 at that time.

Climate Considerations

Labour was both good and cheap, a large proportion being Coloured. Wages were in the region of 15s. per day, while the ruling rate for Native labour was 2s. 6d. per day.

View showing back of wards on north front, with the nurses' home in the background.

Main entrance to building, showing water tower containing supply tanks and water softening plants.

The hot, dry climate of the Karoo in summer, and the even drier cold weather in winter, presented a problem of insulation which had to be solved cheaply. The main consideration was the roof and after a report from the S.A.A.F. Meterological Station at Pretoria, the architects decided on corrugated asbestos. The meteorological report showed that the number of days on which hail had fallen during the years 1922 to 1933 was only eight as compared with thirty-three days in Johannesburg, over the same period. The mean maximum and minimum temperatures over the same period had been 76.6 and 50.2°F. respectively.

The fly and mosquito menace in Beaufort West is very real and as a consequence all doors and windows had to be screened.

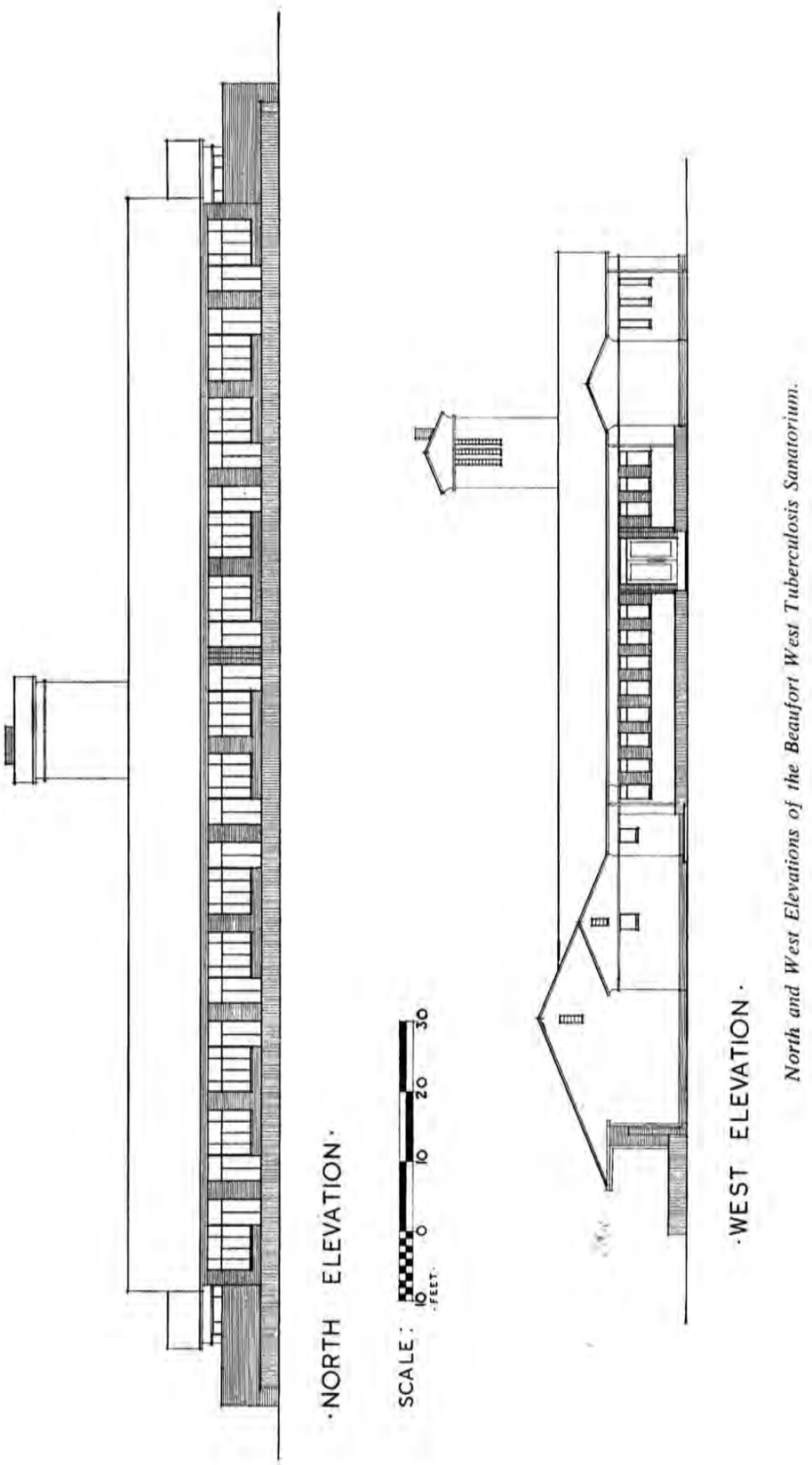
In planning the Hospital, the services have been kept in a wing, centred on the ward block which faces due north. As the site is very flat and views in all directions are typical of the Karoo, this ideal north aspect had no need of modification.

Segregation by Race and Sex

In catering for twelve Europeans and eighteen Coloured patients, with sexes in equal proportions, and for economical nursing and administration, it was necessary to supply common services to this small unit. To achieve segregation, visually the building was divided by a screen in the Hospital corridor, while cut-off doors in each wing again segregated the sexes.

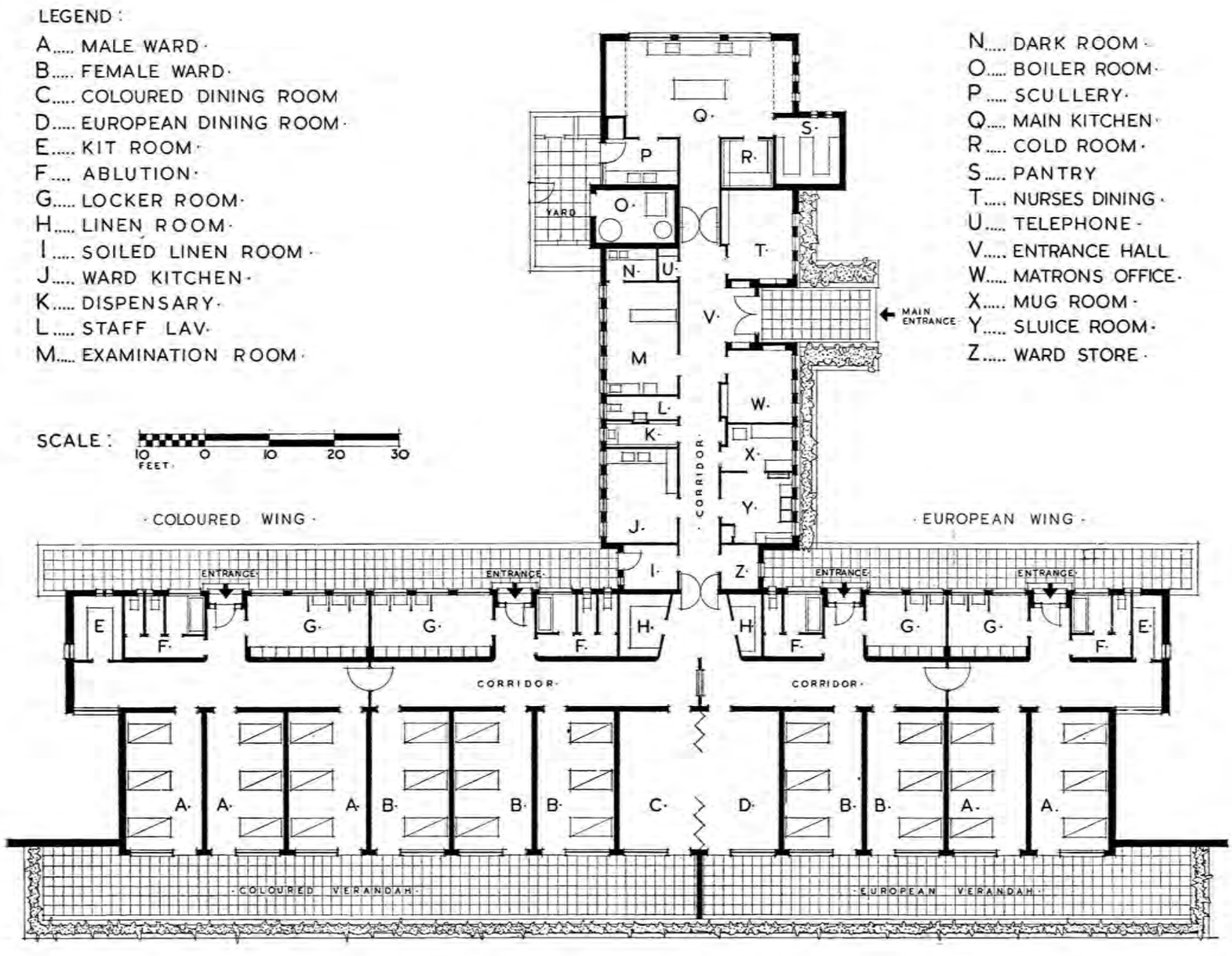
In both the European and non-European wings, separate entrances for males and females, adjacent to their respective locker and ablution rooms, give free access to the gardens.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



North and West Elevations of the Beaufort West Tuberculosis Sanatorium.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



Detailed interior plan of the Beaufort West Tuberculosis Sanatorium.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

North terrace in front of the wards, showing eave projections and Coloured verandah in foreground.

The terrace on the north is partly covered by a 6-foot projection of the eaves, and is again divided by a screen, giving no means of entry from this side of the building.

For flexibility, the wards have been kept small and provision for expansion at either or both ends of the building has been kept in mind, as indicated on the site plan.

Staff Accommodation

The Nurses' Home is also planned for expansion from the present accommodation for six nurses and a matron. Standing in its own grounds it is, at once, as private as the present flat and treeless site permits, while having ready access to the Hospital. Their dining room is in the main Hospital, but a small tea kitchen is provided in their home for light refreshments.

Other buildings on the site include a caretaker's flat, a transformer room, mortuary and a compound and laundry block, with accommodation for four female and six male Native servants.

Due to the high lime content of the water supply, it was found necessary to provide a water-softening plant, which is located in the tower below the main water tanks supplying the Hospital.

Finishes

The Hospital walls are generally finished in a hard plaster, painted with a semi-gloss oil paint. Floors to wards and offices are kiaat wood block, and service rooms, etc., are finished in asphalt tile or tinted granolithic. The corridor floors are linoleum. The ceilings are a fibrous plaster board with flush joints. The doors are flush kiaat finished in steel linings. All windows are steel.

External walls are generally plastered and lime washed above a plinth of buff, semi-glazed face-brick. The Nurses' Home and other blocks have a corresponding standard of finish.

Face-bricks, doors, etc., came from Cape Town and other items such as steel windows, door trims, etc., were railed from Johannesburg.

The cost of the building was £31,450.

The architects for the building were Messrs. Stegmann, Orpen & Porter and the quantity surveyor was Mr. G. Brian McIntosh. The clerk of works was Mr. C. Brimer, of the Public Works Department.

THE UPPER BUFFALO RIVER DEVELOPMENT PROJECT, KINGWILLIAMSTOWN, C.P.

By the Design Engineer, Department of Irrigation.

THE town of Kingwilliamstown, situated in picturesque country some 15 miles south-east of the Amatola Mountain range, is an important and progressive Border centre. Besides enjoying an excellent climate and superb natural setting, it is fortunate in possessing a supply of pure, soft mountain water which comes down the Buffalo River from the Pirie Forest Reserve.

Existing Water Supply

The original water supply scheme for the town was built under powers granted in an act passed by the Cape Parliament in 1881. By 1906 it had become necessary for the Borough to augment its supply and a further act was passed the same year. This empowered the Borough to build a dam on the Buffalo River about 16 miles upstream of the town and to pipe the supply to the municipal area. The works, with ancillary pipe-line, were completed about 1908.

Maden Dam, situated in the scenic foothills of the Amatolas, proved adequate till 1941 when the Borough Council engaged consulting engineers to report on proposals for augmenting the supply. Since the existing structure did not lend itself to appreciable enlargement, a site on the Buffalo, three miles downstream of Maden Dam, called Rooikrantz, was proposed for an earth dam by the consulting engineers in 1945. This site had the advantage of being located below the infall of an important tributary, the Tyusha and the proposal was to build a dam capable of yielding a sustained supply of 750,000 gallons per day for municipal purposes. Application was made for protection in the catchment above Rooikrantz, this being granted under a proclamation dated 20th August, 1943. The permission of the Minister was next sought to construct Rooikrantz Dam with a capacity of 567 million gallons. The statutory enquiry was held on

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

21st December, 1943, and a permit issued in March, 1944. The Borough did not immediately proceed with the scheme and conditions gradually deteriorated until in 1945 acute water shortages were experienced.

Industrial Development Corporation

About that time the Industrial Development Corporation became interested in the water supply of Kingwilliamstown in connection with a textile industry, which the Corporation was seeking to promote. The company concerned was the Good Hope Textile Corporation, a joint undertaking of the I.D.C. of S.A. and the Calico Printers' Association of Great Britain, with a capital of £1 million. Essential requirements of a textile industry are :—

(a) an ample and pure water supply ; and
(b) cheap labour.

The waters of the Buffalo River are particularly clear and soft, while the immediate proximity of Kingwilliamstown to the native territories guarantees at all times a plentiful supply of labour. The town is, furthermore, well served by road and railway and it was therefore natural that it should be chosen as the most favourable centre for a textile industry.

Early in 1945 the Industrial Development Corporation approached the Department of Irrigation with a request that the resources of the Buffalo River be investigated to establish whether there was a sufficiency of water to serve a textile factory with an estimated requirement of one million gallons per day. The investigation was carried out and showed that in the worst year just under a thousand million gallons would be available at the Rooikrantz site. Two other sites were examined but Rooikrantz was found to be the most favourable.

Government Assistance

An important amendment of the Irrigation Act of 1912 was passed by Parliament in 1946 under the title "Irrigation Amendment Act No. 38 of 1946." This gave the Department of Irrigation powers, in addition to building irrigation works, to subsidise, finance and construct works for municipal water supply purposes. The amendment, moreover, empowered the Department to subsidise municipal water undertakings to the extent of 33⅓ per cent. of their final cost, subject to the sanction of the Minister. Shortly afterwards representations were made by the Borough Council for a government subsidy and for the Department of Irrigation to finance and build the works. The Minister of Lands and Irrigation in June, 1946, gave an undertaking to construct the dam and pipe-lines, subject to the water rights of the town being established and, more particularly, to an award by the Water Court of a proportion of the flow of the river for tertiary purposes being obtained. This was necessary because there was some irrigation development on a limited scale along the river and the prior rights of irrigators had to be guaranteed.

In the meantime a further statutory enquiry had been held on 6th February, 1946, with a view to obtaining the Minister's permission to enlarge the scheme and in March, 1947, the Minister issued a permit for a dam of capacity not exceeding 1,000 million gallons.

Water Court Proceedings

The Borough of Kingwilliamstown and the I.D.C. next filed a joint application to the Water Court for a definition of water rights in the normal flow of the river and permission to store flood water and apply it for domestic and tertiary use. The Native Affairs Department was interested but did not join in the application, since the Borough Council and I.D.C. were prepared to look after its interests.

The Water Court conducted sittings in Kingwilliamstown from 4th to 9th June, 1947, and judgment was delivered on the latter date awarding to Kingwilliamstown the right to divert from the proposed Rooikrantz Dam the following quantities of water, viz. : (a) a 2 m.g.d. supply for domestic and industrial use in the town ; (b) 1 m.g.d. for industrial use at the Good Hope Textile Factory, and (c) half a million g.d. for domestic supply in the Native industrial village. The interests of irrigators were guaranteed in that ¾ m.g.d. were to be let down from Rooikrantz Dam for the use of riparian owners. The stage was now set for construction operations to begin. A resident engineer was appointed by the Director of Irrigation and designs for dam and gravitation main were prepared in a minimum of time.

Temporary Supply for Good Hope Textile Factory

Construction operations at the site of the Good Hope Textile Factory, which is situated about 3½ miles from the centre of the town, adjacent to the ground on which the native village is being built, commenced early in 1949. Since construction of the dam would take two years at least, the Department was asked to install a temporary water supply to the factory to serve until the permanent supply from Rooikrantz Dam became available.

Apart from the establishment of a construction camp, the installation of this temporary supply was the first task of the Resident Engineer. With the permission of the Borough Council connection was made to the town main at Middle

View of Kingwilliamstown from the existing high level reservoir.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

View of the Rooikrantz Dam site from the right flank (towards the right centre of the picture). The construction camp is in the background.

Reservoir and 28,000 feet of 10-inch piping were laid up to the Good Hope Textile Factory boundary. In addition 2,100 feet of 6-inch diameter piping were provided for fire services at the factory and 1,800 feet of 3-inch pipe were laid from the factory to a temporary reservoir in Zwelitsha Native Village.

Simultaneously with the installation of the temporary pipeline, the Department constructed a one million gallon, circular reinforced reservoir on an eminence commanding the factory buildings.

The works were completed and water delivered in January, 1949. The factory commenced production about March, so that water was available well on time.

Description of Works

The permanent works now under construction comprise the following items, viz. :—

(a) Rooikrantz Dam ;
(b) a permanent pipeline from the Dam to Kingwilliamstown and thence to Good Hope Textile Factory and Swelitsha Township ;
(c) a one-million gallon service reservoir on Beacon Hill ;
(d) a one-million gallon reservoir (already completed) for Good Hope Textile Factory ;
(e) a 1½ million gallon service reservoir and a 15,000 gallon elevated tank for Native Affairs Department.

The storage dam at Rooikrantz Dam has been designed as an earth and rockfill structure standing 75 feet above river bed level, with a crest length of 1,440 feet. Its capacity at full supply level will be 3,625 acre feet or 1,020 million gallons. On the centre line of the embankment has been constructed a cut-off trench through the foundation materials down to solid rock and this trench has subsequently been filled in with selected clay materials around a reinforced concrete cut-off wall built in the bottom of the trench.

The National Building Research Institute has been consulted in the selection of the materials for the embankment and in the design of the section and their advice has been of the utmost assistance and is gratefully acknowledged.

All materials for the embankment are selected, graded and consolidated in accordance with latest practice in earth dam construction. For the control of the earthfill a field soils laboratory has been established on the works and trained technicians conduct routine tests on the borrow-pit materials before and after placing.

The outlet works consist of a reinforced concrete outlet tower, accommodating a vertical stand-pipe with branches drawing off at three different elevations. A steel bridge gives access to the tower from the embankment. The bottom of the tower connects to a horizontal, reinforced concrete culvert which carries two pipelines extending from the vertical stand-pipe. One of these carries the compensation water for the irrigators while the other carries the town supply.

Floods will be discharged into a side-channel spillway built into the left flank of the dam. The spillway will connect with a concrete-lined chute which will conduct the flood discharge into the river channel some distance below the dam. Over the spillway an arch bridge will be built giving access to the crest of the dam from the left flank.

The Divisional Council of Kingwilliamstown has constructed a road up the eastern side of the valley to the dam site and this is at present used for construction purposes. When the works are completed a scenic road passing over the dam and returning by way of the western side of the valley, will be available to the public of Kingwilliamstown. Provision is also made for parking space alongside the spillway structure which will provide a vantage point from which the dam may be viewed.

The present pipeline from Maden Dam to Kingwilliamstown has deteriorated to such an extent that it will have to be replaced. The new gravitation main will take off from Rooikrantz Dam and will link up with Middle and High Level Reservoirs in the Town. It will consist of 53,300 feet of 27-inch and 20-inch pipes and have a capacity of 4½ million gallons per day. The section from Middle Reservoir to Beacon Hill will require 12,300 feet of 8-inch diameter steel pipes and that from Beacon Hill to Good Hope Textile off-take 5,600 feet of 12-inch pipes. The branch to Good Hope Textile Reservoir will consist of 4,000 feet of 10-inch pipes and that to Zwelitsha Village of 3,000 feet of 10-inch pipes.

The Middle and High Level Reservoirs are existing structures of a combined capacity of 1,220,000 gallons. A new reservoir at Beacon Hill is being built to supplement the town's service reservoir capacity. The reservoir, which is a square, covered, reinforced concrete structure, will have a capacity of one million gallons. As already noted, a one-million gallon reservoir for the Good Hope Textile factory is completed and in commission. To meet the demands of the native village a one-and-a-half-million gallon reservoir is being constructed in the Zwelitsha Native Township and to provide water for buildings higher than the full supply level

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

of this reservoir, an elevated tank of 15,000 gallon capacity will be constructed. Water will be pumped from the main reservoir into this tank and thence fed by gravity into the reticulation system.

Construction Operations

The first step in the construction was the provision of suitable accommodation for the Works Staff and the site selected for the construction camp is situated on rising ground on the left flank of the valley, overlooking the site of the storage works. Buildings erected include mess quarters, offices, stores, laboratory, etc. Suitable provision for the employees' recreation in the form of tennis courts, swimming bath, rugby field, recreation hall and library has been made. An adequate water supply has been installed, water being pumped from the Buffalo River which, after chemical treatment, is delivered into a service reservoir. The availability of an adequate water supply has made it possible for the employees to establish flower gardens round their living quarters. It has been found that comfortable quarters and the amenities mentioned contribute towards the happiness and contentment of the personnel and are well worth the extra cost.

Construction operations on the dam are in progress. Quarries have been opened and rock for the upstream and downstream zones of the embankment is being brought on and dumped into place from 6 cubic yard tip-trucks. The foundation work and outlet culvert are completed. Work is being commenced on the outlet tower and spillway. The works are being built under the direction of the Director of Irrigation.

The total estimated cost of the scheme is £350,000 of which the dam will contribute £185,000 and the pipelines and reservoirs £165,000. Of the above approximately one-third, viz., £120,000, will be covered by a subsidy from the Government, while the remainder of the construction cost will be repaid by the several consumers over a period of years to be fixed by arrangement. The scheme, on completion, will be controlled by the Government or such authority as the former might appoint for the purpose.

Significance of Scheme in Future Development of Town

The Upper Buffalo River Development Scheme, by furnishing a sufficient supply of pure water for domestic use and industry, is destined to play an important part in the future development of Kingwilliamstown and gives expression to the policy of the Union Government to promote decentralization of industry.

View of outlet culvert through the dam, under construction.

The Rooikrantz Dam site, looking north. Along the centre-line a trench has been excavated down to rock.

Kingwilliamstown is rapidly expanding and will undoubtedly in future become one of the major industrial centres of the South-eastern Cape. Several secondary industries have already been established and in all probability many more will find the facilities the town has to offer in the form of an abundant water supply, cheaper labour, proximity to a seaport and good rail and road communications sufficient inducement to attract them to this locality. The S.A. Railways plan to avail themselves of these facilities and intend establishing a large flash-butt welding depot for joining rails.

From the aspect of domestic water supply the completion of the Upper Buffalo Scheme will see an end to irksome restrictions placed on the use of water which the townspeople to-day experience. With its attractive surroundings and delightful climate, Kingwilliamstown should be able to cater for tourists and vacationists on an ever increasing scale.

The town will achieve importance as a result of the establishment of a textile industry and of the lead it has given other South African towns in setting up a model native village on its outskirts. But for the foresight displayed by the city fathers in pressing for this scheme, now in the process of fruition, Kingwilliamstown would have missed its chance of healthy expansion. But now, with an augmented water supply scheme under construction and with industrial needs already catered for by temporary works, prospects for large-scale employment, production and prosperity have never been brighter.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

PRE-STRESSED CONCRETE

By Charles W. Glover, P.I.A.A.S., M.I.Struct.E.

(Extracts reprinted from "Building Digest," January, 1949).

Limitations of Reinforced Concrete

THE advantages claimed for reinforced concrete in building are widely recognised by all employed in the industry, but improvements in the technology of the subject are always subject to the limitations imposed by the low strength and elasticity of the concrete.

For the conventional design of reinforced concrete it is a standard rule to ignore the limited tensile strength of the concrete and to base the design upon a "cracked" section, independent of whether visible cracks occur in the construction or not.

The elastic extension of the concrete before it breaks is of the order of 0.15 in 1,000, whilst the elongation of ordinary mild steel, as stressed to 16,000 p.s.i. in reinforced concrete, is of the order of 0.57 in 1,000 — some four times that of the concrete surrounding the bars.

Thus, it is always inevitable that, to develop the stress in the tensile reinforcement for which it is designed, the surrounding concrete must crack.

The cracking usually takes the form of a multiplicity of hair cracks which are detrimental, but are considered inevitable. The cracks are produced on sections submitted to tension and shear and may occur during maintenance and expose the steel to oxidation and/or corrosion.

Some cracks are due to redistribution of stresses and may cancel or change secondary and tertiary stresses which may not have been taken into account in design.

Shrinkage and temperature changes causing tension in the concrete may also produce cracking of ordinary reinforced concrete. It is obvious that, whatever may be the cause, cracks in reinforced concrete reduce watertightness, are always detrimental, and may, ultimately, bring about progressive failure.

Advantages of Pre-stressing the Concrete

Pre-stressing the concrete is the remedy for all the foregoing disadvantages, as by its judicious use crackless concrete may be obtained and considerable economy in material secured.

The basic idea is to induce in the unloaded member prestresses that are contrary to those brought about by loading.

Tests already carried out show conclusively that pre-stressed members, equal in strength to ordinary reinforced concrete, have about 80 per cent. of the concrete content and need only 20 per cent. of the reinforcement normally provided. Thus

Pre-stressed pre-cast secondary beams erected ready for the casting of the main beams at a new paint factory.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

pre-stressing may result in a saving of 20 per cent. concrete and 80 per cent. reinforcement, the cost reduction being about 30 to 40 per cent. in favourable circumstances.

A pre-stressed concrete tie shows 37 per cent. saving in concrete and 85 per cent. saving in steel as compared with ordinary reinforced concrete.

Moreover, the concrete in the pre-stressed tie, being subject to a pre-compression equal to the working load, is not subject to tension and will remain crackless, whereas the reinforced concrete member, for the reasons already given, will develop cracks when loaded.

Compared with ordinary reinforced concrete, pre-stressed concrete columns and struts can show savings of 30 per cent. in concrete and 94 per cent. in steel.

On beams of equal strength the savings are also marked — 50 per cent. concrete and 87 per cent. steel as compared with ordinary reinforced concrete.

The saving in weight is approximately equal to the saving in the amount of the concrete, thus the economy can be seen through most sections of the work down to the foundations.

Methods

Suitable pre-stresses in the unloaded concrete member can best be secured by applying compression in the tensile zone by:

(a) Stretching reinforcement and transferring the load as compression in the surrounding concrete by release from the straining devices when the concrete has hardened sufficiently ; or

(b) By avoiding bond between concrete and reinforcement and stretching the latter between anchors bearing on the concrete at the ends of the member.

For maximum economy it is essential to have high tensile steel having a 0.2 per cent. proof stress of 100 tons per square inch or higher and a high grade concrete of great crushing strength and density improved by various treatments such as vibration, heat and/or pressure.

Various Methods of Pre-stressing

Pre-stressing, generally, denotes that the reinforcement is tensioned before the load is applied, the stretching force being transmitted as compression to the concrete after the concrete has attained sufficient compressive strength.

Pre-stretching indicates that the tensioning is carried out before hardening of the concrete.

Under this method the products have to remain in the moulds until the stretching produced by tensioning the reinforcement against anchorages at its ends can be transmitted safely to the concrete by release of the wires.

Post-stretching indicates that the tensioning is carried out after the concrete has hardened, but as there is no bond between reinforcement and concrete by this method, special anchorages at the ends of the reinforcement are needed to bear upon the concrete.

With pre-stretching, at the release of the stretching force, the initial pre-stress is immediately reduced owing to the elastic deformation of the concrete and to shrinkage, which losses gradually increase by further shrinkage and plastic flow of the concrete. With post-stretching, immediate losses owing to the elastic deformation of the concrete in its initial shrinkage do not occur, but its elastic contraction under compression has to be allowed for.

Design

The design of pre-stressed concrete can best be understood by treating the finished section as if it were of homogeneous material, stressed to the appropriate amount and a few simple examples will serve to illustrate the method.

The exact solution of specific cases is matter for the specialist or serious student of the subject.

Development

Prior to the war, pre-stressed concrete received considerable attention on the Continent and in America for the construction of bridges and the manufacture of high pressure pipes. Owing to the war, in this country considerable research upon and development of pre-stressed concrete sleepers was undertaken with a view to their production an a large scale. The new technique of pre-stressing was first applied to the manufacture of concrete sleepers in this country* in 1941, and to-day pre-stressed concrete sleepers, made by mass production methods to the requirements of B.S.S. 986/1945, are supplied to the British Railways in large quantities for use in main lines.

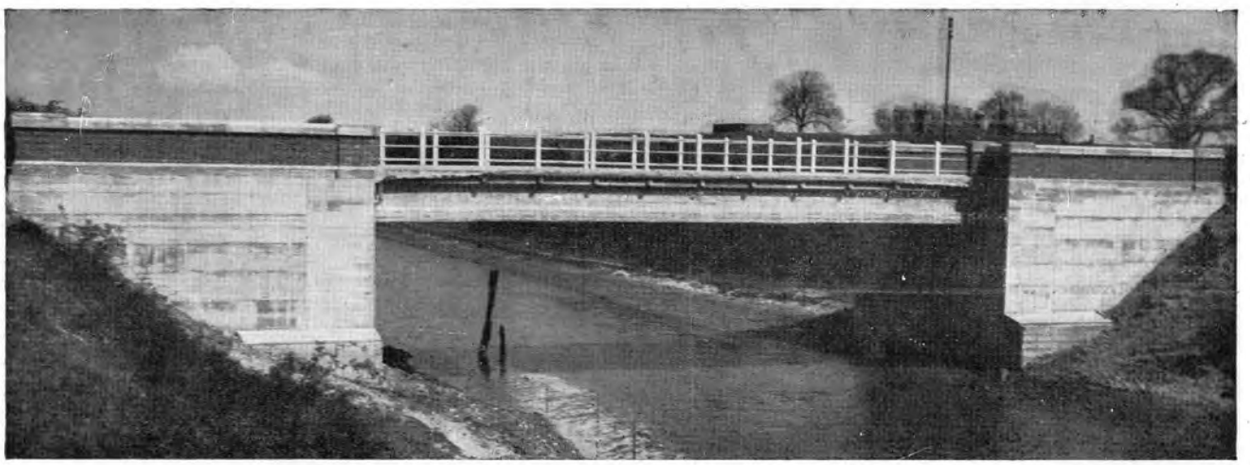
For the mass production of building units generally — floor beams, rafters, purlins, joists, etc. — a method very suitable for quick and economic production involves a casting bench up to 500 ft. long with wire anchors at one end and wire strainers at the other.

The concrete is conveniently mixed on a raised platform over the centre of the bench. The mixer feeds into a small

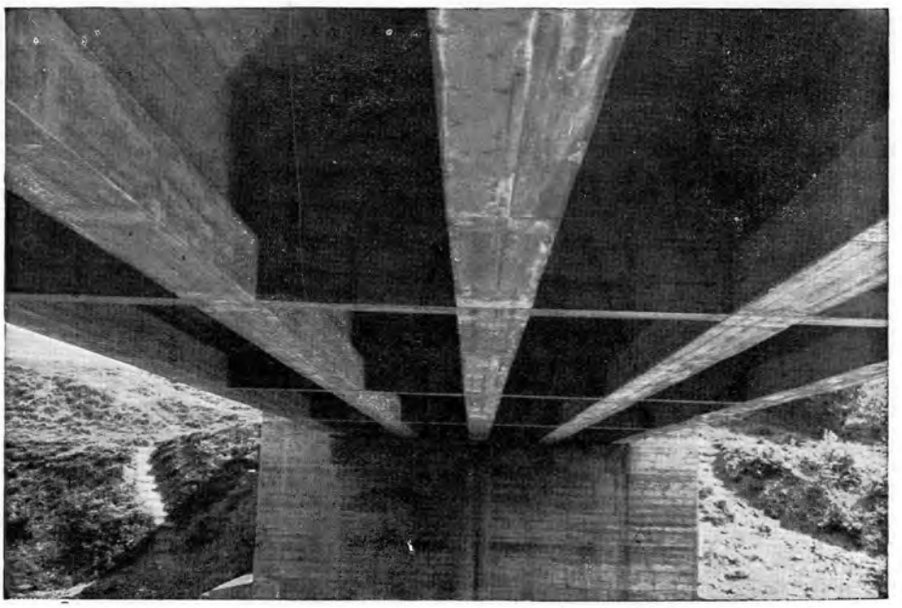
* *Great Britain.*

Anchor on short casting bench, showing wires and cores in place for hollow columns for single-storey building.

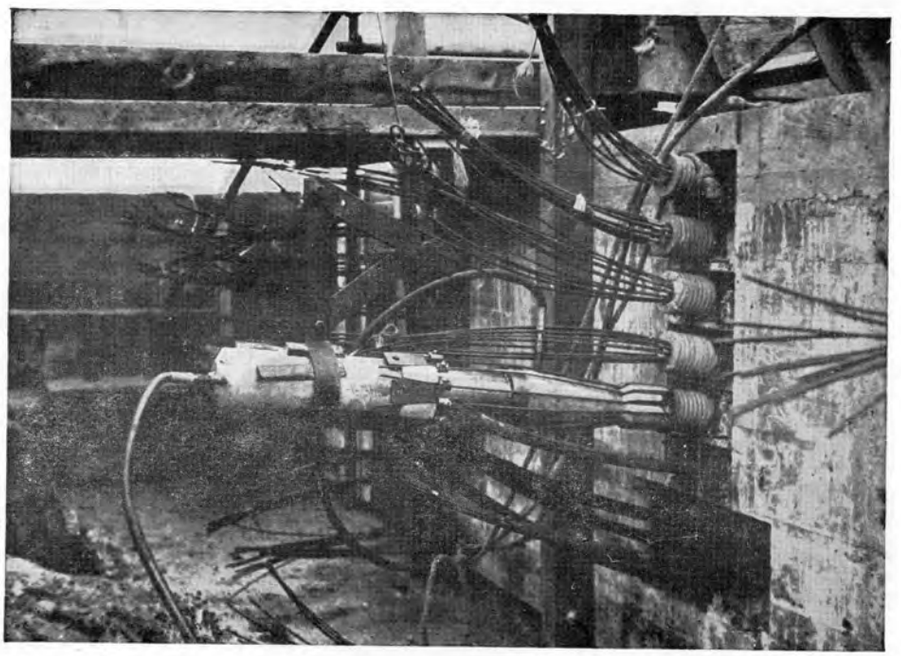
Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



Above : Pre-stressed in situ concrete bridge at Fishtoft, near Boston, Lincs.



Right: Underside of bridge showing main beams and cross diaphragms.



Left: Freysinnet wirejack at ends of beams of bridge shown above.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

General view of casting bank and mixing machine for pre-stressed concrete in Germany.

overhead hopper which travels the length of the table and through the medium of an adjustable filler fitted with vibrators and tampers fills the moulds and vibrates the concrete as it proceeds along the table. The moulds consists of sides only, and are assembled about the stretched wires round which the concrete is cast. After hardening of the concrete, the wires are released and cut, and the unit stored at the side of the shop. Before despatch, all units are tested on the testing bench. This tester is operated by a 100-ton hydraulic jack which, through the medium of a small attachment, is also utilised for testing concrete cubes.

As already state, it is desirable in bonded pre-stressed concrete to delay the release of the wires from the stretching devices until the concrete has attained a cube crushing strength of 4,000 p.s.i.

The use of accelerators (such as calcium chloride up to a maximum of 2 per cent.) would in cases of specially careful control provide a safe method of speeding the hardening process and the use of heated aggregates, warm gauging water and heated moulds will also be beneficial in this respect. By heating coarse and fine aggregate so as to produce a mix initially at about 150 degrees F. the hardening process may be speeded sufficiently to produce a result intermediate between 1-1½-3 rapid hardening portland, and a 1-2-4 high alumina cement concrete. Direct firing or steam heating methods may be used for this purpose, and steam jacketed moulds for repetition work will be found an economic possibility in normal circumstances.

Without artificial heating of the concrete, portland cement mixes require to be in moulds with the wires retained stretched on the casting platform about a week before they may be safely released. Whereas, with properly matured high alumina cement, release may be made within 24 hours.

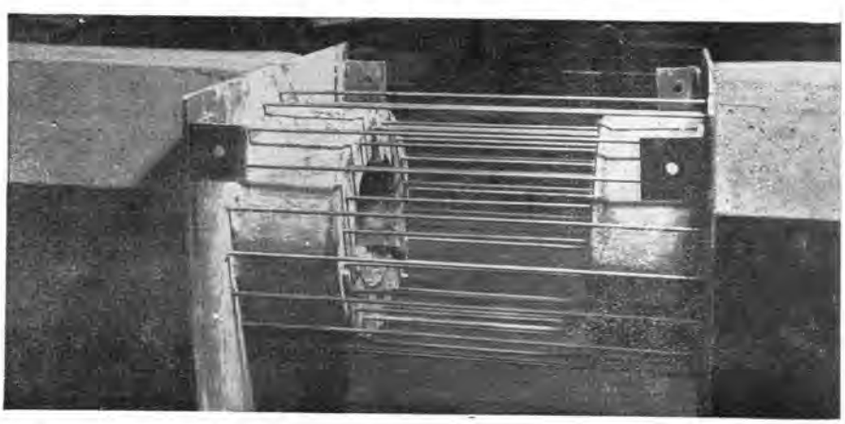
Too rich a mix is undesirable, but 1-2-4 high alumina concrete allows a 24-hour cycle, thus permitting one cast per mould per day. If the castings are small and the moulds numerous it may not be economic to incur the additional expense of high alumina cement, but usually a casting cycle of one week will prove too expensive in repetition pre-stressed pre-cast concrete work.

Wire Cutting

When units cast on one long line are ready for release the tension on the wires is eased off, and wires cut, thus permitting the removal of mould ends. The first cut is easily effected by the use of bolt croppers with hardened jaws, but cutting wires close up to the edge of the concrete requires the use of a hack-saw or oxy-acetylene burner.

Concrete Cutting

For cutting grooves, or cutting through pre-cast pre-stressed concrete units made in one long section, a stone saw will be found practically indispensable. Concrete and reinforcement are cut through with equal facility at about the rate of 1 sq. inch per second using a 10 H.P. motor, and costing less than one-tenth of a penny per sq. inch for wheel replacement, the all-in working out to about 8 sq. inches a penny.



Close up, showing stretched wires continuous through ends of column. Shalts cast in one long line.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

BUILDING REGULATIONS AND CODES

PROGRESS REPORT

By

S. S. MORRIS, B.Sc. (Eng.), A.M.I.C.E., A.M.T.P.I., M.I.Mun.E.

(Representative of the Institution of Municipal Engineers on the Co-ordinating Committee on Building Regulations and Codes, established by the Standards Council).

In our February issue we published a "Justification" for model building regulations and codes of practice, as put out by the S.A. Bureau of Standards in answer to criticisms by the Institute of Municipal Engineers at their conference in August last year. It would now appear that some measure of agreement has been reached in this matter. This article by Mr. S. S. Morris, indicates the results of further enquiry and the nature of the compromise accepted by all parties in this discussion. The practical importance of this matter has never been in doubt. The only question was how to solve the problem. That seems now to have been satisfactorily answered.

THE considerable effort expended by the South African District in advising the South African Standards Council and the Bureau of Standards regarding the production of Building Regulations and Codes has borne fruit. As a result of the resolutions adopted at the 27th Annual Conference, the South African Bureau of Standards has now clearly indicated that it has no intention of securing compulsory adoption of any regulations produced and that it will be left to local authorities to utilise the documents produced in the manner they think fit. An Investigatory Committee was set up from members of the Co-ordinating Committee to investigate in detail the criticisms made by the Institution, and as a result certain re-organisation was suggested and put into effect.

Questionnaire Results

One of the most important activities undertaken as a result of the Institution's criticisms was the circulation of a questionnaire to all local authorities in an attempt to obtain information regarding conditions actually existing in the country. The questionnaire was sent to 233 local authorities, of whom 81 replied. The response to the questionnaire was reasonably satisfactory in that it enabled a better appreciation to be made of the problem which the Standards Council had set out to solve.

The replies to the questionnaire proved conclusively that the criticisms made by the Institution were sound and based upon facts. The two main points made were completely confirmed, namely, that existing legislation did not hinder building development nor interfere with planning and design, and that, apart from administrative difficulties, existing regulations did not retard building development, nor cause building owners to suffer any real loss. The doubts expressed regarding the capacity of existing local authority staffs to administer complicated regulations were likewise completely substantiated.

Out of the total number of 233 local authorities to whom questionnaires were sent, five local authorities had populations over 60,000, nine had populations over 20,000 and sixteen had populations over 7,000. Even in group 1 there appeared two officers whose qualifications lent doubt to their ability and competence to decide authoritatively in respect of technical points encountered in the regulations so far recommended. In group 2, out of the five replies received, two officers were likewise possessed of doubtful qualifications, while the qualifications of two others were also open to query. In group 3, out of the ten replies received the same applied to three of the officers, while the remaining persons were the Town Engineers themselves.

In medium size towns — indeed, in all towns, both large and small — the Town Engineer himself assumed the responsibility for administering By-laws. The Town Engineer, however, was responsible for **all** the multifarious duties falling within the compass of a local authority's executive activities. It was generally impossible for the Town Engineer personally to administer, in addition to all his other duties, the provisions of building regulations, and special officers were therefore delegated for this purpose.

A design to relieve the monotony in London's East End Cottages.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Out of the 233 local authorities there were only thirty with populations over 7,000, that is, about 13 per cent. Of the 20 replies received in groups 1, 2 and 3, only thirteen indicated local authorities with officers who definitely possessed qualifications enabling them to deal with complicated technical matters.

Simple Set of Regulations

Attending a meeting of the Co-ordinating Committee in Johannesburg on 9th May, 1949, the Institution's representative once again pointed out that, apart from the larger local authorities, the persons charged with the responsibility of administering municipal building regulations were not in a position to administer any complicated provisions. It was suggested, therefore, that the first task of the Bureau should be the production of a simple set of model regulations which could be utilised by the majority of local authorities. If the Bureau preferred, this simple set of regulations could be one specially drawn up for use by smaller local authorities.

A way was indicated, however, whereby a simplified set of model regulations could be made to serve not only small local authorities but all local authorities throughout the Union.

Most of the building projects submitted to small local authorities consist of houses or domestic buildings. If a set of regulations covering these could be produced it would immediately go a long way to solving the difficulties of small local authorities. Similarly, the greatest number of building projects submitted to all local authorities, including the larger ones, comprised dwellings or domestic buildings or alterations to them. If, therefore, a set of model regulations was first produced dealing with dwellings and simple domestic buildings, it would immediately and without much loss of time eliminate most of those difficulties which appeared to exist throughout the whole country to-day. The manner in which such a set of model regulations should be produced had been suggested by the Institution in its previous recommendations.

The Institution's representative emphasised the fact that as long as regulations existed there would always need to be revisions and modernization; indeed, he pointed out that simple machinery for constant revision was essential for sound regulation.

Model Clauses

He pointed out further that the difficulties encountered in existing building regulations could be remedied immediately without waiting for the wholesale revision of legislation. If local authorities were having particular difficulties regarding special issues, then the solution of problems arising from these issues should be undertaken first. There existed adequate legal machinery in the country to enable amendments to building legislation to be made at any time. He suggested, therefore, that the Bureau should produce model clauses relating to the particular problems to which their attention had now been drawn; these could be incorporated without delay in existing legislation and so give immediate relief to the local authorities concerned, without waiting for the final comprehensive and complete documents.

As a result of the representations made by the Institution's representative, the Co-ordinating Committee agreed to adopt the following as their general policy:—

(a) The immediate investigation of problems as and when they occurred;

(b) The production of model regulations governing the construction of dwellings and appurtenant buildings;

(c) The comprehensive revision of all building legislation.

To give effect to the above, it was decided to establish an additional committee to deal with (b) so that all the above work could be undertaken concurrently.

The Co-ordinating Committee's decision to adopt the above programme is a gratifying one, and one which will be heartily welcomed by all municipal engineers.

The Institution is anxious to co-operate with the Bureau and the Standards Council, and trusts that the cordial relations now established will continue in the future.

New British stake-driving tool, which enables two men to put in the ground nine stakes in five minutes — more than they could manage in an hour with the usual spade and rammer.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

PUBLICATIONS RECEIVED

Design and Construction of Reinforced Concrete Bridges by Messrs. A. W. Legat G. Dunn and W. A. Fairhurst, published by Concrete Publications, Ltd., 14, Dartmouth Street, London S.W.1. 528 pp. 31/- post-paid.

This book, written by well-known Bridge Engineers and published by the firm responsible for the excellent "Concrete" series of books, fills a long-felt need for an authoritative and modern book on the design and construction of all types of reinforced concrete bridges.

It is well illustrated and contains numerous working drawings, graphs and tables which will be of great assistance to the student as well as the experienced engineer, and will reduce the time required for what are often laborious calculations.

The first three chapters are devoted to a discussion of the "ideal" bridge, the necessary site investigations, and a description of the thirteen possible types of bridges that can be used combined with five different types of cross-section, with notes on the types most suitable for particular conditions.

The following four chapters deal with the detail design of slab and girder bridges, portal frame and arch bridges, with actual examples worked out in detail.

A useful section in the chapter on slab bridges gives the method of dealing with concentrated wheel loads. The chapter on portal frames deals only with bridges hinged at the footings. While, as stated by the authors, this is the preferable condition, many portal frame bridges have been built with fixed ends to the vertical members, and a discussion of this condition and of the various degrees of restraint and how they should be dealt with would have been very useful and would have made the chapter more complete.

Foundations for arch bridges are well covered by numerous working drawings and calculations for mass and cellular abutments.

An excellent chapter is devoted to Bridge Architecture, a phase of bridge design too often neglected.

The strengthening, widening and re-alignment of existing bridges is a welcome and novel feature in a book on bridge design. There is one chapter, particularly useful to students, on office practice, giving methods of preparing drawings, detaling of reinforcement and compiling of bar schedules.

Useful charts are given for roughly estimating the cost of any type of bridge, and the final engineer's estimate for a bridge is worked out in detail.

The remainder of the book is devoted to the practical side of construction with chapters on methods and equipment, centreing and shuttering, reinforcement, concrete and concreting and supervision by the Resident Engineer.

Some exception could be taken to the continuance of the old method of specifying mixes as 1 : 2 : 4, etc., in these days of designing mixes for certain strengths and other properties, and we would disagree with the remarks on "proportioning."

The last chapter has sections on Railway bridges, culverts, pre-cast concrete bridges, pre-stressed concrete, hinges, drainage, wind pressure, testing and plain concrete bridges.

Appendices are included to cover conditions of contract, specifications, bills of quantities and photographs and descriptions of various types of bridges.

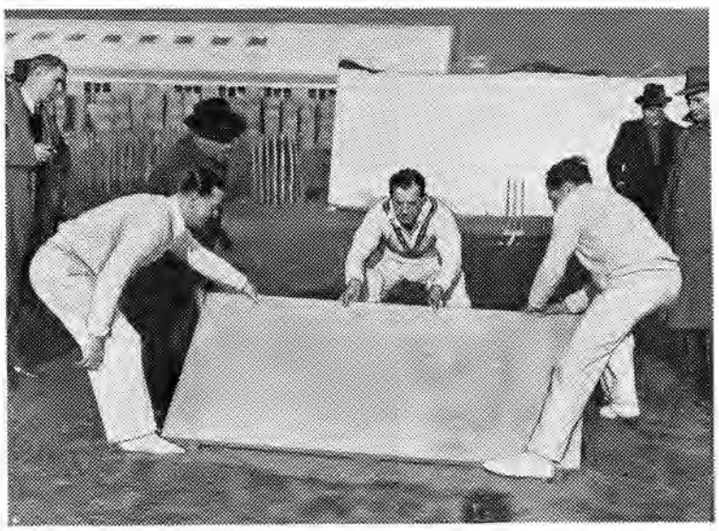
The book of 528 pages covers the design of reinforced concrete bridges in a very thorough manner, and is a credit to the authors and publishers, and will be a valuable addition to the Engineer's library.

South African Council for Scientific and Industrial Research — Third Annual Report, 1947-1948. 160 pp. with appendices.

Among the most interesting features of this report is the section dealing with the work of the National Building Research Institute. This organisation is now divided into five separate divisions handling architectural problems, functional efficiency, engineering, materials and soil mechanics. Additions to the professional and technical staff gave considerable impetus to the work of the Institute during the year under review.

Practical work has been carried out both on **contracts** and **research.** In the former field interesting investigations have been completed for the Department of Irrigation, the South African Railways and Harbours Administration, the Electricity Supply Commission and a number of private firms. Foundation analyses and examinations have been among the tasks undertaken. Tests, also, have been conducted to compare the warmth of a commercial asphalt tile with that of other flooring materials in South Africa. Weathering and absorption tests on sand lime and conventional burnt bricks have also been carried out. Daylight illumination intensities in the main line concourse of the new Johannesburg station has been another subject investigated.

In the Research Programme the list of studies undertaken is impressive. Amongst them has been research on the physical properties of the various elements of buildings; the cost of buildings; the properties and uses of vermiculite; the uses and limitations of both soil-cement and pisé-de-terre for wall construction; the efficiency of commercial waterproofing



A concrete cricket pitch which is portable. When laid the surface is covered by matting.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

materials; the capacity for the improvement of Portland cement; termite damage and general measures for the protection of building timbers; ventilation conditions; acoustical properties of building materials and a number of other cognate matters of interest and importance.

It is impossible here to review all the activities of the Institute. In any event the C.S.I.R. Report itself can only refer briefly to the subjects covered. Those interested in the obviously valuable work being done could not to do better than get in touch with the Institute direct.

Social and Economic Planning Council — Fourth Annual Report for the year ended 30th September, 1948. Published by the Government Printer, Pretoria. 3s. 22 pp.

This is quite the most modest publication for so important a subject that has come across our desk for a long time. Despite its small size it reveals that the Council has already published thirteen reports, dealing with matters of such importance to the economy of South Africa as Regional and Town Planning, Public Works Programme and Policy, Economic and Social conditions of the Racial Groups in South Africa as well as one now in preparation, dealing with the maintenance of full employment in the Union.

Like other Government-sponsored bodies, however, the Council reports that its staff establishment of 25 — small enough in all conscience for the important work it has to do — is 15, or 60 per cent., **under** strength.

In an appendix the Report includes a survey of South African economic conditions between September, 1947, and the same month last year. This survey covers trade and industry, agriculture, mining, transport, housing, prices, unemployment and irrigation, banking and public finance, stock exchange and companies registered, as well as legislation. Almost entirely factual the authors of the survey do, however, permit themselves this warning, undoubtedly topical to-day: "While it cannot be predicted whether or when a recession will occur . . . . the Union must be prepared to meet the problems which such a possible recession would bring."

Report of the Natural Resources Development Council. 30 dupl. pp. incl. annexures.

While public attention has been focussed lately upon the activities of the Council in the Eastern Transvaal, this report concerns itself with the objects, function and O.F.S. researches of this offspring of the Social and Economic Council.

The main functions of the Council are to advise the Minister as to the establishment of **controlled areas** (of which one, at present, exists in the Free State), to investigate the manner in which the natural resources of the Union could best be exploited, to prepare schemes for that exploitation and to facilitate and guide the carrying out of such schemes. It is interesting to note too that among the objects of the Council is the encouragement of the "teaching and study of regional and town planning and to advise and assist administrators, township boards and local authorities in regard to the establishment of townships and town planning." The Council is also intended "to advise and assist associations established for the purpose of promoting regional or town planning."

In the summary of the second preliminary report of the Regional Committee on the goldfields of the "controlled area" in the south-western Orange Free State, there are some extremely interesting population forecasts. Whereas at the May, 1946, census the inhabitants of the area numbered only

A new type of rammer for straightening weak foundations like unstable clay soil.

22,000, of whom nearly 18,000 were Natives and rather more than 4,000 Europeans, by 1966 the Regional Committee estimate the population will be 377,000, made up of 132,000 Europeans and 245,000 Non-Europeans. Of this number some 116,000 (all races) are likely to be employed on the mines.

This expansion in numbers of people, based upon projected gold production and upon the proportion of inhabitants, which the Rand has shown necessary to make up the consequential community, leads to other implications. One of these, of course, is communications. New roads and additional railway lines will be needed, as the report points out. But additional telephone and telegraph facilities, as well as airports, are no less necessary.

Within the next 20 years between 90 and 100 thousand dwellings will be required and, very possible, the present Vaal water supply plans may prove inadequate. Further, unless the Rand gold mines are all worked out within those twenty years, immigration on a large scale will be needed to provide the labour. Even, in fact, if all the presently marginal mines on the Witwatersrand were abandoned, fresh labour would still be needed for the O.F.S. without, if not within, the gold industry itself. And, if 20 years seems far away, it is worth noting that the O.F.S. goldfields population, **within ten years,** is expected to top the 100,000 mark — thus creating a centre at least as large as Springs is now.

Thirty-Seventh Annual Report of the Public Service Commission, 1948. Published by the Government Printer, Pretoria. 32 pp. 5s. 6d.

The two most interesting conclusions from this report are the deficiency in bilingualism amongst candidates for the public service and the difficulty obviously incurred in obtaining recruits, especially for posts demanding specialist qualifications.

With regard to the former conclusion the report says: "... only 35.8 per cent. of the candidates appointed can be regarded as having attained a reasonable degree of proficiency in the

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

two languages and that, due no doubt to the preponderance of Afrikaans-speaking recruits, nearly one-half of the total number of appointees possessed an inadequate knowledge of the English language. Unfortunately the acute shortage of man-power produces the imposition of severe restrictions in the selection of candidates, with the result that the State, as employer, is compelled to engage individuals whose candidature would not be entertained favourably under normal conditions. It is clear, however, that the continuance of the present unsatisfactory position, as regards language proficiency, can result only in a gradual deterioration of the general standard of efficiency and in the quality of the services rendered to the public."

With regard to several vacancies there were **no** applicants. For 44 draughtsmen, grade 2, there were only 2 candidates. While 7 applications were received for each of two appointments as Provincial and Principal Assistant Architect, and 9 for the post of Senior Assistant Architect Grade I (all in the Transvaal) there were only 2 candidates for 8 positions as Senior Assistant Architect grade II. These figures, taken at random, are evidently typical of the whole position in the public service at the present time.

National Building Research Institute. Bulletin No. 2. Published by the Council for Scientific and Industrial Research.

This number contains five papers on the use of soil cement hides as a building material; should strip footings under brick walls be reinforced?; foundations on expansive clay soils; quality and quantity in lighting and notes on the planning of urban residential areas.

Annual Report of the Director of Prisons for the year 1947. Published by the Government Printer, Pretoria. 18 pp. 2s. 6d.

The only buildings completed for prison purposes during the year reviewed were the staff quarters for the new Port Elizabeth gaol and the new gaol and staff quarters at Malmesbury. Other large buildings in hand or about to be started at the end of the year, were the new gaol at Port Elizabeth, the new gaols and staff quarters at Engcobo, Eshowe, Vereeniging, Butterworth, Swellendam, and Idutywa. Staff quarters at Cape Town, Pretoria and Pietermaritzburg were also under construction.

The report shows that there were 167 gaols and 9 convict prisons in use as at 31st December, 1947. It also shows that over 250,000 people of all races — or 2.3 per cent. of the Union population — were admitted to penal institutions. The daily average of admissions was more than 1,000 Europeans and over 23,000 Non-Europeans. As to whether the accommodation available is adequate is not indicated.

Eleventh Annual Report of the Registrar of Building Societies for the period ended 31st December, 1948. Published by the Government Printer, Pretoria. 45 pp. 7s. 6d.

This report is more profusely illustrated by graphs and diagrams than most Government Reports. The great increase in the assets of building societies is well illustrated by the fact that, whereas in 1939 these amounted to under £60 million, by 1948 they were over £197 million—a 333 per cent. increase.

The ratio of surplus liquid assets to loan commitments and the crises developed in the middle of last year, are carefully analysed. The Registrar goes on to say: "the crisis was due primarily to the bad timing, or in other words, inadequate correlation between available means, i.e., surplus liquid assets and loan commitments. . . . One is also struck by the unbalanced constitution of the Movement and the overpowering size of a handful of the Societies . . . Indeed, one is overawed by the responsibility resting upon the shoulders of that small group of persons to whose care thousands upon thousands of individuals have entrusted their savings for safe custody and increase. The trend exhibited by the development of the movement is in direct conflict with its original conception and more and more it is taking on the appearance of a concentrated capitalistic, rather than a widespread mutual, Movement."

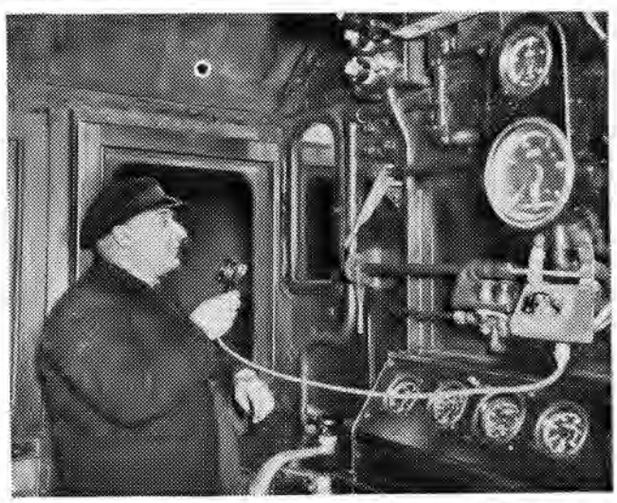
Final Report of the Company Law Amendment Enquiry Commission, 1947-1988. Published by the Government Printer, Pretoria. 182 pp. 10s.

This is an exhaustive report covering an important field. A large body of evidence was collected from organisations and individuals, both orally and in writing. The recommendations cover such subjects as the constitution of a company; prospectus, application and allotment; shares and share capital; administration; meetings and resolutions; inspection of company's affairs; investigation of real ownership of shares; accounts and directors' reports; audits and auditors; winding up procedure; judicial management; foreign companies and offences which should be made punishable by law.

All company directors and holders of considerable numbers of shares will find this report, with its suggested amendments to the existing company law in South Africa, of great interest and importance.

Annual Report of the Commissioner for Mental Hygiene, Statistical Tables, 1947. Published by the Government Printer, Pretoria. 16 pp. 2/-.

In this sphere too the staff shortage, particularly of nurses, is acute. At the end of 1947 the female mental nursing staff was short by 60 per cent. and the female staff for mentally defectives was over 50 per cent. deficient. In both Mental Hospitals and Institutions for Defectives, the accommodation question too, is a serious one. Since there were close on 2,000 persons of all races awaiting admissions to establishments of this nature, the rate of mental defectives per 100,000 of population (quoted in the report) does not mean much, except that the rate given for Europeans is two-and-a-half times that for other races. Equally significant is the fact that there are no institutions for non-European mentally defective persons, while for Europeans there are only two, one in the Cape and the other in the Transvaal.



Radio-telephony control for locomotives, now being tried out on the British Railways.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

TECHNICAL NOTES

"CATERPILLAR" CABLE CONTROL UNITS

OF importance and interest is the announcement that "Caterpillar" Cable Control Units are now available to fit all makes of crawler tractors. This comes as good news to the many equipment owners who are in need of heavy-duty cable control units to equip their tractors for scraper, bulldozer and ripper operation.

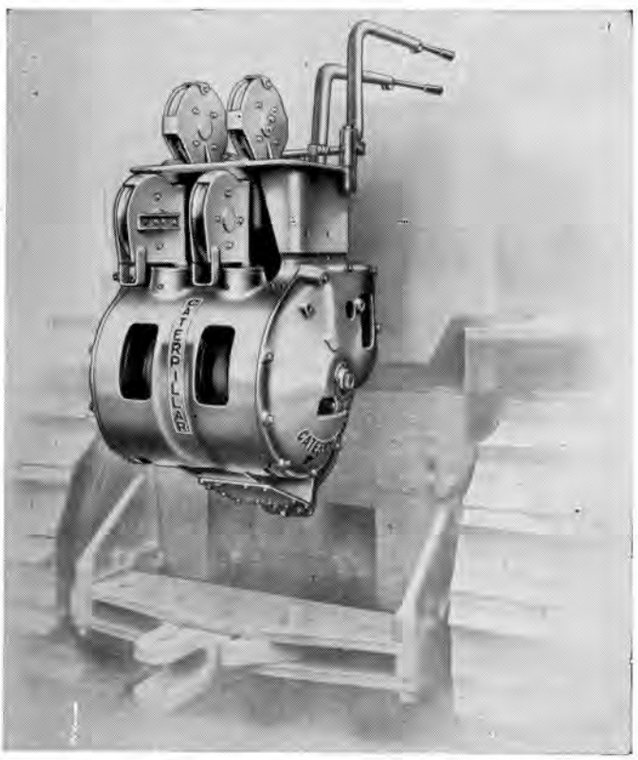
Undoubtedly the most outstanding is the "Caterpillar" No. 25 Unit, a rear-mounted, double-drum control for use on large capacity tractor-scraper combinations. Designed to permit rapid free spooling when desired, the control responds quickly and with the minimum of effort that virtually eliminates fatigue from this operation.

The multiple disc clutch with metallic facings is of the same type as that used for many years in "Caterpillar" track-type Tractors, and with synchronised brake release and clutch engagement, provides consistent smoothness of operation.

Other significant features of the No. 25 rear cable control include large-diameter, specially grooved sheaves; large brake capacity; longer life through use of anti-friction bearings and recessing of cable drums in the case; compact design which permits mounting close to the tractor for protection against damage, and for improved balance; and a rugged cast steel case ensuring freedom from distortion.

A less expensive version of the No. 25 is the "Caterpillar" No. 23 Cable Control. Possessing the same advantageous characteristics, the No. 23 develops line pulls ample for the more normal requirements of scrapers, bulldozers and rippers.

The final member of the "Caterpillar" Cable Control team for track-type tractors is the No. 24 unit. A front-mounted, single-drum control unit especially designed for bulldozer operation, the No. 24 permits accurate, powerful control and rapid free spooling when desired. Here again, the multiple disc clutch with metallic facings provides easy, smooth clutch engagement. All normal adjustments and brake mechanisms are quickly and simply made from the outside of the unit, and readily removable covers permit easy access for inspection or replacement of internal parts.



"Caterpillar" No. 25 Rear Cable Control.

For use with "Caterpillar" Diesel DW10 Tractors, there is the No. 21 unit, the operating features and structural design of which are similar to those of the "Caterpillar" Cable Control units described above.

Panoramic view of the Modderfontein factory of African Explosives and Chemical Industries, Ltd. This is the largest dynamite factory in the world, and also the biggest chemical centre in the Southern Hemisphere.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Fertiliser Plant Extensions

Apart from explosives, used in South African mines, the Modderfontein factory of African Explosives and Chemical Industries, Ltd., is a large manufacturing centre for fertilisers. At present the annual output is about 400,000 tons of superphosphates. In a few months plant extensions will raise this figure to half a million tons annually, sufficient for the whole Union. With the present programme for combating soil erosion and for landscaping schemes, this is an extremely important development. At the present time, too, with the need for cutting down currency exchange, self-sufficiency in this direction acquires additional importance for this country.

Further extensions, begun on a 30-acre site three months ago, will see the erection during the next three years of a £2,000,000 plant to manufacture nitrate and ammonia. By 1952 the Union should also be self-sufficient in these two commodities of such vital importance to farming, for the mining industry and for blasting operations in South Africa. Already employing 1,200 Europeans and 3,500 Natives, this is the biggest dynamite factory in the world.

Engineering and Marine Exhibition

This event takes place at Olympia, in London, between 25th August and 10th September, 1949. This exhibition, which was first held in 1906, is the largest in the world devoted to products of mechnical engineering industry.

While the 1947 exhibition broke all previous records for both numbers of exhibitors and visitors, this one looks like being even bigger. Already 600 firms have booked space.

Among the many interesting exhibits will be smoke-detection equipment, giving early warning of fire outbreaks; new fireproof paints and modern applications of metal spraying to reduce its resistance to atmospheric and other adverse conditions.

New Railway Workshops

In order to provide adequate workshop facilities to cope with all its rolling stock repairs, extensive operations are under way at Koedoespoort, seven miles to the north of Pretoria where, within the next few years, the Railways will have its biggest mechanical workshops in the Union. A stretch of land 1,000 acres in extent, has been made available for the purpose and the workshops alone will occupy an area of 300 acres.

The estimated cost of the Koedoespoort workshops is £5,500,000 but this amount does not include the cost of machinery and equipment, for which a further amount of at least £1,250,000 will be required. When the workshops are completed, employment will be provided for 5,000 Europeans and 500 non-Europeans. Nineteen miles of track and three miles of road will be laid on in the workshop area.

In view of the importance of the service, preference has been given to the workshops at Koedoespoort, where locomotives and passenger coaches are to be repaired. Good progress has been made with the preliminary work, and more than 1,000,000 cubic yards of soil have already been excavated to level the workshop area. At present, workmen are engaged on the drainage system which, in view of the size of the workshop area, is of particular importance. The subsidiary drains alone cover a distance of five miles, while the main outfall drain which will lead the accumulated water from the area will be one mile in length.

Eventually the Koedoespoort workshops will be equipped to undertake all classes of repairs for fifty locomotives and 150 coaches per month.

The central concrete batching plant with the concrete bridge in the background. The subway will become the main entrance to the workshops from the Pretoria side.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Part of the drainage system — the outfall drain 1 mile in length that will collect all run-off water from the subsidiary drains and take it to the main concrete outlet furrows.

NEW PROJECTS

Aliwal North : Improvements to Power Station and additions to the Water Works. Estimated cost, £17,000, of which £15,000 is to be spent on the Power Station.

Brakpan : Erection of Location Clinic. Estimated cost, £9750.

Bethlehem : Wall of Loch Athlone, the main water supply, to be raised. Enlargement of the town's filtering plant. New pipelines to Jordinia, Hospital Hill and Morelig extensions. Estimated cost, £165,000.

Cape Town : Memorial Hall for the Rondebosch Boys' High School ; estimated cost, £35,000.

Cape Flats : Canalisation scheme, running from Bellville to Zeekoe Vlei for the purpose of taking surplus water to the sea during the winter months and preventing floods in the Elsie's Kraal River and large areas on on the Flats. Water will, also, be conserved during dry summers.

Durban : Improvements at the South Beach include extensions to the bathing booths at an estimated cost of £33,000 ; £22,500 to be spent on essential improvements at the children's paddling pool, including the installation of a filtration plant, chutes and other amusements for children, fountains, island causeway, boat house and an office ; £25,000 for a milk bar and shops at the beach.

East London : Native Sub-Economic Housing : erection of 100 pairs of Austerity Houses at Duncan Village.

Maritzburg : Native men's Hostel. Estimated cost, £21,200.
S.A. Railways : Housing for Railway servants.
Sub-Economic Housing Scheme : Echo Road (European) ; Lower Berg Street (Non-European).

Pretoria : Completion of sewerage scheme at Capital Park. £50,000.
Building for the Pretoria Society to Help the Civilian Blind. Present funds : £8,280.

Port Elizabeth : Scheme to turn Strand Street, Victoria Quay, Slater Street and Zwartkops Street into a boulevard to connect with Broad Street and Patterson Road, to relieve congestion of traffic.

Paarl : Extensions to Hospital. £65,000.

Petrusburg : Town Lighting Scheme. Erection of a 220-volt A.C. plant is to start immediately.

Springs : Erection of a Gas Plant at New Era, Springs. Estimated cost, £250,000.
Construction of 200 European economic houses. Estimated cost, £400,000.
Further 100 European economic houses ; estimated cost, £220,000.
New abattoir at New Era, Springs. Estimated cost, £148,000. Of this, cold storage plant would cost £40,000.
Additions to Springs Town Hall, to include extra office accommodation and enlargement of the Council Chamber and the Mayor's Parlour.
Additions to Public Health Offices. Estimated cost, £5,300.

Stellenbosch : Reservoir to be built in Ida's Valley. Estimated cost, £210,912.

Uitenhage : Sewerage scheme. Estimated cost, £300,000.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

TENDERS INVITED

THE following are particulars of the more important tenders which have been invited up to the time of going to press for public works by Government Departments, Provincial Administrations and Municipalities. In each case the date by which the tender must be submitted is given. While every endeavour will be made to maintain accuracy in these columns it is pointed out that readers using this information do so entirely at their own risk.

BUILDING, ETC.:

Salisbury Municipality: The erection and completion of Native married quarters of semi-detached or single houses at the Harari Township, Salisbury. Contract, C.E. 25/1949. City Engineer, Salisbury. Extended to 16/8/49.

Cape Town: The erection of a rondavel at the Sunshine Home, Bellville, 12 ft. in diameter, 9-in. walls, 2 single windows, stable door, tiled roof and parquet block floors. Secretary, Sunshine Home, P.O. Box 1433, Cape Town.

ELECTRICAL EQUIPMENT, ETC.:

Cape Town Municipality: Manufacture, supply and delivery of cable. Specification 1570/1949. City Electrical Engineer, Cape Town. Due, 24/8/1949.

Durban Municipality: Transformers. E.2209. Electricity Department, Durban. Due, 2/9/49.

Electric Cable. Tender No. E.2211. Electricity Department. Due, 30/9/49.

Electric Supply Commission (Cape Western Undertaking), P.O. Box 117, Cape Town. Electrical transmission line material. Specification C.T. 11. The Commission's enquiries counter: 7th Floor, Grand Parade Centre, Castle Street Cape Town. Due, 17/9/49.

Paarl Municipality: Transformers, switch gear, etc. Contract No. E.D./49. The Electrical Engineer, Paarl. Due, 25/8/49.

Pretoria West: Street lamp fittings. Specification 340. Controller of Stores and Buyer, Pretoria West. Due, 15/8/49.

Rustenburg Municipality: 11 k.v. ring main switch gear. Contract E.1/9/49. Electrical Engineer, Rustenburg. Due, 10/8/49.

Stellenbosch Municipality: Three 250 k.v.a. Transformers, 3,300/400/230 volts. Electrical Engineer, Stellenbosch. Due, 22/8/49.

Upington Municipality: Electricity extensions: One 625 k.w. turbo-alternator, condensing and cooling water plant, etc. Contract 2/1949. Two boiler units, capacity of each 20,000 lbs. per hour, economisers, feed water pumps, chimney and induced draught plant, etc. Contract 3/1949. Two complete sets of plans and specifications for either contract on deposit of £3-3-0—additional copies at £1-1-0 per set. Consulting Engineer: H. M. S. Muller, P.O. Box 17, Upington. Due, 24/10/49.

Bulawayo Municipality: Second Extension, 13th Avenue Power Station: Section 5. Supply, delivery and erection at the above-stated power station (Bulawayo) of 33 k.v., 2.2 k.v. and 400-volt switch gear and control panels, power cables, main and auxiliary transformers, etc., which forms part of the second extension of the power station. (3 copies of contract documents on deposit of £5-5-0 — extra copies £2-2-0 each). Town Clerk, Bulawayo. Contract E.53/1949. Due, 14/10/49.

Uganda Electricity Board, P.O. Box 599, Kampala, Uganda. Owen Falls hydro-electric scheme: The construction and maintenance for a period of 12 months of a civil engineering work comprising the Owen Falls hydro-electric scheme on the Victoria Nile near Jinja, in Uganda. The work to be carried out under contract comprises the construction of a gravity and sluice dam, principally of concrete foundations and super structure for the Power Station, together with ancillary buildings, offices, control room, etc., reinforced concrete road bridge, permanent road approaches, access roads and railways and temporary works such as coffer dams. A copy of the contract documents and drawings may be obtained from the consulting engineers: Kennedy & Donkin, Alliance House, 12, Caxton Street, Westminster, London, S.W.1, **or** Sir Alexander Gibb and Partners, Queen Anne's Lodge, London, S.W.1, from the 8th June, 1949, on payment of **deposit** of a sum equal to £100. **Note:** Tenders must be delivered to the Uganda Electricity Board, Grand Buildings Trafalgar Square, London, W.C.2, by noon on the 15th August, 1949.

ENGINEERING EQUIPMENT, ETC.:

Salisbury Municipality: Workshop machines and equipment. Contract C.E.26/1949. City Engineer, Salisbury. Due, 23/8/49.

Springs Municipality: The design, supply and erection, of a 3-lift spiral-guided gas holder having a capacity of not less than 750,000 cubic feet, to be erected, complete with foundations, on the site of the new Municipal gas works at New Era, Springs. Contract 41. Town Engineer, Springs. Due, 17/8/49.

ROADS:

Pietermaritzburg Municipality: 10-ton overhead travelling crane. Contract No. 16/49. Provincial Roads Engineer, P.O. Box 417, Pietermaritzburg. Extended to 10/8/49.

TELEPHONE AND TELEGRAPH MATERIAL, ETC.:

S.A. Railways: Telegraph line material. Tender No. C. 484. S.A.R. Tender Board, 715. P.F.A.C. Building, 15 de Villiers Street, Johannesburg. Due, 11/8/49.

S.A. Railways: Telegraph line material. Tender No. C. 532. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg. Due, 15/9/49.

S.A. Railways: Telegraph line material. Tender No. C. 490. S.A.R. Tender Board. 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg. Due, 18/8/49.

WATER SUPPLY AND IRRIGATION EQUIPMENT:

Bulawayo: Supply, delivery and erection in the 13th Avenue Power Station, Bulawayo, of high and low pressure steam, feed and water piping, steam receive, tanks, pumps, etc., which form part of the second 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 a charge of £2-2-0 per set). Town Clerk, Bulawayo. Due, 10/10/49.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Durban Municipality : Two electric pumps and controls for Northdene. Contract W.487. City and Water Engineer, Durban. Due, 16/9/49.

Johannesburg : Compressed air and water piping and fittings. Tender No. A.492. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15 de Villiers Street, Johannesburg. Due, 18/8/49.

Rand Water Board : Additional water supply (1949) scheme : Sluice, reflux and air valves. Contract 734. (Deposit of £2-2-0 — extra copies at £1-1-0 each.) Chief Engineer, 3, Fraser Street, Johannesburg. Due, 31/8/49.

Pietermaritzburg Municipality : The construction, including earth works, of a quarter-of-a-million-gallon reservoir at Blackbridge, Pietermaritzburg. Contract C.E. 13/1949. (Deposit of £2-2-0). City Engineer, Pietermaritzburg. Due, 30/8/49.

MISCELLANEOUS :

Supply of aerodrome ground-controlled approach equipment to the Department of Defence. Tender No. S.O. 3395. Due, 11/8/49.

Supply, delivery and erection of complete crushing plant and equipment. Town Clerk, Kimberley. Extended to 15/8/49.

Two Boilers : Tender No. C.68. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15 de Villiers Street, Johannesburg. Due, 1/9/49.

Boiler Plant and Boiler House : Tender No. C.340. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15, de Villiers Street, Johannesburg. Due, 29/9/49.

Aluminium Paint : Contract 932. City Treasurer, Johannesburg. Due, 9/9/49.

Galvanised Signal Chain : Bloemfontein. Contract A.656. S.A.R. Tender Board. Chief Stores Superintendent, 501, Park Chambers, Risik Street, Johannesburg. Due, 15/8/49.

Crushing Plant : Contract No. 128/1949. Transvaal Provincial Tender Board. Controller of Prov. Stores, P.O. Box 857, Pretoria. Due, 21/9/49.

Paint for Electric Standards. Contract G.571. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15, de Villiers St., Johannesburg. Due, 11/8/49.

Varnish and Enamels, Etc. : Contract No. G.587. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15, de Villiers Street, Johannesburg. Due, 25/8/49.

Copper Wire : Contract No. C.582. S.A.R. Tender Board, 715, P.F.A.C. Buildings, 15, de Villiers Street, Johannesburg. Due, 25/8/49.

One Portable Petrol-Driven Concrete Mixer of 10/7 Cubic Feet Capacity. Town Clerk, Bellville. Due, 12/8/49.

Plywood : Tender No. A.642. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg. Due, 18/8/49.

Three and Five-Ton Vehicles and Chassis. Tender No. F.537. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg. Due, 18/8/49.

The Beaufort West T.B. Hospital is Floored with Armstrong Products . . .

ARMSTRONGS LINOLEUM
AND
ARMSTRONGS ASPHALT TILE
SUPPLIED AND LAID BY
NORTH BRITISH RUBBER CO. (S.A.) LTD.

23-35. VILLAGE ROAD,
SELBY, JOHANNESBURG
PHONE 34-1731

The reason is not hard to find ! Armstrong's Linoleum and Armstrong's Asphalt Tiles have proved themselves, over and over again, as the finest flooring materials for any building, public or private.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Another addition to the "Force"!

Every installation of Electro-matic vehicle-actuated road signals eases police commitments and frees men for service in other duties.

The signals, operated by a control mechanism which, in turn, is regulated by the density and speed of the traffic, provide a degree of safety, efficiency and flexibility which the human element unaided could never hope to equal.

Electro-matic signals have been installed at thousands of road intersections all over the world, and advice will gladly be given concerning any present or future traffic problem.

wherever you turn EVA ELECTRO-MATIC VEHICLE-ACTUATED SIGNALS **can make the highways SAFER!**

AUTOMATIC TELEPHONES (SOUTH AFRICA) LTD.

701, Kelvin House, Corner Hollard & Marshall Streets, Johannesburg. (P.O. Box 6687). Telephone: 33-2911

Associated Distributing Company for

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD., LONDON & LIVERPOOL, ENGLAND

A10171-A3

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

For fine quality paints and distempers - For cleaner and more durable castings. For better asbestos - cement goods - For improved rubber products - For high-grade chemical products - You need the products of our own mining properties prepared to the finest grades — Fuller's earth, kieselguhr, calcium carbonate, magnesium carbonate, barytes, and other base minerals.

G. & W.

BASE AND INDUSTRIAL MINERALS

P.O. Box 6211 Phone 33-6787/8
JOHANNESBURG

10 YEAR GUARANTEE ON Emalux WATERPROOF CEMENT PAINT!

- EMALUX CEMENT PAINT guaranteed to adhere to any solid material except wood for at least 10 years.
- EMALUX CEMENT PAINT adheres firmly and permanently to brick, concrete, stone, plaster, wall boards, asbestos, metal, glass, without the necessity of wetting, roughing or priming the surface to which it is to be applied.
- EMALUX CEMENT PAINT on exteriors will keep out driving rain and is guaranteed to waterproof the most porous walls; can be painted over with oil paint if desired.
- EMALUX CEMENT PAINT on interiors will reduce, and in most cases obviate all sweating, condensation and discolouration of decorations due to moisture.
- EMALUX CEMENT PAINT when thoroughly dry, gives an extra hard, durable and washable finish.
- EMALUX CEMENT PAINT will not crack, craze, peel or blister even when applied to a surface which is itself affected by temperature or slight movement.
- EMALUX CEMENT PAINT available in 14 pastel shades and cheaper than any other cement paint.

For further particulars, brochures, samples, etc., please contact

Emalux REGD TRADE MARK (S.A) CO

178-184 SMITH STREET
DURBAN

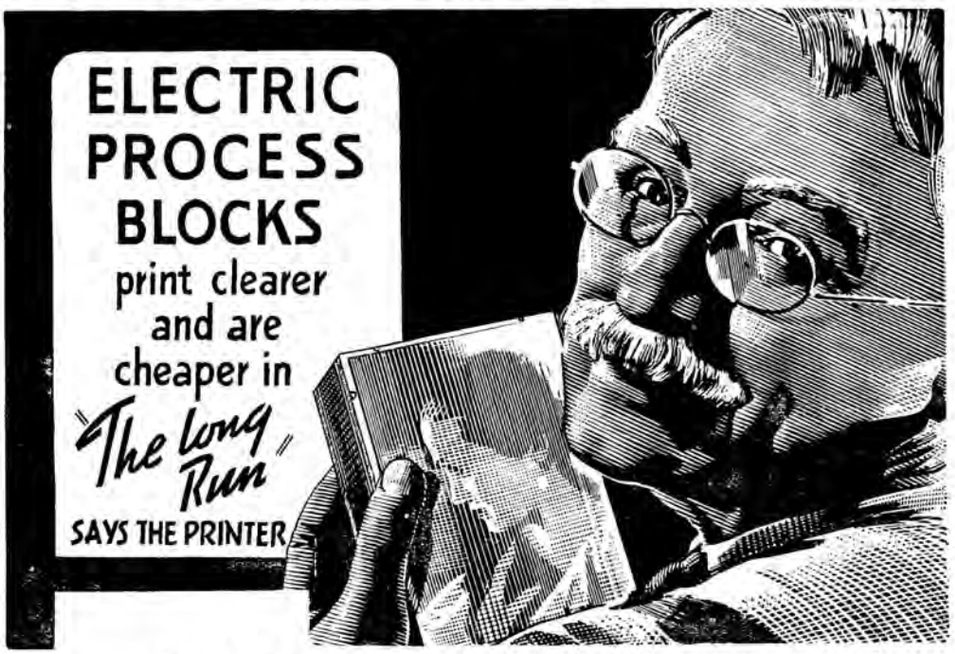
Tel.: "Emalux" Phone. 23407

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

FOR LINE, HALF.TONE and COLOUR BLOCKS — BRASS NAME PLATES

CONSULT . . . .

Electric Process Engraving Company (Transvaal) Limited



P.O. Box 1186 21, SAUER STREET EXT., JOHANNESBURG Telephone 34–2767

Bitumen COLAS REG. TRADE MARK *Emulsion*

THE EFFICIENT, DURABLE, AND ECONOMICAL SURFACE FOR

- INDUSTRIAL FLOORS
- ROADS
- DRIVES
- CAR PARKS
- PLAYGROUNDS

Simple to use
APPLIED COLD

Consult us on your problems — We maintain a fully-equipped contracting department or we can supply you direct

COLAS SOUTH AFRICA LTD.

JOHANNESBURG — DURBAN — EAST LONDON — CAPE TOWN — PORT ELIZABETH

RHODESIAN COLAS PRODUCTS

SALISBURY —————— NDOLA

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

CARST & WALKER (PTY.) Ltd.

JOHANNESBURG, CAPE TOWN, DURBAN & PORT ELIZABETH

Representatives in South Africa of Leading Overseas Manufacturers and Shippers

TIMBER, LOGS, SLEEPERS, PLYWOOD, FLOORING, DOORS, INSULATING BOARDS AND HARDBOARDS;

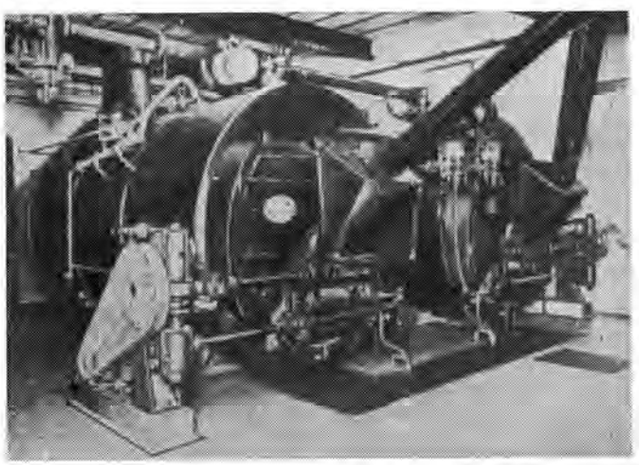
IRON AND STEEL PRODUCTS;

CEMENT;

LINSEED AND OTHER PAINT-MAKING OILS, RESINS, GLUE, CREOSOTE, COAL TAR AND OTHER HEAVY CHEMICALS;

TEXTILES, JUTE GOODS AND FIBRES;

PAPER AND PAPER PRODUCTS.



"Hodgkinson" Coking Stoker

★ **Consult us for your steam plant requirements — Supply and Erection of Steam Plant, Furnace Installations, Boiler Repairs and Maintenance, etc., etc.**

HODGKINSON

MECHANICAL STOKERS

James Hodgkinson (Salford) Ltd., London, England

COKING, SPRINKLING & UNDERFEED TYPES

The Modern Boiler Plant has, of necessity, to meet exacting demands. It must be capable of answering to rapidly fluctuating loads when burning coals of varying sizes and characteristics, and of operating without the emission of smoke or grit. Moreover the maintenance of a uniformly high thermal efficiency is certainly no less desirable.

Hodgkinson smokeless and gritless Coking Stokers enable all these conditions to be fulfilled, hence the popularity of these machines in industry.

If you are not already users of Hodgkinson Mechanical Stokers, we shall be very pleased to give you full particulars.

Sole Agents for South Africa and Rhodesia:

E. M. DOUGLAS & CO. (Pty.) LTD. **Mechanical and Electrical Engineers**

P.O. Box 6404, JOHANNESBURG, Phone 33-7670

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

CAXTON LIMITED

PRINTERS OF
HIGH-CLASS
PUBLICATIONS

ESSELEN STREET, PRETORIA

Phone 2-4480 P.O. Box 598

VITAL PROTECTION for all your TIMBERS

and many years more life

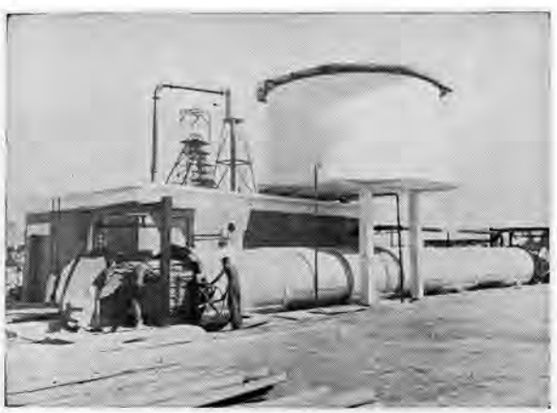
Complete protection against TERMITES, BORERS and DRY ROT

Vacuum Pressure Treatment for —

BUILDING TIMBERS, BLOCK FLOORING, FENCING AND FARMING POLES, TELEPHONE AND TRANSMISSION POLES, SLEEPERS AND FURNITURE TIMBERS

with Government Approved Preservatives

ELIMINATE THE SERIOUS RISKS AND EXPENSE OF DETERIORATION



HICKSON'S TIMBER IMPREGNATION CO. (S.A.) LTD.

P.O. Box 118, ROODEPOORT. Telephone 61-1303.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Sand and Co., Ltd.

EVERYTHING FOR BUILDING

Special Departments For :

★ ELECTRIC "VOLCANO" GEYSERS

★ ELECTRIC STOVES

★ CONCRETE MIXERS

95–107 BREE STREET
NEWTOWN
JOHANNESBURG
Phone 34-1901

170 Mitchell Street,
PRETORIA WEST
Phone 26204

44 Herschell Road,
Maydon Wharf,
DURBAN
Phone 57101

"ESAVIAN" Sliding and Folding Door and Window Fittings

ALL BALL BEARING FITTINGS

TYPE "E"
Bottom Track Rollers with top Roller Guides.

TYPE "K"
Top Hung Tubular Track Rollers with Bottom Channel and Guide.

W. S. THOM & CO. (TVL.) (PTY.) LIMITED

13, Maclaren Street
JOHANNESBURG

Tel. Add.: "Cheery"

74, Umgeni Road
DURBAN

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

PIONEERS IN *LOCKS*

STILL THE LEADERS

Rebated Locks
2 and 3 Lever
Mortice Locks
Rim Locks

ESCO
REGISTERED TRADE MARK

Cupboard Locks
6 and 8 Lever
Safe Locks
Door Furniture

MANUFACTURERS:—

E. SCHULTZ & Co. (Pty.) Ltd.

P.O. Box 3901
Phone 22-6270

34, Salisbury Street,
JOHANNESBURG

Sole Distributors: HUMPHREY PATTERSON.

HOW MANY MEN ARE NEEDED TO MIX THE AGGREGATE FOR 1,000 YDS. OF CONCRETE PER DAY?

. . . . By older methods — a labour force prohibitive when viewed in relation to present-day cost and availability. Hence the introduction for major construction projects, of the BLAW KNOX "COMBINE" Aggregate Batching Plant.

Designed for highway construction and developed during the war to balance manpower shortage against demands of military engineering, the BLAW KNOX "COMBINE" with its time-cycle of only 45 seconds can handle the material for an output of 1,000 cubic yards per 10-hour day. Mounted on six sprung, pneumatic-tyred wheels, the plant is fully mobile in the sense that it can be towed to any part of a site and by removing the top section of the bin and the skip frame, etc., it can be towed on main roads and under bridges.

Combine
BATCHING PLANT

NATIONAL ENGINEERING (PTY.) LTD.
P.O. Box 2762 Showrooms: Corner Main and Delvers Streets, JOHANNESBURG. Phone 33-0066
NATIONAL TRADING CO. LTD., Durban and Cape Town.
Rhodesia: J. MANN & CO., LTD., Salisbury, Bulawayo, N'Dola.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

TS P
TRANSVAAL STEEL PRESSING

. . . the QUALITY name in pressed steel and aluminium ware

You can see the T.S.P. Mark on many things — buckets, milk cans, refuse bins, aluminium basins, bowls and plates — indeed on countless everyday articles which the giant T.S.P. presses make in thousands. You can depend on T.S.P. goods. Each is of the highest quality and modern production keeps the price down to a level you'll appreciate.

Transvaal Steel Pressing Syndicate, Ltd.

JOHANNESBURG, CAPE TOWN, DURBAN.

BRUYNZEEL

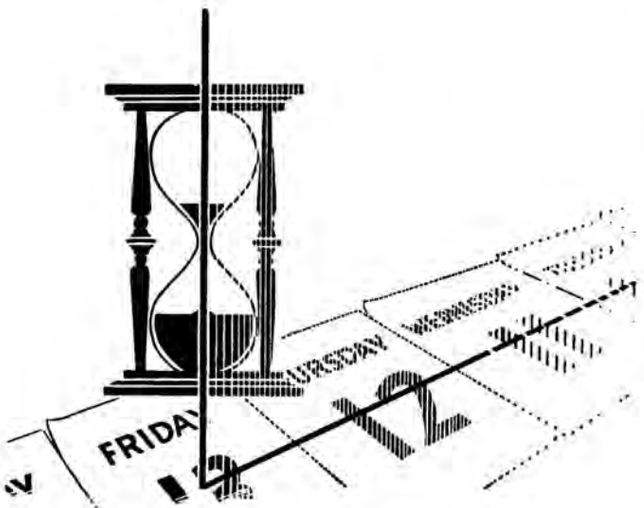
Daniel, a Bruynzeel boy, finds delivering Bruynzeel doors a pleasure . . . they are so easy to handle!

For details:

BRUYNZEEL

PRODUCTS
(S.A.) (PTY.) LTD.
28 Marlborough Road (off Eloff Street Extension),
Springfield, Johannesburg
Telephone 32-2854

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.



When is the deadline?

Air Survey

CUTS OUT UNNECESSARY DELAY

Photogrammetric air survey does in days what ground survey may sometimes fail to do in months. It gives you the complete picture, in full, accurate detail, to enable you to go ahead with your planning within the shortest possible time.

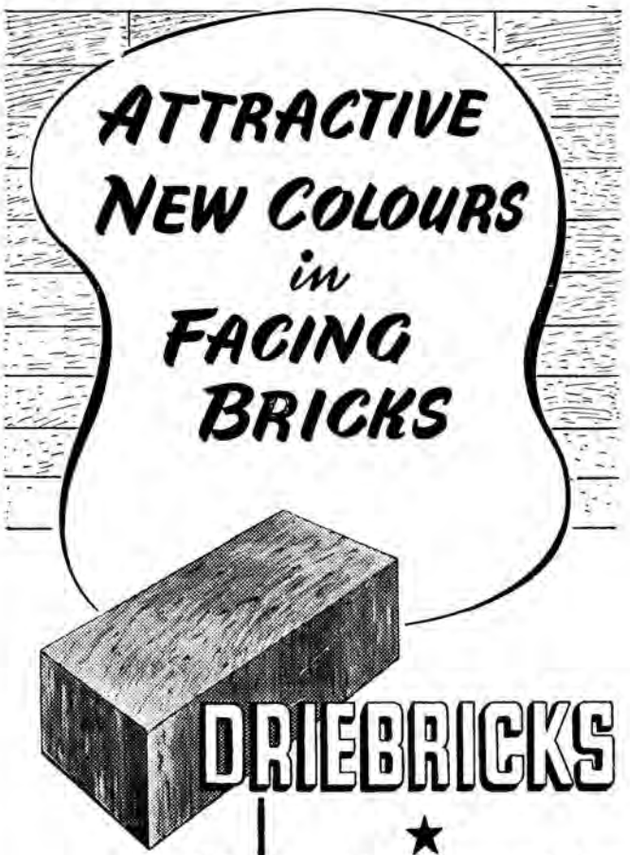
The information that you need about the area that concerns you can be made available in exactly the form you require: as simple stereoscopic photographs, as a mosaic of these photographs, and as accurate contour maps or plans at all scales up to 1/1000 with 5 ft. contours or even bigger in special cases.

Air survey is invaluable for engineering and development schemes, for roads, railways, power and irrigation projects. May we give you fuller information?

AIRCRAFT OPERATING CO. OF AFRICA LTD.

CONTRACTORS FOR AIR SURVEYS AND AIRCRAFT OPERATIONS
AERONAUTICAL ENGINEERS AND CONSULTANTS

Aircraft House, 23 Rogers Street, Selby, Johannesburg
P.O. Box 2830 Tel. Add.: "Airphotos" Phone 33-3255



★

Unlimited quantities available for

IMMEDIATE DELIVERY

★

Driebricks — burnt in the very latest of tunnel kilns — offer you something different in the way of colours. You will appreciate their quality and low prices.

Contact us now, we will only be too pleased to give you all the information you require.

DRIEFONTEIN BRICK AND POTTERIES CO. LTD.

Telephone: Bank 15 P.O. Bank Transvaal

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

The Brick and Potteries Company, Limited

Manufacturers of the following:

" HERONMERE " BRICKS
DOWN DRAUGHT KILN FACING BRICKS
GOLDEN BROWN FACING BRICKS
HOFFMAN KILN BRICKS
SPECIALS

Prices will be furnished on application to:
THE SALES MANAGER. 'Phone 33-4158/9.

Head Office:
TRUST BUILDINGS,
Cor. Fox and Loveday Streets,
JOHANNESBURG.
'Phone 33 - 3414.

P.O. Box 155.

Works:
STEVENS ROAD,
Off Eloff Street Extension, Booysens,
JOHANNESBURG.
'Phones 33 - 4158/9.

Phone 33–2114. P.O. Box 3664.

R. L. ESSON & CO. Ltd.

Southern Life Buildings,
cor. Main and Harrison Streets,
JOHANNESBURG.

Manufacturers and Suppliers of:
DRAWING OFFICE MATERIALS
SENSITIZED PHOTO PAPERS & CLOTHS
DRAWING OFFICE EQUIPMENT

Sole Agents in South Africa for
W. OTTWAY & CO., LTD.
LONDON, ENGLAND
Manufacturers of Surveying and Optical Equipment

ORANGE SERIES R. L. ESSON & CO. LTD

The Famous 'Orange Series' Drawing Office Supplies
KNOWN THROUGHOUT AFRICA

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

We Are Friendly People . . .

. . . Who enjoy being helpful about things we know. Take air-conditioning for example — in this field we can be of assistance to you in every sphere of a relatively new, yet ever-growing industry. If you have a problem, require guidance or suggestions, ring us up or drop us a line. We are the sole representatives for Chrysler Air Temp — division of the famous motor firm.

CHRYSLER AIRTEMP

AIR CONDITIONING & ENGINEERING CO. LTD.

P.O. BOX 7821, JOHANNESBURG. 33-0341. P.O. BOX 4018, CAPE TOWN. 5-1574.

AND

(Natal Branch) A. E. BARKER LTD., P.O. Box 1253, DURBAN. 2-3056.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

THE ERECHTEUM
ATHENS

HOW long can a building stand the ravages of time and weather? This magnificent piece of Greek Architecture was built between 460 and 500 B.C. and is the most perfectly preserved of all Athenian buildings of that period.

The cement in the construction was "natural" cement — a mixture of volcanic dust and slaked lime. The fact that even this crude combination has lasted almost 2,400 years, is a testimony to the endurance of all cement.

Modern cement has many advantages over the old Roman product. The materials are scientifically tested during all the stages of manufacture, from the original analysis of the raw materials, including the spot-testing throughout the process, to the final test of the finished cement.

Anglo-Alpha Cement conforms to the British Standard specifications and is noted for strength and durability.

ANGLO-ALPHA CEMENT

ANGLO-ALPHA CEMENT LIMITED

Head Office: Anglovaal House, Fox Street, Johannesburg.

DORR EQUIPMENT

for Water Purification

DORR EQUIPMENT is directly applicable to the treatment of both municipal water supplies and industrial water for power generation and general process work. The type of treatment may range from simple turbidity removal to water softening; coagulation for the removal of other impurities; and the Dorrco D-1 System for the partial or complete removal of mineral salts in solution.

Edwd. L. BATEMAN (Pty) Ltd.

7th FLOOR, PRUDENTIAL ASSURANCE BUILDING, 90, FOX STREET.
BOX 1671. JOHANNESBURG. PHONE 33-7091.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

LEO WHITTLE (Pty.) LTD.

" The Decorators of Distinction "

For All

PAINTING and DECORATING

Requirements

Phone 45-4258 JOHANNESBURG P.O. Box 7709

KEEPING PACE...

WITH THE

INDUSTRIAL EXPANSION OF SOUTH AFRICA

— Loads From 6 To 60 Tons —

ROSS TRANSPORT CO. LTD.

152, PRESIDENT ST., GERMISTON.

Phones: 51-4402 51-1179

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

CROSSLEY Crude Oil Engines
COCHRAN Economic Boilers
ERICSSONS Telephone Equipment
GENT'S Electric Clock Systems
PERMUTIT Water Treatment Plants
MACHINE TOOLS Metal & Woodworking
ASPHALT Contracting

●

ROGERS-JENKINS & Co., (Pty.) Ltd.

JOHANNESBURG - CAPETOWN - DURBAN - PORT ELIZABETH

Chemistry starts...

where nature stops

Take the finest raw materials that Mother Earth provides . . . it still needs skill and knowledge to make a weather and corrosion resisting paint. That's where PARTHENON scores. To 60 years of priceless practical knowledge and skill is added everything consistent laboratory practice can produce. Bridges in salt air areas, roofs subject to acid atmosphere, pipes which heat and cool rapidly — there's a Parthenon Paint for each and for everything else. It pays to paint with PARTHENON.

PARTHENON *Paints*

BY TEST THE BEST

HERBERT EVANS & CO. LIMITED

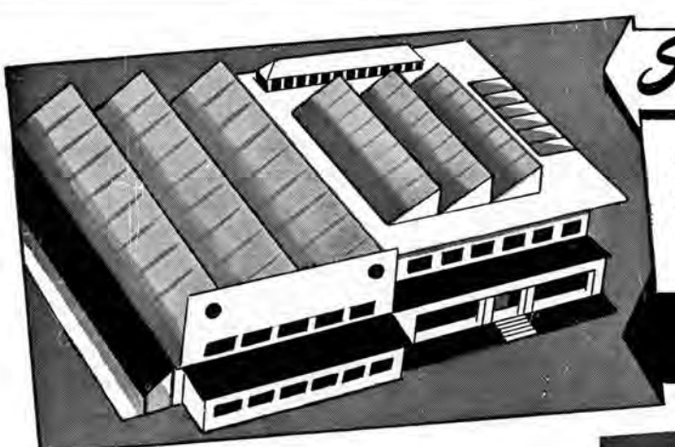
Head Office: Johannesburg. Branch: Pretoria. Factories: Durban, Johannesburg.
Depots: Johannesburg, Pretoria, Durban, Cape Town, Port Elizabeth, Bloemfontein and Salisbury.
AGENTS THROUGHOUT SOUTHERN AFRICA

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

LAING

BUILDING AND ENGINEERING CONTRACTORS

MARITIME HOUSE · JOHANNESBURG



Shield Your Roof

Coolite, the Aluminium Shield for all roofs — factory or residential. The ideal roof protection from Hot Sun. Has been known to reduce interior temperatures as much as 15%, and spreads twice as far as ordinary roof coatings.

COOLITE

Protect Your Floors

Mastipave, resilient to thousands of feet which walk over it daily, is the ideal flooring for office or factory. Having an innate ability to heal itself, even when cut, Mastipave gives years of excellent service while keeping an attractive look. Easy to lay in either plain or squared formation, Mastipave is the ideal floor covering for all heavy-duty floors.

MASTIPAVE

HUNT LEUCHARS & HEPBURN, LTD.

Baltic Buildings, 42 Anderson Street, P.O. Box 47, Johannesburg. Head Office: Durban

Branches at: Pretoria – Lourenco Marques – Germiston – Brakpan – Klerksdorp.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

WIRE INDUSTRIES STEEL PRODUCTS AND ENGINEERING CO., LTD.

49, COVENTRY STREET, OPHIRTON, JOHANNESBURG,
SOUTH AFRICA.

Telephone :	33-9534
Telegrams :	"Castings"
P.O. Box	8799

Manufacturers of :

STEEL WINDOWS, DOORS AND FLYSCREENS, PRESSED STEEL DOOR FRAMES AND WINDOW SURROUNDS, GATES AND FENCING, SCREENING, WHEELBARROWS, ETC.

Also at : CAPE TOWN, DURBAN, PORT ELIZABETH, EAST LONDON

REINFORCING AND STRUCTURAL ENGINEERS

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

BUILDERS

ARCHITECTS

BUILDERS MERCHANTS

SOLID FLUSH DOORS

★

LAMINATED BOARDS

★

VENEERED PANELLING

★

PLYWOOD

★

Veneered Plywoods (S.A.) (Pty.) Ltd.

MANUFACTURERS

OFFICE:
22 BOK STREET, JOHANNESBURG
Opposite Joubert Park
Phones 44-7191 & 44-2863 - P.O. Box 5650

MILLS:
BOKSBURG-BENONI ROAD
BOXBURG EAST

Printed by Caxton, Limited, Esselen Street, Pretoria, for the proprietors and publishers, Public Services Publicity (Pty.), Limited, Norwich Union Buildings, Main Street, Johannesburg.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Supplement to
"Public Works of South Africa", July, 1949

69 (05)
Series DIS-5.

INFORMATION SHEET

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

The Resistance of Brick Walls to Rain Penetration

21. Q: What are the important factors affecting the resistance of unplastered brick walls to penetration by rain ?

A: Generally, the resistance of brick walls to rain penetration depends more upon the class of workmanship involved than on any other factor. Tests have proved that walls having the bed, head and cross joints well filled with a suitable mortar which in itself does not crack excessively (later referred to as class A workmanship) show much greater resistance to rain penetration than walls built with as little mortar as possible (class B workmanship). Penetration in the first case is probably entirely due to capillary action, while that in the second case takes place chiefly through the large interstices in the joints.

High absorptive, high suction bricks tend to be less resistant to rain penetration when used with class A workmanship, but they have the opposite effect when used with class B workmanship. In the latter case this is probably because high absorptive bricks absorb more of the water which penetrates into the joint cavities than low absorptive bricks, thus retarding the general flow through the wall. The rain resistance of high absorptive bricks can be improved, however, by thoroughly wetting the bricks before laying.

Heavy rain tests have shown that wall thickness has a marked effect on rain penetration, the time taken for the penetration of dampness through a 12-inch wall being 50 times as great as for similar 8-inch walls where class A workmanship was used, and about 6 times as great with B workmanship.

Tooled joints are more effective than cut joints in increasing the resistance to moisture penetration but this increase is insufficient to overcome the influence of inferior workmanship inside the wall.

Mortar mixes with little lime and a reasonable proportion of cement give better resistance than low cement, high lime mixes, although variations in mortar mixes are not as important as the other factors mentioned.

Bond Strength of Concrete

22. Q: When better grade concretes are used does the "bond strength" increase in proportion to the compressive strength ?

A: Early investigators found that the bond strength of concrete increased in porportion to the compressive strength, which led to the practice of specifying, in Building Bye-Laws, the allowable bond stress as a percentage of the 28 day compressive strength.

However, this work was largely carried out on concretes having a maximum strength of 2,000 lbs./in^2. Later investigators have found that the bond strength only increase slowly as the compressive strength rises above 2,000 lbs./in^2. It has been found that the increase is greater for some types of bars than for others. One investigator working on several types of commercial deformed bars found that when the concrete strength was raised from 3,000 to 7,000 lbs./in^2 (an increase of 133%) the smallest increase in bond strength was 23% while the greatest was only 63%.

A study of this work and the results of a number of other investigators has led to the unqualified statement that, for current concrete mixtures, bond strength does not increase in direct proportion to the compressive strength of the concrete.

Foundations on Sand

23. Q: When may foundations safely be put on sand ?

A: A dense sand is generally one of the most satisfactory foundation materials. Heavy loads may be carried with very little settlement taking place and the material does not undergo changes in volume with changing moisture content. All that must be guarded against is the erosion of the sand adjacent to the foundation.

If however the sand is in a very loose condition, severe settlements may take place under relatively light loads particularly when the sand is subjected to vibrations. When loose sand is saturated a shock may cause the whole mass to liquefy and a condition generally referred to as "quicksand" develops: under the circumstances it is possible for the whole foundation to sink into the ground.

In saturated ground the uplift effect of the water must be taken into account when determining the stability. Any upward flow of water through sand will seriously decrease the safety of a foundation and under these circumstances precautions must be taken to ensure that quicksand conditions cannot arise.

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.

Paint Failure on Galvanized Iron

24. Q: Why are paint failures on galvanized iron roofs so common ?

A: There are a number of contributing factors of which the following are the most important:—

(1) The extreme smoothness of the new galvanized surface.

(2) Chemical reaction between the zinc metal and the binding media in the paint. Certain chemical products are formed between the base of the paint film and the metal surface. Some of these chemicals upset the chemical adhesion forces and so promote peeling. Other chemical reaction products cause the hardening of the paint film with resultant loss in flexibility.

(3) The severe conditions under which a paint is exposed on a roof—

(*a*) Certain components of sunlight have a deleterious effect on the organic portion of a paint film.

(*b*) When the galvanized iron contracts or expands due to cooling and heating, the paint film tends to check, crack and peel off.

(*c*) The roof is continually exposed to severe wetting and drying conditions. Dew action, or humid conditions, do considerable damage to a paint film and to the underlying metal.

(*d*) The mechanical effect of hail action can also be a contributing factor.

(4) Lack of care in application. When paint is applied to large, continuous surfaces workmanship often suffers due to a variety of reasons. Amongst these may be quoted: excessive thinning of the paint in order to improve its working or brushing qualities, a thinner film results and the surface is not adequately covered; little attention to brushing out properly, which results in variable film thickness, ridges and runmarks; applying the paint under bad weather conditions.

(5) Paint quality. The painting of a roof can be a relatively large item of expenditure to a house owner. There is therefore a tendency to use cheap roof paints, irrespective of quality.

Prevention of Rapid Paint Breakdown on Galvanized Iron Roofs

25. Q: What are the methods for preventing the rapid breakdown of paints on galvanized iron roofs ?

A: Apart from the possible effects of improvements in paint formulation the life of a paint on a roof will be prolonged by the following:—

(1) Ageing of the galvanized iron prior to painting. The galvanizing will age slowly and become roughened in the process, ensuring a better grip for the paint film. However, when corrosive conditions are encountered, like those existing in highly industrialized surroundings or in marine atmospheres, it is often necessary to paint galvanized iron when still new and in this case a pre-treatment as under (4) or (5) should be used.

(2) Painting roofs during the dry season. It must be borne in mind that a paint film should preferably age for some days under favourable atmospheric conditions.

(3) The use of properly formulated inhibitive primers like those made from yellow zinc chromate. Red lead primers on galvanized iron should be used with caution.

(4) Pre-treatment of galvanized iron at the factory. Bonderizing, Parkerizing, Iridite treatment and other processes have been very successful in improving paint life.

(5) Pre-treatment of new galvanized iron on the roof. The following methods have been recommended and are tabulated here in approximate order of merit:—

(*a*) Phosphating solutions. These consist mainly of aqueous solutions of one or more metal phosphates, containing free phosphoric acid, with or without activating agents. Any superficial dirt and grease on the galvanized iron should first be removed. The adhesion, water resistance and rust-inhibiting properties of the paint film are much improved by the thin adherent film of phosphates precipitated on the galvanized iron.

(*b*) Chromating solutions. These are similar to (*a*).

(*c*) Cleaning and mild etching solutions. These processes impart a slight roughness to the galvanized iron surface and result in better mechanical adhesion of the paint.

(*d*) Other etching solutions, prepared from mineral acids alone, copper acetate, copper nitrate, copper chloride, copper sulphate, etc. These have often been used, although some are likely to cause more harm than good.

It is essential in all these cases to remove excess chemicals by thorough washing after treatment.

W.P.—66881—3-6-49

Digitised by the Open Scholarship & Digitisation Programme, University of Pretoria, 2016.