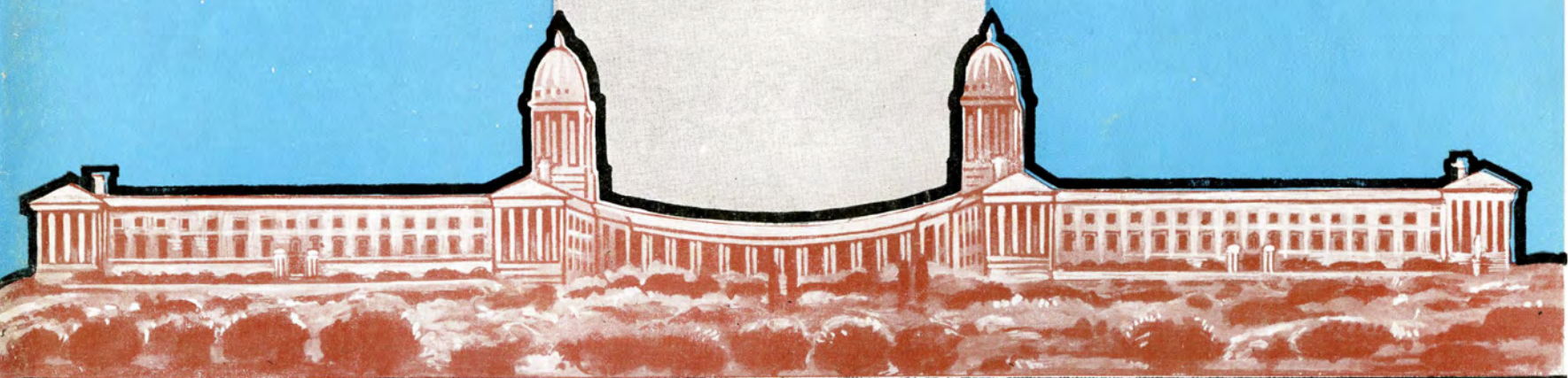
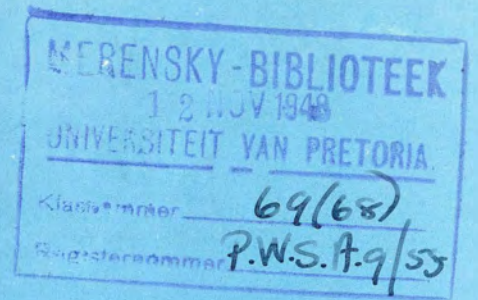


Vol. IX.

No. 55.

JUNE : 1948.

PUBLIC WORKS OF SOUTH AFRICA



Registered at the General Post
Office as a Newspaper.

Price per Copy : 1/6

Subscription : 15/- per annum



Know this Wheel!

THIS is no ordinary wheel . . . it is a wheel that never stops. Day in and day out it keeps on turning, recording the cycle of progress and prosperity throughout the length and breadth of our land.

This is the first wheel of all the many wheels of industry . . . this is the wheel that brings meaning and purpose to the daily lives of people everywhere — on the farms, in the factories, in bustling

cities and in far-flung places.

This is the wheel that moves steadily forward, opening new horizons of opportunity and making secure the results of past efforts.

This is the symbol of rail transport, the basic factor in the achievements of the past, a vital necessity in the vigorous enterprise of the future.

Know this wheel . . . it runs for you!



S O U T H A F R I C A N R A I L W A Y S

3153-1



● WE ARE FACE BRICK SPECIALISTS MAKING THE WIDEST RANGE IN SOUTH AFRICA. CAN WE ASSIST YOU IN MAKING YOUR CHOICE ?

PRIMROSE BRICK WORKS (1936) LTD.

TELEPHONE 58-1311-2-3

TEL. ADD.: "PRIMBRICKS"

P.O. BOX 49, GERMISTON

at crossings like this*...

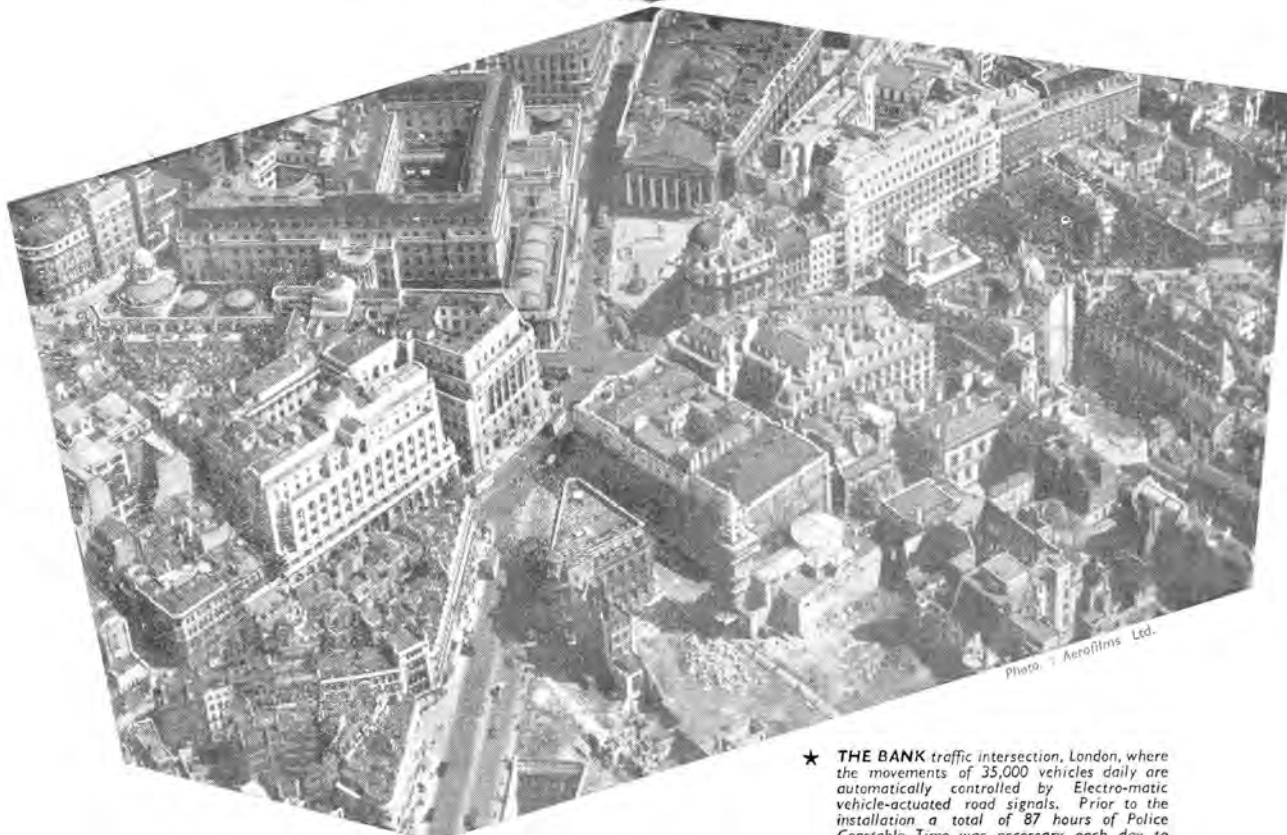


Photo: Aerofilms Ltd.

* THE BANK traffic intersection, London, where the movements of 35,000 vehicles daily are automatically controlled by Electro-matic vehicle-actuated road signals. Prior to the installation a total of 87 hours of Police Constable Time was necessary each day to control traffic.

ELECTRO-MATIC
VEHICLE-ACTUATED SIGNALS

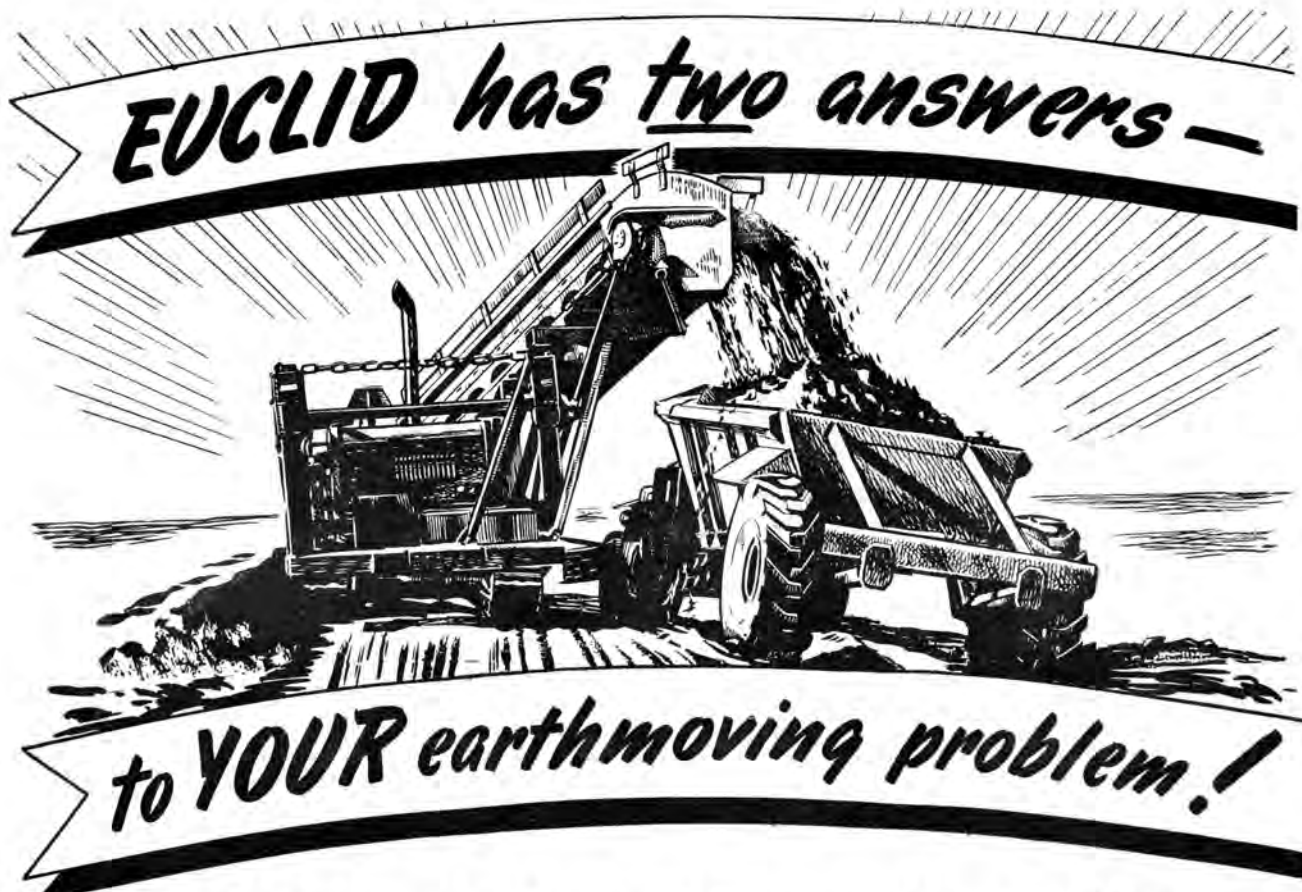
can save Police Power

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. Advice will gladly be given concerning any road traffic control problem.



AUTOMATIC TELEPHONES (SOUTH AFRICA) LTD.
701, Kelvin House, Corner Hollard & Marshall Streets, Johannesburg. (P.O. Box 6687) Phone: 33-3200
Associated Distributing Company for Automatic Telephone & Electric Co. Ltd, London & Liverpool, Eng.

A10161-A3



EUCLID Bottom Dump WAGON EUCLID LOADER

Shortages of suitable heavy earth-moving equipment . . . high operation costs . . . tough, difficult terrain to be covered — these are some of the problems which confront the South African contractor.

But here's BIG news — that tough, terrific earth-moving combination, the EUCLID LOADER and EUCLID Bottom Dump WAGON

is now available in unlimited supply!

A proved overseas reputation more than qualifies them to solve every South African earth-moving problem.

LOADER is built to match the speed of the EUCLID WAGON. You get faster loading and bigger hauls at lower costs.

BOTTOM DUMP WAGON (below) the pioneer and still unchallenged for easier loading, quicker turnaround and faster dumping.



Write now for full details. A complete after-sales service is supplied.

SOLE DISTRIBUTORS

BLACKWOOD HODGE & CO (SA) (PTY) LTD

LOMBARDY BUILDING 50 KERK STREET JOHANNESBURG

Phone 22-3926

Telegrams Suntract Johannesburg

London, Northampton, Dublin, New York, Spain, Portugal, East Africa, the Rhodesias, Belgian Congo, India, Pakistan.

3773-1

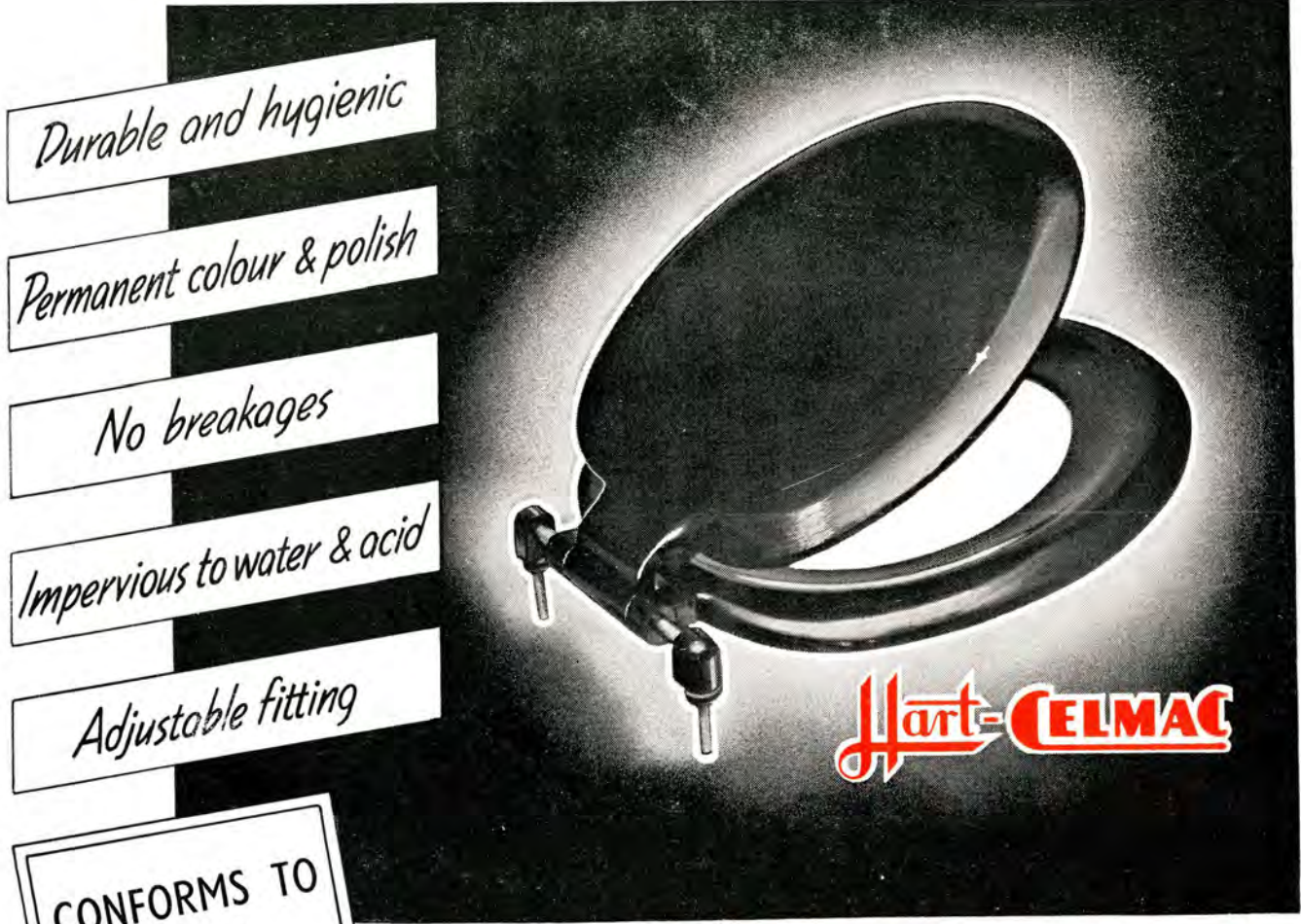
*More Durable -
More Hygienic -*

**A must in every
modern building**

WITH some exclusive modern features to recommend it and a famous name behind it, the new Hart-Celmac plastic seat is winning a host of friends—building a great reputation.

Note the moulding. An unbroken solid flat under-surface eliminates the hollowing out of older models—makes the Hart-Celmac easy to clean. The rubber buffers too are moulded right into the seat and cover for extra durability.

Backed by years of experience, the Hart-Celmac seat is manufactured in conjunction with Messrs. Robert McArd & Co., Ltd. and is identical in every respect with the world renowned Celmac seat made in Manchester, England.



Durable and hygienic

Permanent colour & polish

No breakages

Impervious to water & acid

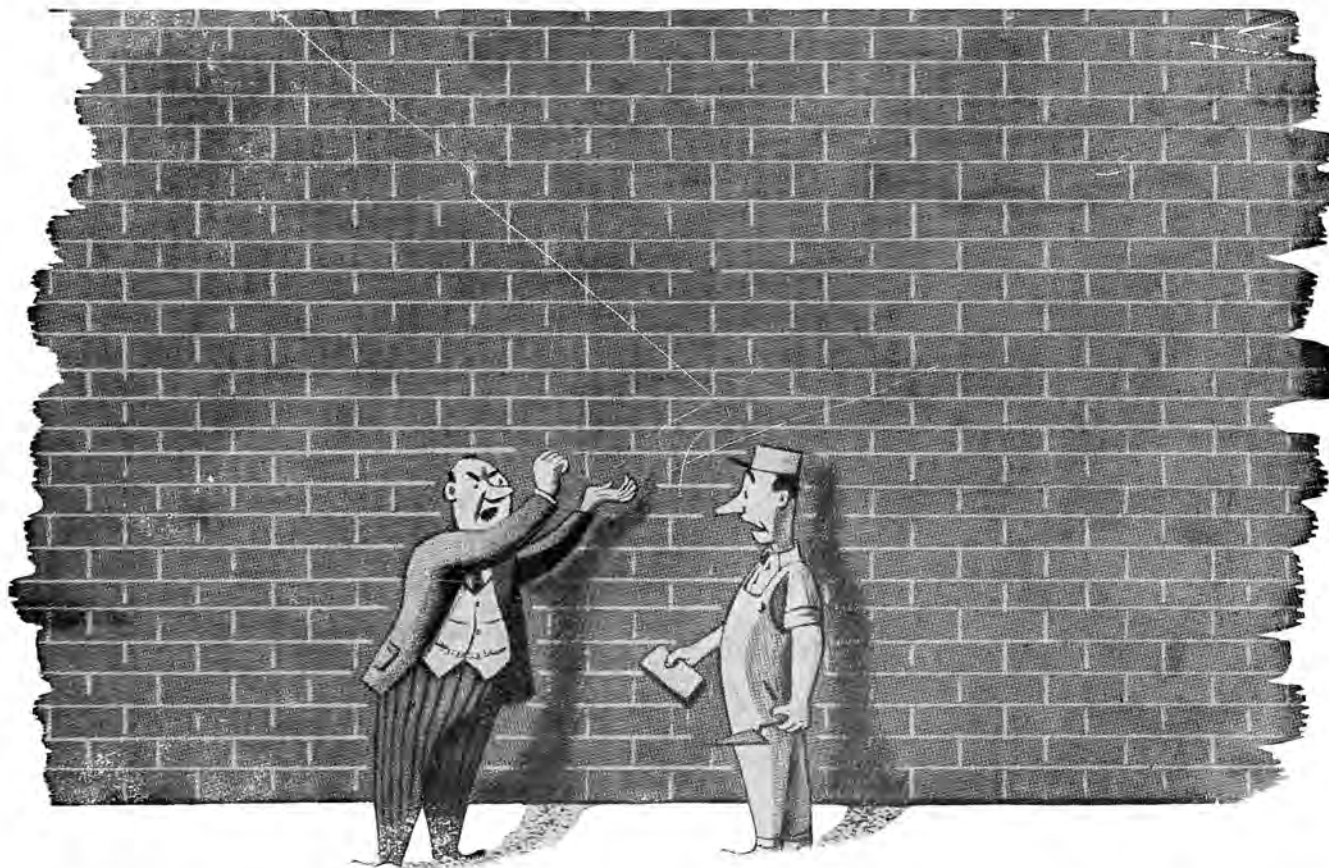
Adjustable fitting

**CONFORMS TO
BRITISH
STANDARD
SPECIFICATIONS**

**Specify "HART-CELMAC" when ordering
from your regular sanitary-ware supplier**

Made by HART LTD., DURBAN AND JOHANNESBURG
WHAT SOUTH AFRICA MAKES—MAKES SOUTH AFRICA RICH!

1574-1



“But I want windows — everybody else has them”

Some people are sentimental about windows. They've always had them — don't like to be different.

Yet it's no longer wise to count on windows for light and ventilation. To-day's plants are built around machinery and production lines. The shape of the building — and the location of windows — are incidental. A ventilation system or something better becomes a must.

In a windowless building, year-round Carrier Air Conditioning costs less in the long run and gives you all the extra benefits of scientific control of humidity

and temperature, plus freedom from dust. Factory processes are improved — and output mounts as the efficiency of employees increases.

Carrier is the leader in air conditioning. *In fact, the idea was born with Carrier.* Its engineers have been helping manufacturers *modernize* factories for over 40 years. Carrier engineers know the importance of humidity and temperature control. They can show you how to boost the quality and quantity of your products. Why not talk it over with us? There's no obligation of course!



AIR CONDITIONING
REFRIGERATION
INDUSTRIAL HEATING

CARRIER AFRICA (PTY.) LIMITED

P.O. Box 8604,

Johannesburg.

DEALERS: Air Conditioning & Engineering Co. (Natal) (Division of McCarthy Rodway, Limited), P.O. Box 2421, Durban.
H. G. Skelton & Co. (Pty.) Ltd., P.O. Box 1140, Cape Town.
Thermaire (Pty.), Limited, P.O. Box 1107, Port Elizabeth.
L. M. Engineers, P.O. Box 846, Bloemfontein.
Johnson & Fletcher, Ltd., P.O. Box 224, Bulawayo and P.O. Box 588, Salisbury.

A. BENNETT & CO. (PTY.) LTD.

who were responsible for the erection of

ANSTEYS BUILDINGS

EMPIRE BUILDINGS

BROADCAST HOUSE

METRO THEATRE

20th CENTURY THEATRE

HERMANNA COURT

and many other major works

*have been
incorporated
into*

GILBERT-ASH LTD.

associated with

BOVIS LTD. of LONDON

**CONTRACTORS OF REPUTE
THROUGHOUT THE WORLD**

*and are now operating under
the name of*

GILBERT-ASH S.A. (PTY.) LTD.



PARKER HIGH-SPEED NON-TILT MIXER

with pneumatic tyres and balanced braking for fast towing. Quick action drum and quick discharge hopper give high-speed operation. 4-Wheel type with or without pneumatic tyres.

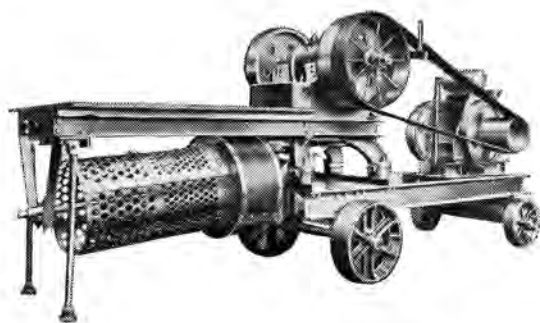
— AND HERE IS THE PLANT FOR THE JOB!




PARKER PLANT

This Parker Portable Loader cuts labour to one-fifth in loading, handling and piling coal, coke, sand, stone, etc.

PARKER MOBILE AND STATIONARY LOADERS AND CONVEYORS



★

THE PARKER PORTABLE STONE BREAKER

with Engine and Screen.

Here is a highly efficient performance combining with the mobility necessary for roadside work. Compactness and weight have been studied without sacrifice of strength. Supplied with petrol, paraffin, diesel or electric power unit.



★

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.

SAVE PRECIOUS WATER

By Using Our $\frac{1}{2}$ " & $\frac{3}{4}$ " Automatic Self Closing Drinking Water Taps

IN SOLID BRASS OR CHROMIUM PLATE

Closes Automatically and cannot be left running



If we have done nothing more than interest you sufficiently to try this waste prevention water tap, we shall have done a service to the country in helping to conserve water.

ALSO MADE AS A PILLAR TAP FOR WASH BASIN USE



MANUFACTURED BY:

West Rand Engineering Works

(PTY.) LTD.

LITTLE BIRMINGHAM, KRUGERSDORP

Telephones 66-2101/4

P.O. Box 76

AGENTS:

CAPE PROVINCE: Messrs. G. F. Dunay (Pty.) Ltd., P.O. Box 892, Cape Town. NATAL: Hughes & Nicol (Pty.) Ltd., P.O. Box 599, Durban.

SOUTHERN AND NORTHERN RHODESIA: J. Clack & Co, Ltd., Salisbury, Bulawayo and N'dola.

FOR HIGH GRADE
JOINERY, CABINET WORK, BUILT-IN FURNITURE
ETC.

SPECIFY AND USE

L I M B A

(Terminalia Superba)

BUT
DO NOT
FORGET
TO SPECIFY

Agrifor's "Protected" Limba

AND

BUY FROM THE DISTRIBUTORS WHO WILL
TAKE THE TROUBLE TO CONDITION THIS
VALUABLE WOOD TO SUIT YOUR SPECIAL
NEEDS

ETOILE — THE STAR ★ SIGN OF VALUE



Ste "AGRIFOR," Lemba-Boma, Belgian Congo

REPRESENTED BY:

TIMBER & ALLIED AGENCIES (PTY.), LTD.

87, COMMISSIONER STREET,
JOHANNESBURG.

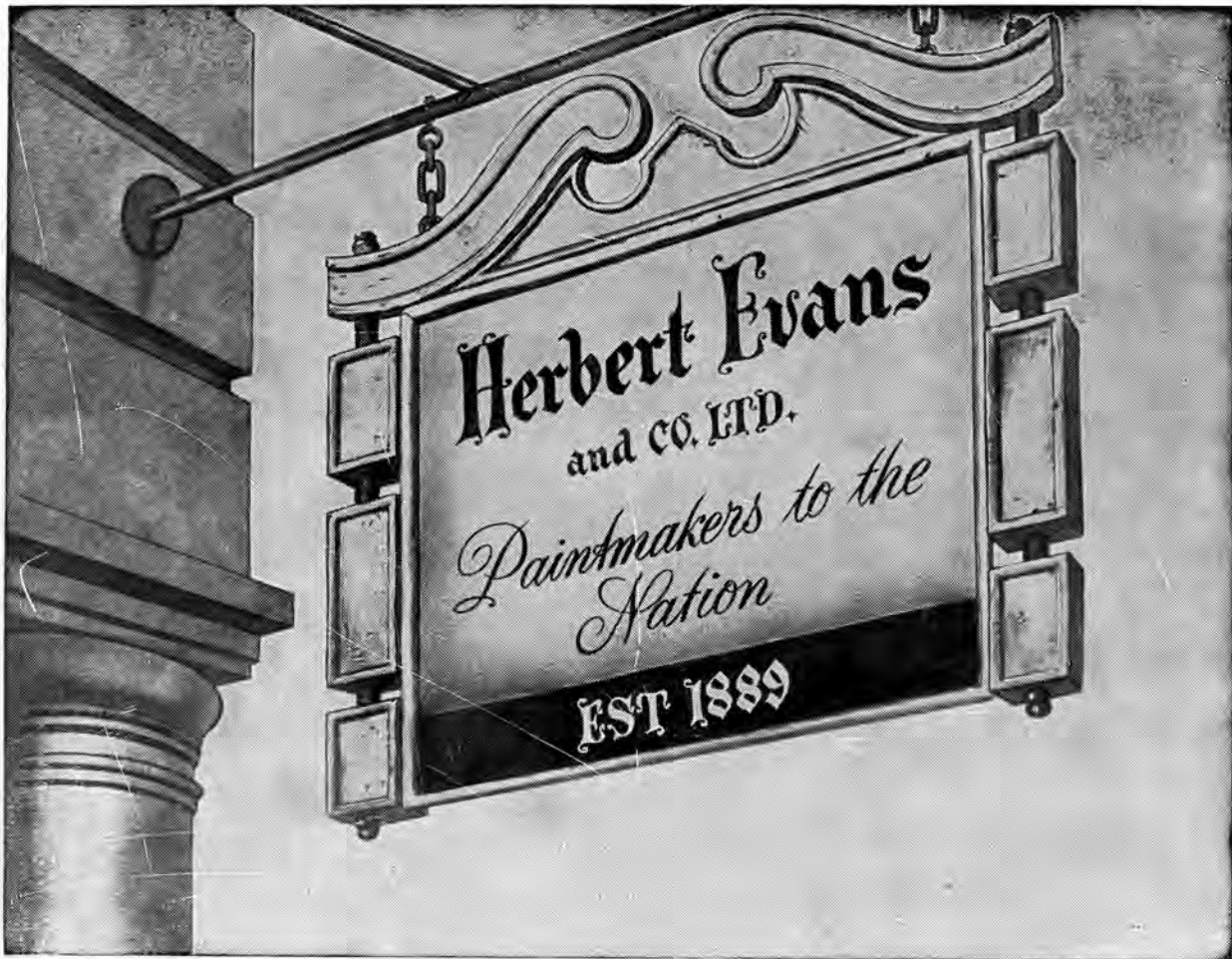
52, ST. GEORGE'S STREET,
CAPE TOWN.

Cables: Brettimber.

Public Buildings
throughout South Africa
bear evidence of the
Expert Craftmanship
in
Architectural Metalwork
and
High Class Joinery
carried out
by

FREDERICK SAGE & CO. (S.A.) (Pty.) LTD.

10, HEIDELBERG ROAD, VILLAGE MAIN,
PHONE 22-7555. JOHANNESBURG. BOX 777.



Built on the solid foundation of quality materials and excellence of workmanship—backed by ceaseless research work in laboratory and testing shop—Parthenon Products are accepted by the people of South Africa as the finest manufactured.

PARTHENON

By Test  *the Best*

A COMPLETE RANGE OF PAINTS, VARNISHES, ENAMELS, STAINS, DISTEMPERS, AND POLISHES

MANUFACTURED BY **HERBERT EVANS & CO., LTD.**

Head Office : JOHANNESBURG. Branch : PRETORIA. Factories : DURBAN & JOHANNESBURG
Depots : JOHANNESBURG, PRETORIA, DURBAN, CAPE TOWN, PORT ELIZABETH, BLOEMFONTEIN AND SALISBURY

AGENTS THROUGHOUT SOUTHERN AFRICA

OPERATION "EFFICIENCY!" "BROOMWADE" ROTARY EXHAUSTERS

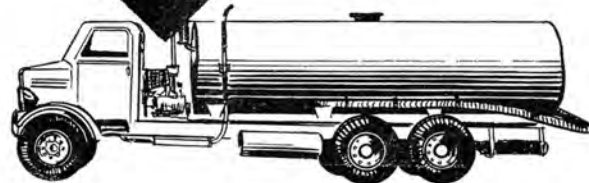
for Industrial and Municipal use



THE HEART OF THE JOB!

FOR MUNICIPAL USES — the famous type "P" range for Tank Wagons 800 to 2,500-gallon capacity as fitted by all the well-known Body Builders to Municipal requirements.

Capacities 10½ to 142 cu. ft. displacements for Chemical Factories, Vegetable and Mineral Oil Refineries, Acid Works, Canneries, Gas Works, Priming Centrifugal Pumps, Gas Blowlamps.



- * British Built.
- * Backed by the Broomwade reputation.
- * Designed for efficient and economical service.
- * Stocks now available.

BROOM & WADE (S.A.) (PTY.) LTD.

MANAGERS: BALDWINS (S.A.) LTD. ● 10th FLOOR, MARITIME HOUSE, LOVEDAY ST.
PHONE 33-1821 ● P.O. BOX 1189, JOHANNESBURG ● BRANCHES: CAPE TOWN ● PORT
ELIZABETH ● EAST LONDON ● DURBAN ● BULAWAYO AND SALISBURY.

BOWRANITE

Genuine Anti-Corrosive

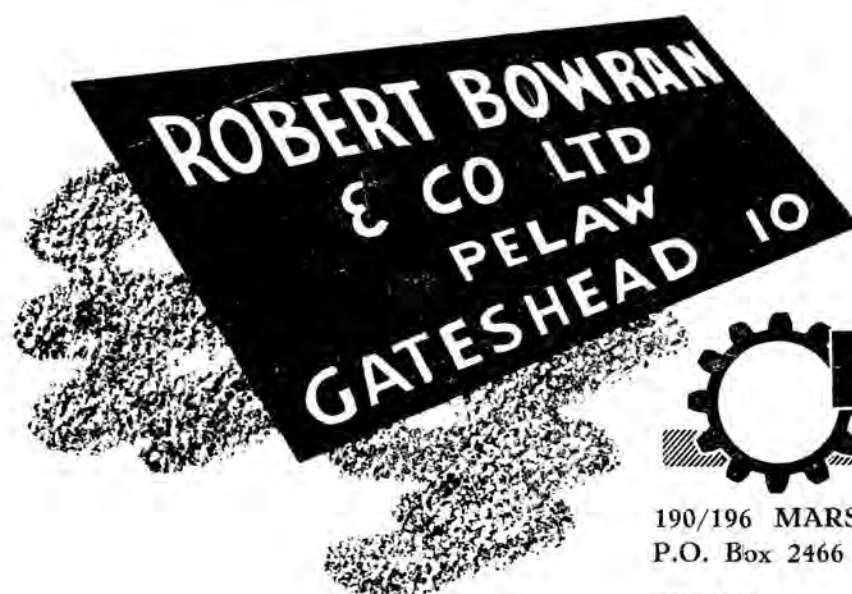


Unaffected by salt water, spray, sea air, chemically charged atmosphere, frost or sun's heat. Has great covering and enduring capacity. Easily applied by brush or spray.

In all parts of the world "Bowranite" has been found to be impervious to the most exacting climatic conditions. Its success has been specially striking in hot climates, where a number of great industrial undertakings are already using this special anti-corrosive paint to protect their iron and steel work. Extensive experiment has produced "Bowranite," a protective coating which is completely unaffected by heat, frost, humidity, alkali, acid and all other corrosive action — even years after application. "Bowranite" maintains iron and steel in a clean, sound and safe condition and has become accepted as standard treatment.

Available in 9 serviceable and attractive colours

- STANDARD RED
- STANDARD GREY
- STANDARD GREEN
- STANDARD BLACK
- CHOCOLATE
- FRENCH GREY
- LIGHT GREEN
- SUPER BLACK
- ALUMINIUM



REPRESENTED IN SOUTHERN AFRICA BY



190/196 MARSHALL STREET, JOHANNESBURG
P.O. Box 2466 Tel. 22-8955

Also at
DURBAN CAPE TOWN PORT ELIZABETH

CRITTALL-HOPE METAL WINDOWS

for

THE HOMES AND DWELLINGS OF MAN

for

FACTORIES, WORKSHOPS AND ALL BUILDINGS
OF AN INDUSTRIAL NATURE

for

SCHOOLS, HOSPITALS AND ALL
INSTITUTIONAL BUILDINGS



Crittall-Hope Metal Windows

(SOUTH AFRICA) LTD.

Factory :

INDUSTRIA, JOHANNESBURG

Phones : 35-4111/2/3/4/5/6/7

City Office :

8th Floor, MARITIME HOUSE, LOVEDAY STREET

Phones : 33-1804/5

P.O. Box 3047

CAPE TOWN - P.O. Box 2908

DURBAN - P.O. Box 1494

PORT ELIZABETH - P.O. Box 119

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.
LONDON ADDRESS: RYTON PUBLICITY SERVICES, 92, FLEET STREET, LONDON E.C.4.

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 South Africa and activities overseas.

VOLUME IX • NUMBER FIFTY-FIVE • JUNE 1948

CONTENTS

WATER SUPPLY AT PORT ELIZABETH
— CHURCHILL WATER SCHEME

TABLE BAY POWER STATION
— CAPE TOWN

RE-INFORCED CONCRETE WATER TOWERS
— KRUGERSDORP

OVERSEAS NEWS AND PRACTICE

TENDERS INVITED



GENERAL VIEW FROM THE UPSTREAM SIDE OF DAM
PORT ELIZABETH.



AERIAL VIEW OF THE
IMPOUNDED WATER.

WATER SUPPLY AT PORT ELIZABETH.

CHURCHILL WATER SCHEME.

THIS important scheme has recently been completed for Port Elizabeth Municipality and although delayed by the war, and its completion almost six years overdue, it is gratifying to know that the scheme has been carried out successfully and now provides an additional source of supply to the Municipality. The design for the scheme has required careful consideration, because in the first place, it was necessary to select a suitable site for the dam, with the desirable feature of elevation to permit of the flow of water by gravity to Port Elizabeth. A site was obtainable only at a distance of more than 75 miles from the town, and situated in a valley between Tzitsikama Mountains and Zuur Annays Hills, mountain ranges that run parallel to the sea coast and at right angles to the moisture laden winds from the sea. These mountains being very rocky and covered by natural vegetation, should ensure that silt does not decrease the storage capacity of the reservoir. About eight years ago, a gauging weir was installed to determine the average daily flow of the river which has amounted to thirty million gallons. It is interesting to know that the steep river bank, between the dam and the sea coast, does not facilitate the use of the river water by industries situated along the river banks, and accordingly, there is no need to provide for normal flows, and all the water flowing into the dam can be retained there, with the exception of minor quantities required for farm stock. The dam has a storage capacity of 7,850 million gallons, which is adequate for Port Elizabeth at the present rate of draw off, to last for three years. The height of the container wall is 130 feet and the dam covers 620 acres at this depth but the council have secured the right to increase the height of the wall of the dam by an additional 25 feet and by these means would provide additional storage capacity amounting to 12,500 million gallons.

Many interesting design features have been incorporated in the wall of the dam which include a series of arches, ten in number, each with a span of 61 feet $3\frac{1}{2}$ inches, and a gravity suction of slightly greater length, on the right flank. The arches slope upward from the foundations and down stream at an angle of approximately 60 degrees to the horizontal, and the end of each arch is curved so as to rest in a curved groove in the buttress. A water-tight joint is made by the use of a double copper strip seal which covers the entire length of the joint. These arches are reinforced, and are 10 feet 6 inches thick at the base, decreasing uniformly to a thickness of 5 feet 6 inches at the top. The crest of six of the arches is 10 feet lower than the others and provides for an overflow when the dam is full, thereby enabling any water flowing into the reservoir from Kromme

River, to decant over the spillway arches. Because of the curved and sloping nature of the spillway arches, the water which flows over them can collect together into a single column of falling water, clear of the wall itself. Energy created by this falling water is destroyed in ponds that increase in depth from 23 feet to 47 feet when water to a depth of 7 feet 6 inches is flowing over the arches. The dam is provided with a roller sluice gate which is located on the left bank and this gate controls the flow of water down a spillway channel, which is 40 feet wide. This gate weighs 43 tons and is 40 feet wide by 26 feet 6 inches high and is at all times in balance. The operating gear is used to overcome friction and can function by the influence of the water power or by means of an electric circuit with push button control. The gate is closed by either manually operated gears or electrically operated mechanism. A 10 h.p. lifting motor raises the gate at a speed of 4 feet per minute against a thrust on the back of the gate, caused by water pressure, that may amount to approximately 400 tons. The gate is fitted with an automatic control device that comprises a float switch located in a chamber, constructed at a point 90 feet upstream of the gate. When the water level rises 9 inches above the normal water level (i.e. crest of overflow arches), the gate opens to 2 feet 6 inches, an additional 3 inch increment in the level of the water, provides automatically, an opening of the gate to 5 feet and a further rise of 3 inches in the water level causes the gate to open up to 25 feet and similarly to a top level position for the water, amounting to 2 feet 3 inches above normal, when the gate opens to a maximum position of 38 feet 6 inches. Under sluices are provided through the arch on the right flank of the dam and consist of two 60 inch pipes positioned 90 feet below the crest of the overflow arches. Each of these pipes is fitted with a needle valve at the downstream end and a sluice gate at the upstream end. The jet from these valves, having a destructive effect on the rock downstream from the dam, has made necessary the provision of a disperser fitment, to each valve, to enable this force to be dissipated. At the base of the intake tower there is a 36 inch scour valve for emptying down from the lowest level of the reservoir, and for scouring immediately around the intake. It is interesting to record that when water to a depth of 7 feet 6 inches is passing over the overflow arches, and the stony sluice gate, two needle valves and the 36 inch scour valve are open, a flood of water amounting to 26,000 million gallons per day (equivalent to a flow at 50 thousand cubic feet per second), can be passed down the river, a volume that is more than three times the total volume of water stored in the reservoir.



KROMME RIVER GAUGING WEIR.

The following significant statistics show the magnitude of this construction :—

Case Borings : 10,552 lineal feet (approximately two miles).

Excavation : 70,000 cub. yards (approximately 161,000 lg. tons).

Steel Reinforcement : 290 short tons.

Concrete : 100,000 cub. yards (approximately 166,000 lg. tons).

Shuttering : 57,333 square yards.

Intake Tower.

This construction has an external diameter of 24 feet and an internal diameter that varies from 14 feet at the base to 17 feet in diameter at the top, the wall thickness being 5 feet at the bottom and 3 feet 6 inches at the top. Water can be drawn off at five different levels, namely, 10 feet, 20 feet, 35 feet, 55 feet, and 80 feet below the highest normal water level. In order to take advantage of the sterilising effect of sunlight on the water, the draw off is arranged from the inlet and close to the existing surface level. Each of the inlet pipes and valves has a diameter of 20 inches and the central pipe column is 30 inches in diameter. Although two 30 inch diameter pipes are provided to convey water from the intake tower to the canal, one only is at present in commission, the other one being available for future use. The delivery from the intake towers is conveyed by a canal, 3,435 feet in length, to the purification system, which is situated in a valley below the dam.

The Canal.

This is constructed in concrete and has cross-sectional dimensions of 5 feet wide by 4 feet deep, laid to a fall of 1 in 2,600 and provides a carrying capacity amounting to 21 million gallons of water per day. A sluice valve is provided at the upstream end of the canal and a sluice gate at the downstream end, which are operated electrically in accordance with the rise and fall of the water level in a tank for the clear water, positioned at the top of the pipe-line supplying the town. It is therefore apparent that the feed through the canal adjusts itself to the demand from Port Elizabeth.

Chemical Treatment.

The pH value of the raw water is recorded electrically at the downstream end of the canal where the water passes through a Venturi tube and a meter records the amount of water that passes through the tube. The Venturi tube also functions as a speed adjuster for the Chemical Pumps that supply the necessary doses of alum or sodium aluminate, to the raw water. By these means, a constant proportion of chemical to raw water is obtained automatically. After receiving the dose of chemical, the water passes along the final length of canal, and the pH of the chemically treated

JUNE, 1948.

water is recorded as fed to two tanks of similar design. These tanks are called Clariflocculators, and each tank is 75 feet in diameter and 15 feet deep, constructed in reinforced concrete with hopper shaped bottom and sunk in the ground to within 18 inches of the upper edge. These tanks are each capable of dealing with three million gallons of water per day and function as a sedimentation unit. After the raw water has received a dose of alum (or sodium aluminate) a suspended flocculent precipitate is formed, and this settles in the Clariflocculators together with impurity suspended in the water. This sludge, which settles to the bottom of the tanks, is removed continuously by means of an automatic sludging device while the clarified water decants over the lip of a weir, provided on the periphery of the tank, and flows to a contact tank.

The contact tank is constructed in the main building and if necessary, the water received by this tank is treated again with a chemical to permit it to carry a certain amount of "floc" into the filters, thereby forming a skin on the surface of the filter media. These filters which contain sand are of the rapid gravity type and there are eight units each with an effective filtering area of 450 square feet. When the filters become clogged by thick deposits of impurity they can be cleaned by blowing compressed air upwards through the bed of sand, which serves to break up the outer skin and afterwards by passing purified water through the sand in the same direction, the dirt is removed and conveyed to a channel for waste water.

Water as filtered, passes through another channel into a clear water tank, which is divided into two equal sections by a partition wall that incorporates a measuring weir, and the level of water above the lip of the weir, is a measure of the volume of water passing, which is recorded. Reference has already been made to the Venturi tube and its function to regulate the speed of the pumps that supply chemical to the raw water, and in a similar manner, the measuring weir in the clear water tank is used to regulate the supply of chemical to the clean water passing through the tank.

The chemicals used at this stage are :—

- (a) Lime—to raise the pH of the water to 8.2/8.5 and provide an alkaline condition in the water,
- (b) Chlorine—to sterilise the water.
- (c) Calgon—or Sodium hexa-meta-phosphate, to attack and prevent corrosion in the pipe-line.

The application of Calgon to aggressive waters in the proportion of 1½ to 2 pounds per hundred thousand gallons is a comparatively new practice in the treatment of water and is the outcome of recent research on corrosion inhibition. This water Purification Plant has a capacity of 6 million gallons per day but provision has been made for its extension to meet anticipated future requirements, up to 20 million gallons per day.

The Pipe-line.

The pipe-line covers a distance of 75 miles and incorporates tunnel constructions. There are two tunnels near to the dam, each 3 feet 6 inches wide by 6 feet 9 inches high and 913 yards and 595 yards long, respectively. These tunnels are lined with concrete and are each capable of passing 20 million gallons of water per day under a gravity head. For the first 43 miles, which is the distance to a point

four miles west of the mouth of Van Staadens River, the pipe-line is constructed in steel to provide an internal diameter of 30 inches. At this point the pipe connects with the tunnel, which is fabricated from steel plate and lined with 12 inches of reinforced concrete, is constructed through a sand hill and provides an internal diameter of 4 feet for a distance of 654 yards. The steel pipe-line that leads from this sand tunnel to Port Elizabeth has an internal diameter of 27 inches and is constructed from 26 feet lengths each weighing 28 cwts. There is a variety of valves, and some of these weigh over two tons each. In all there are 206 different types of valves and specials incorporated in the pipe-line. The pipe-line has a capacity of $5\frac{1}{2}$ million gallons per day and passes along the sheer face of two krantz, under four and over three rivers. This has necessitated the construction of three bridges including a self-anchoring suspension bridge at Gamtoos, with a centre span of 418 feet and two side spans of 207 feet. The top of the towers is 90 feet above the river bed and 52 feet above the top of the supporting piers. The superstructure rests on concrete foundations, each having a height of nearly 130 feet and the two central pier foundations each comprise a four compartment type caisson, sunk to depths ranging between 97.5 feet and 68 feet below the normal river level. Bridge decking is provided at a height of 30 feet above water

level. Nearly 400 tons of steel have been used in the fabrication of the superstructure and the supporting cables comprise six steel wire ropes, each with a diameter of 2 inches, secured to each side. The towers are mounted on rocker bearings. In positions where the pipe-line crosses a river or kloofs, the piers have been constructed of sufficient width to accommodate future pipe-lines and a similar policy has been adopted where hard rock formations have been encountered and blasted. Mount Road Reservoir is the main terminal of the pipe-line but additional feeds have been provided to St. George's Park and Fort Nottingham Reservoirs and a connection from this line will supply direct to South End.

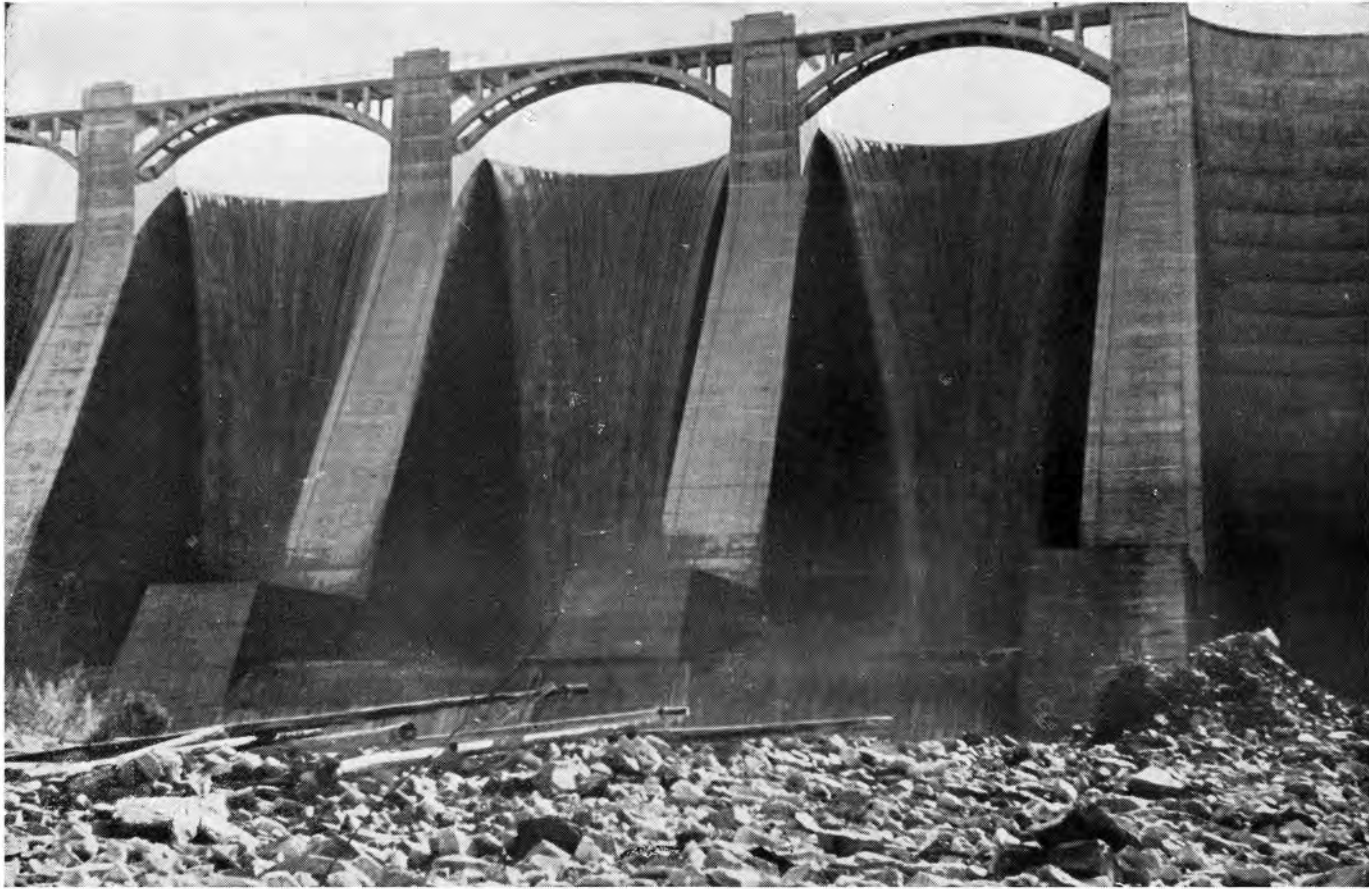
The reservoir at Mount Road is now under construction and should be completed by the end of August. This reservoir will have an effective depth of 21 feet providing a capacity of 10 million gallons, and the inlets to the reservoir will be controlled by needle valves operated mechanically.

Further reference will be made to this construction in a subsequent issue of "Public Works of South Africa."

The entire scheme was designed and carried out under the direction of the Board of Engineers of Port Elizabeth Municipality, namely, Mr. J. C. Hawkins, M.Inst.C.E., and Mr. George A. Stewart, M.Inst.C.E., M.Inst.Mech.E., Consulting Engineers.



VIEW SHOWING CANAL TO PURIFICATION WORKS.



(Top) FIRST OVERFLOW — MAY, 1944.

(Bottom) VIEW LOOKING UPSTREAM DURING A STAGE IN THE CONSTRUCTION OF THE DAM.



TABLE BAY POWER STATION—CAPE TOWN.

EXTENSIONS COSTING £2,500,000 NEARING COMPLETION.

The massive structure of the Table Bay Power Station, which is at present being extended by the Cape Town Municipality, at a cost of £2,500,000, dominates Cape Town's Dock Road. Unique in many ways because of the limitations imposed by the smallness of the site, the design has many interesting features. We are indebted to the Cape Town Municipality for the following particulars of the existing station and its extensions.

THE existing power station which came into commercial use in 1939, constitutes the first stage of this project and was built to house three turbo-alternators, each of 40,000 kilowatts capacity, and six boilers. The extensions, which constitute the second and final stage, are now nearing completion and will house two additional turbo-alternators and three additional boilers. These additional power units have naturally involved a considerable extension to the power house, including the addition of a second chimney stack, together with all the other essential accessories.

Power House.

The original building comprises a steel frame-work and a similar method of construction has been adopted for the extensions. When the original construction took place, a difficulty with which the contractors had to contend was the nature of the site. This comprised the original primitive beach, which had been filled in with builders' rubbish, and the whole of this had to be excavated before construction could be commenced. The foundations are of concrete which were taken down to solid rock.

Architecturally the design throughout is essentially simple, with the massive structure of girders filled in with brick and concrete, and most of the façades are taken up by large windows. The external finish incorporates a plinth up to window-sill height, constructed in red face brick, and the remainder is finished in cream-coloured Spanish plaster.

Steel girders have been used in the construction of the roof, the portion above the turbine house being covered with hollow concrete slabs and bitumen water-proofing, and the roof over the boiler house comprises concrete on corrugated steel centering. The extensions follow a similar method of roof construction.

In addition to the main power house, there is an office and switchgear block, the switch operating room and telephone exchange being air-conditioned.

Cooling System.

The cooling system for the steam condensers, is a feature of the Table Bay Power Station. Owing to the close proximity of the station to the sea, the circulating water is pumped

direct from the Duncan Dock through two underground culverts, of mass concrete construction. The inlet for these culverts is constructed in the quay-side. Each of these culverts are rectangular in shape, with a length of 2,500 feet, providing a cross sectional area of about 60 square feet.

Seawater is drawn through the culverts into the pump intake chamber, which is also constructed in reinforced concrete. Water drawn from this chamber by five centrifugal pumps, each driven by a 550 h.p. motor, is first passed through screens to remove small fish, seaweed and the debris which inevitably fouls the ocean wherever shipping is congregated. The rate of circulation provided by each pump is 33,000 gallons per minute.

From the pump chamber, the water is delivered to the turbine house through two underground pipe lines, each 6 feet in diameter and constructed of Hume pipes. On completion of its duty in the circuit, the cooling water is returned to the Duncan Dock by a single concrete duct, which is 2,400 feet long and has cross section dimensions of 9 feet by 7 feet.

Although the corrosive properties of seawater are well-known, it is considered appropriate to mention the construction of the pumps and the safeguards employed against corrosion. These pumps are manufactured from gunmetal and solid bronze. Since cast-iron is unaffected by salt water, it has been used for the pipes in the pump house and also for the condensers. The condenser tubes are made from brass alloy of special composition, which is likewise unaffected by salt water. In addition to these safeguards, the condensers are fitted with an electrolytic system of protection, and by these means all corrosion is confined to internal zinc anodes.

Coal Bin.

Trucks of coal, delivered to the Power Station by the South African Railways, pass over a weighbridge and are discharged into the storage bin, which is constructed of concrete, and has a capacity of 23,000 tons. As the daily consumption of the station is approximately 1,100 tons, the reserve of coal is sufficient for a period of about three weeks. A coal crusher is included in the equipment to reduce the coal to nuts one quarter inch to 4 millimeters in size, coal

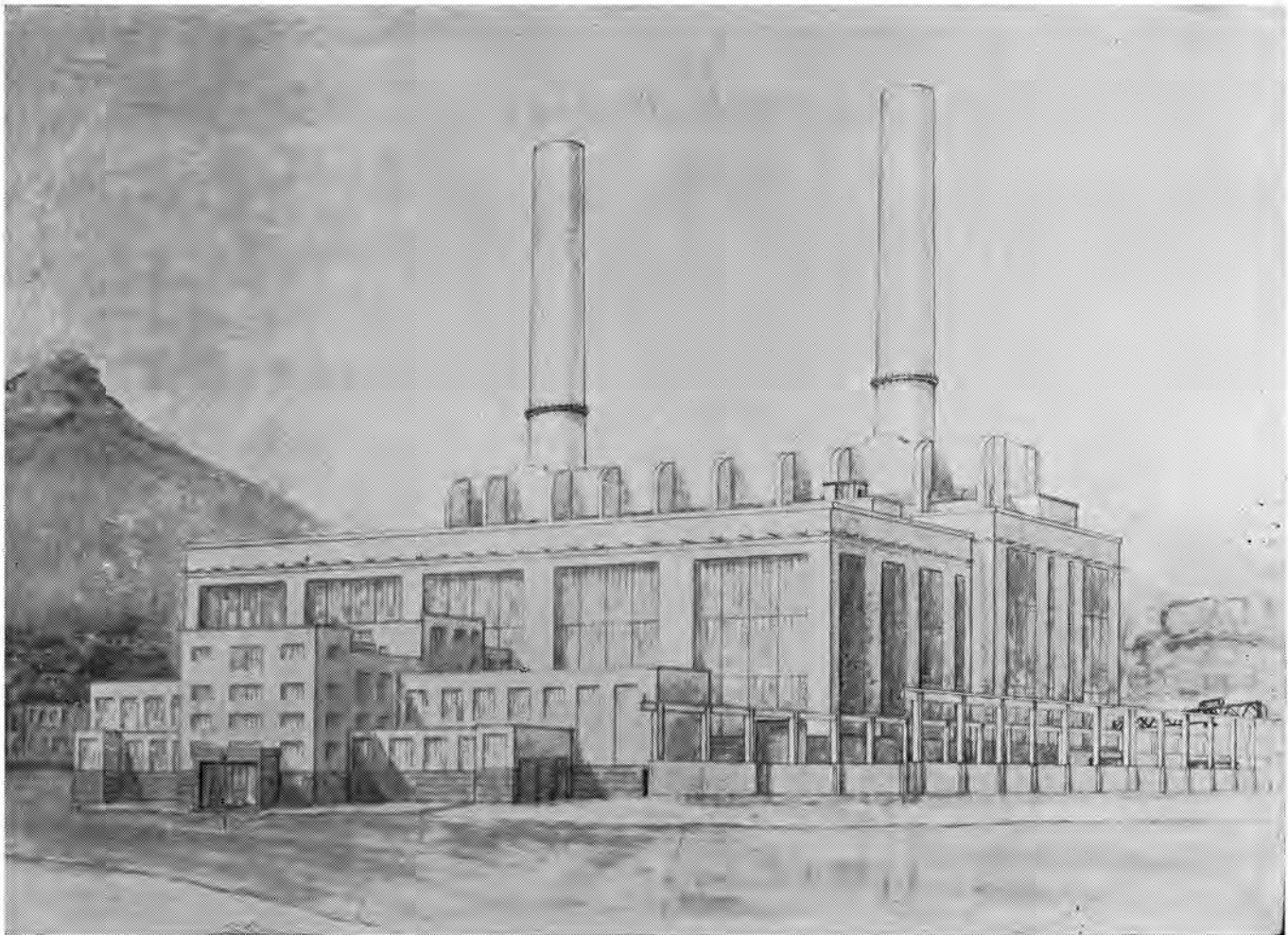


TABLE BAY POWER STATION — CAPE TOWN.
Perspective sketch.

of a larger size being unsuitable for the chain grate mechanical stokers.

The close proximity of this power station to the centre of the city has necessitated certain precautions being taken to avoid the emission of obnoxious fumes in excessive quantity. The "pea" coal used does not produce very much fine ash, and the small amount that passes into the chimney is trapped in dust collectors. In addition, the chimney stacks are unusually high, towering 300 feet above ground level. Fumes from the furnaces are, therefore, distributed over a large area and are dissipated into the atmosphere at such a height that their presence is not apparent at street level.

Reference should be made to the construction of the coal bin which is sunk in the ground to about 14 feet below the normal level of spring tide low water. Because of the nearness of the sea, the ground at this level is waterlogged and the bin tends to float. Considerable upward pressure is thereby exerted on the bin which has had to be keyed into the rock to resist this pressure.

Ash.

Ash from the furnaces drops into the ash basement underneath the boilers, and is removed by high pressure water jets which discharge the ash and carry it to overhead bunkers. The excess of water is drained off, and the wet ash deposited into railway trucks.

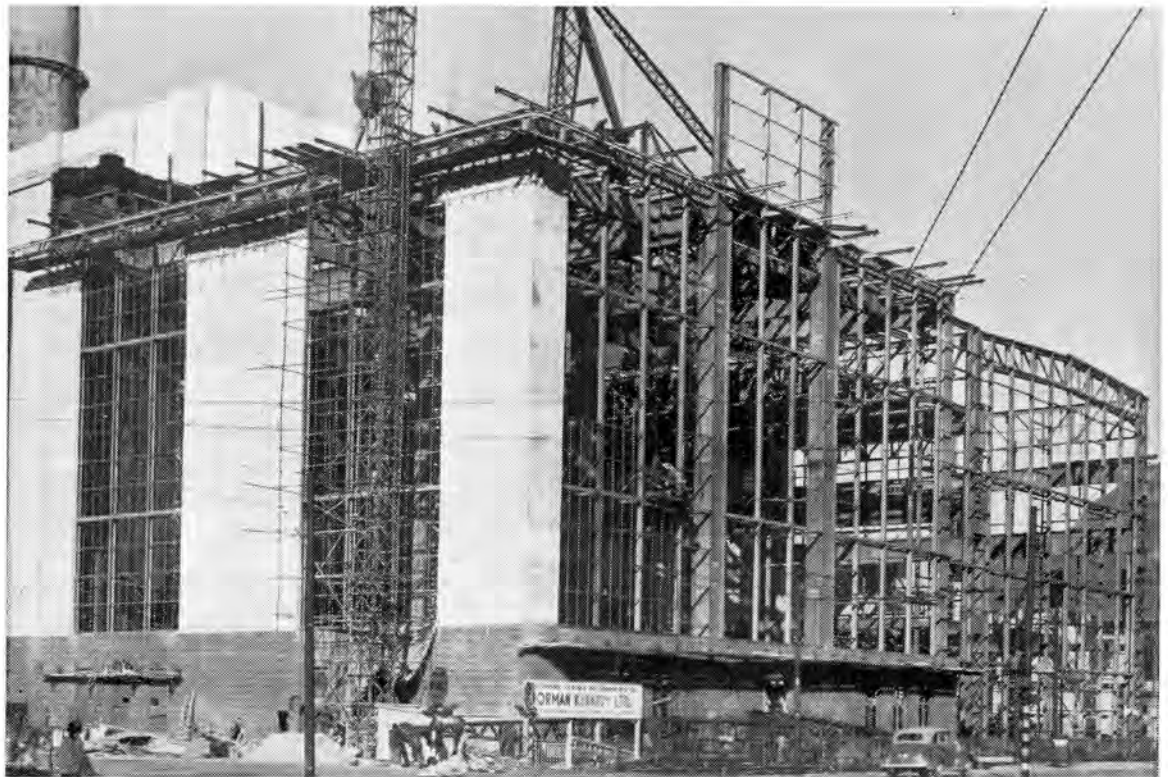
Boilers.

Both the existing and the additional boilers, are fitted with automatic chain grate stokers, and will deliver steam at a pressure of 625 lb. per square inch and a temperature of 825 degrees Fahrenheit.

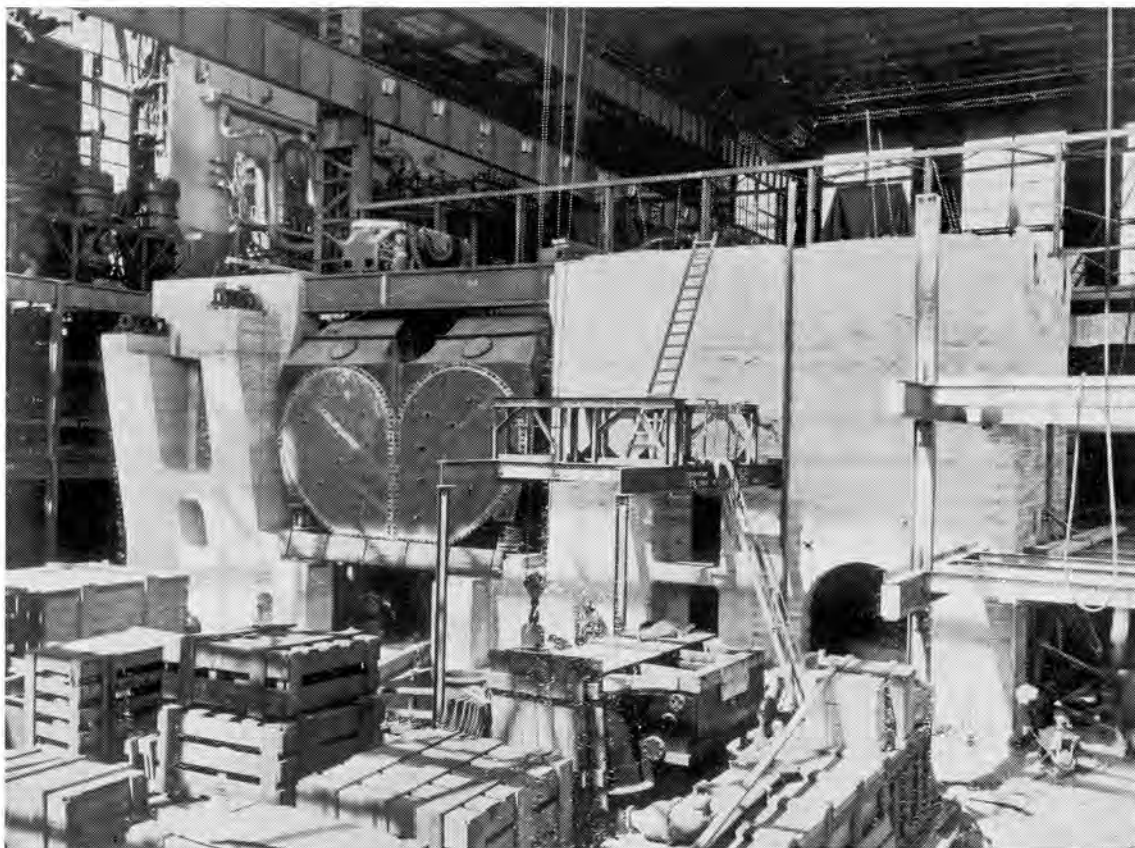
Chimneys.

When the extensions are completed, the station will have two chimney stacks and each of these will be 300 feet above ground level, with a diameter of 24 feet at the base and 19 feet at the top. These stacks are constructed from steel plates which are rivetted together, and covered both inside and out by a cement mixture, applied as a spray, by means of a cement gun.

PUBLIC WORKS OF
SOUTH AFRICA.
JUNE, 1948.



VIEW SHOWING THE CONSTRUCTION
OF STEEL FRAME BUILDINGS.



FOUNDATION BLOCK FOR NO. 4 TURBO-ALTERNATOR.

TWO RE-INFORCED CONCRETE WATER TOWERS AT KRUGERSDORP.

KRUGERSDORP'S water has been purchased from the Rand Water Board since April, 1911. Up to that time the town was supplied with water from boreholes, situated at various points in the Municipal area. In 1930 the water consumption amounted to 1.8 million gallons per month, but to-day's monthly consumption is 32 million gallons.

The water is pumped by the Rand Water Board to a storage reservoir situated on high ground to the east of the town, and the water is then fed by gravity into the Municipal reservoir which has a capacity of 500,000 gallons. There are two gravity mains, one 12 inches in diameter, is laid along the valley running from east to west, in which is situated the main part of the town, and the other, 8 inches in diameter, is laid along the ridge to the north, on which are situated the new residential areas, and these mains feed separate reticulations for the various townships. To the north of the town a further 500,000 gallon reservoir has been built, adjacent to the Munsieville Native Location, and this is filled by gravity from the first Municipal storage reservoir, to the east.

The initial storage reservoir was so situated in the vicinity of the Rand Water Board reservoir, that the pressure throughout the town to the west could be sustained by virtue of the height of this reservoir above the rest of the town. In the case of the 12 inch main which feeds the central area, the pressure is such that the installation of a pressure reducing valve was necessary. Owing to the small difference in level between the first reservoir and the township of Lewisham, which is situated to the south, a water tower with a capacity of 10,000 gallons was constructed in 1929 for the purpose of boosting the pressure in this area.

As the town developed, the land in the immediate vicinity of the two reservoirs was built up, and as a result of this the pressure in these areas was very low. The area to the east had been laid out as an industrial township, and with its development fire hazard also became a factor to be considered. Therefore, in order to boost the pressure in these areas, it was decided to build two water towers, each of 30,000 gallon capacity and 80 feet in height.

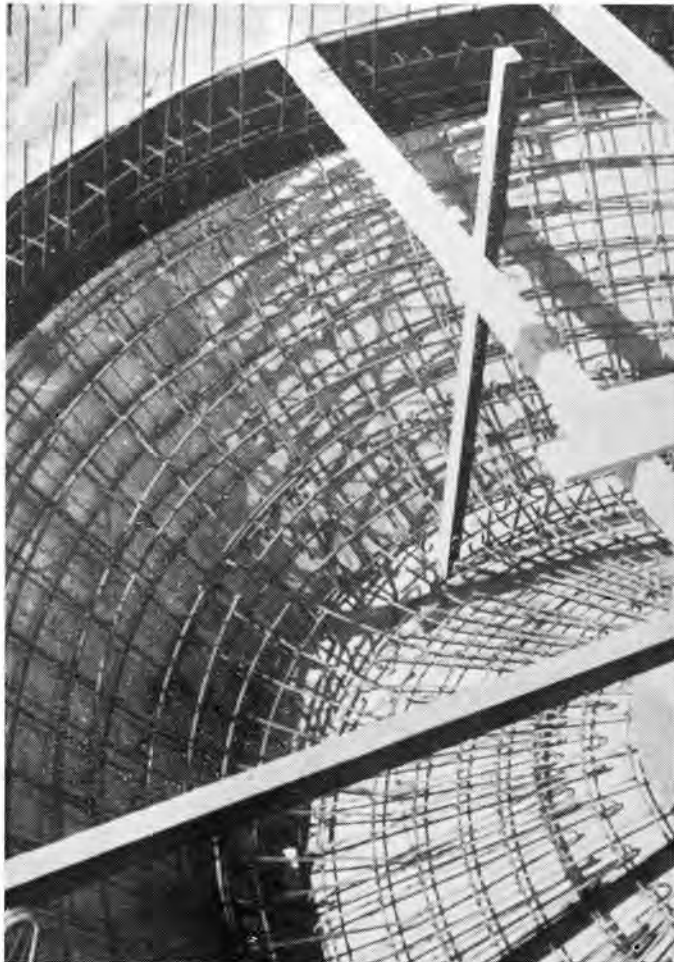
Design.

In deciding on a design it was felt that the Intze type of tank presented a modern and artistic appearance, that would be in conformity with the architectural requirements of the new industrial area. Both towers are identical in design and construction. The design was duplicated at Munsieville for reasons of economy. This type of tank is designed to obtain balanced inward and outward horizontal thrusts on the ring beam located at the summits of the columns of the supporting trestle.

The tank has a diameter of 20 feet and is supported on a ring beam which is in turn supported by a framework



WATER TOWER AT KRUGERSDORP.



CONSTRUCTION OF CONICAL BOTTOM WITH INNER DOME.

consisting of six columns which slope inward to ensure additional stability and these are braced horizontally at four levels. The bottom of the tank is constructed in the form of an inverted truncated cone with its maximum diameter on the outside of the ring beam, and a conical dome on the inside. The circular walls of the tank construction are supported on a ring beam, which is provided at the outer edge of the cone, and a conical dome roof is incorporated complete with manhole.

This tank has a capacity of 30,000 gallons and the height from the bottom of the tank to the top water level is 17 feet. An access shaft, 3 feet in diameter, provided for inspection purposes, etc., is constructed vertically in the centre of the tank, the shaft rising from the inner conical base to a point 6 inches above top water level. A steel cat-ladder, fixed to the internal framework of the trestle, provides access to the shaft.

The pumphouse is situated at ground level, and the spaces between the columns are walled with face bricks. Adequate windows and electric lighting are provided. The floor of the pumphouse is in concrete with sunken wells for the pumps. An inlet pipe, 10 inches in diameter and outlet 12 inches

REINFORCEMENT TO CONICAL BOTTOM OF WATER TANK.

A portion of shuttering for access shaft is shown on the right.

diameter is provided together with a 6-inch diameter scour pipe. The top of the inlet pipe is funnelled and ends 12 inches below top water level. To ensure a uniformity in the settlement of this construction the footing is of the continuous hexagonal type.

Since the ratio of the height of water to the size of the base, is large, wind pressure had to be taken into account.

Pumps.

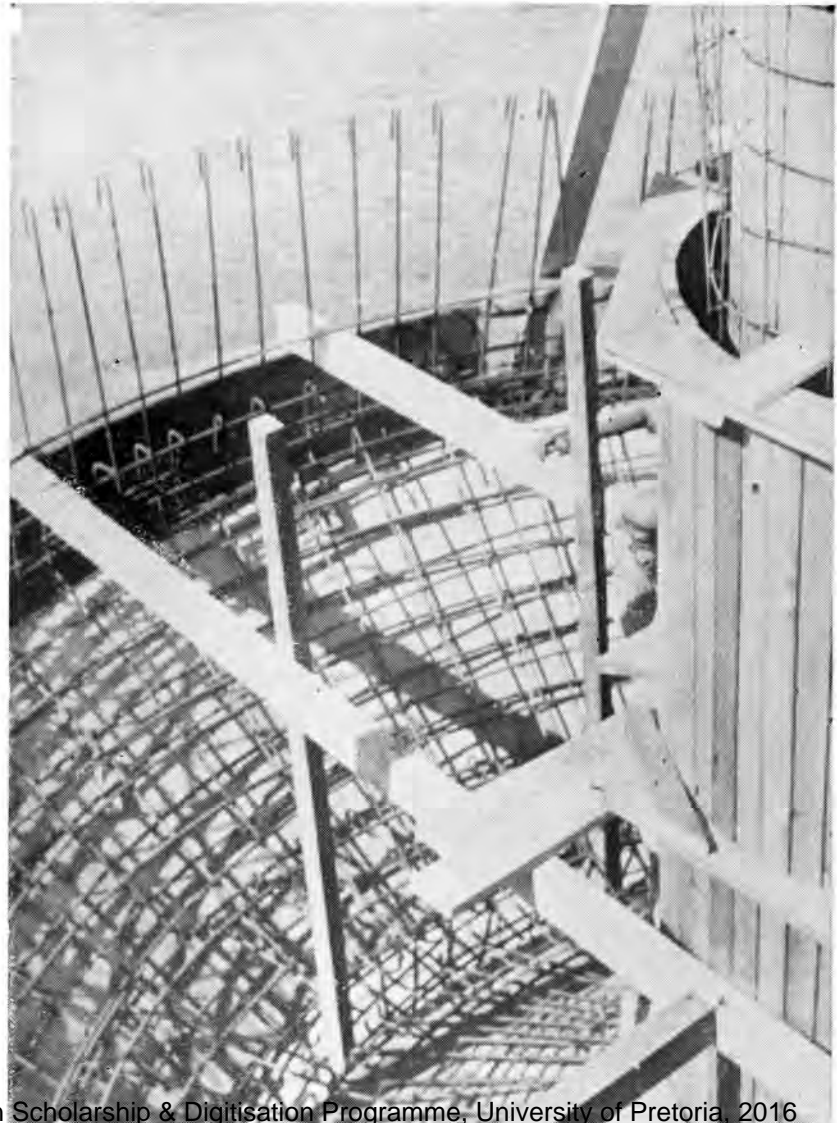
There are two pumps to each tower, and in each case one of these is provided as standby. Two of these are the 5" L2 Worthington Simpson type, supplied by Messrs Stewarts & Lloyds of S.A., Ltd., and a 5" SL Buffalo Pump, supplied by Messrs. Matheson & Bremner, is installed to complete the pump assembly for each of the towers. The pumps are rated to deliver 1,000 gallons per minute, and are brought into operation automatically when the water level has dropped a distance of two feet. The pumps are of the horizontal centrifugal type, driven by 40 H.P. Lancashire Dynamo Crypto Slip Ring Induction Motors, with Ingranic Starters, Isolators and Float Switches.

At Factoria the intake is from a 15-inch water main, in proximity to the Rand Water Board storage reservoir, and Munsieville has an intake main that is fed from the Municipal storage reservoir.

Construction.

The design, detailed drawings and contract documents were prepared by the Town Engineer's Department, Krugersdorp, and the contract was carried out by Messrs. S.A.E. Contractors Ltd., the tender price for the two towers being £5,338, including £400 for contingencies.

It was decided to construct first, the reinforced concrete





INTERSECTION OF HORIZONTAL, CIRCUMFERENTIAL AND DIAGONAL BRACING, IN TRESTLE CONSTRUCTION.

trestle of the Factoria tower, and then build a similar tower afterwards at Munsieville, using the shuttering from the construction at Factoria. The site chosen for the Factoria tower had been moved approximately 100 yards from the position selected at the inception of the design, and since the first site had, from trial holes, indicated solid rock foundations, these factors had been allowed for in the design. The site, chosen finally, however, revealed on excavation, strata of red clay and yellow weathered sand stone, that dipped at approximately 60 degrees and the clay was moist and plastic. Tests indicated that a bearing capacity of one ton per square foot was allowable, and accordingly, the foundations were deepened from 3 feet 6 inches to 6 feet 6 inches, and the size of the footings were increased for the new bearing capacity.

At Munsieville no difficulty was experienced in this respect, because the foundations are of sound quartzitic sand stone.

Work on the Factoria tower was commenced in July, 1946, and the first tower was completed in June, 1947.

The trestle was cast in four lifts, each horizontal bracing being cast during the construction of each section, the construction joint occurring above this level in each case. A hoist and steel scaffolding was used to facilitate concreting, and steel reinforcement members were supplied and bent to

PUMPING INSTALLATION.

View shows the pump, motor, non-return and sluice valves.

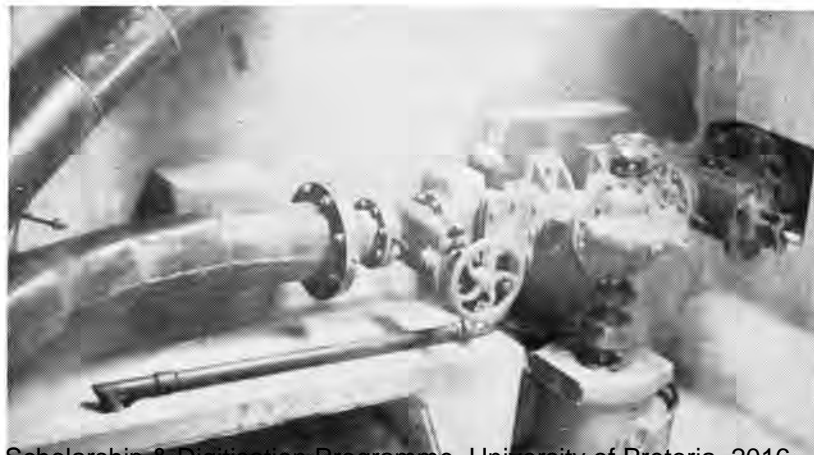
the required shape by Messrs. Hunt, Leuchars and Hepburn.

After the completion of the trestles and ring beams, the difficult task of constructing the tank was commenced. A timber platform was erected level with the bottom edge of the ring beam and projecting the required distance from the ring beam, and supported by scaffold pole bracings from the trestle. The shuttering for the outer and inner conical bottom and central shaft was then erected. After the steel reinforcement had been fixed, the floor and central shaft were cast. It is pertinent to mention that, during the casting of the floor, an extremely heavy downpour of rain washed out a portion of the concrete on the incline face of the cone and great difficulty was experienced in remedying this damage, before setting of the concrete took place, which took a period of two weeks. After the inverted conical base, lower ring beam and central shaft had acquired sufficient strength, the hoisting of the outer circular shuttering (previously framed at ground level in four sections) was undertaken. A jib was secured to the top of the hoist, and block and tackle were fixed at a point consistent with a minimum of horizontal manoeuvring of the section, when hoisted to the required height. The sections, correctly oriented, suitably braced, and with guide ropes attached, were then hoisted one by one and lowered on to short lengths of $\frac{3}{8}$ -ins. diameter M.S. rods which were used as rollers, placed on the top of the lower ring beam. A wooden jig, framed out of 6" by 2" timber and fitted around the shuttering of the central shaft, to act as a pivot, was attached to the section, yoke fashion. The section was then manhandled into its final position where temporary stays and braces were attached. The swivel jig was made available for the succeeding sections. During these operations, the steel reinforcement protruding from the ring beam had to be bent to provide clearance and to avoid fouling of the sections being moved. The section cleats were then coupled and braced together and two multi-strand steel wire ropes were windlashed tight around the circumference, the jig being used to check for plumb and distance, and the reinforcement was then fixed. In order to facilitate placing and rodding of the concrete, the inner shuttering was constructed in twelve vertical sections, each alternate bay being carried to the full height of the walls, while the intermediate sections, being sub-divided into 2 feet 6 ins. lifts, were fixed as concreting work proceeded. Since all sections were assembled at ground level, a minimum of time was spent in fixing these, and concreting of the walls was done in one lift. The mix for the tank was designed by the Minimum Voids Method.

The water/cement ratio was carefully controlled at all stages in the construction.

The tower at Factoria was rendered with plaster and afterwards waterproofed by the application of commercial compounds. In the case of the Munsieville tower a waterproofing compound was applied direct to the concrete without any rendering.

The second tower, located at Munsieville, was completed in August, 1947.



OVERSEAS NEWS AND PRACTICE.

AN EXPERIMENT IN DISTRICT HEATING.

By DOUGLAS ENEFER.



The people of Britain are very loyal to the open type of coal fire. It is however interesting to note that the advantages provided by a system of district heating are now fully realised. This article reviews the first district heating scheme operated in Great Britain.

SIXTY-FIVE families living in municipally-owned houses at Flixton, a small Lancashire town just outside the city limits of Manchester, England, are the first people in Britain to have constant hot water for all purposes, including interior heating, piped into their homes from a single boiler station serving the entire housing estate.

Urmston Urban Council, which administers the adjoining areas of Urmston and Flixton, is the first local government authority in the country to put a district heating plan into operation. In twelve months since the scheme began, inquiries have poured in and officials have spent a lot of time showing delegations how the plan works.

Mr. E. L. Leeming, surveyor to the council, who persuaded the council to adopt the scheme, believes that ultimately Britain's government will have to tell all local authorities that they must start similar plans, in order to economise in coal.

But district heating has other attractions. It ensures that every part of the house is evenly warmed, and rids the atmosphere of that unnecessary smoke, which is such a problem in industrial districts.

The 62 houses at present served by a temporary single boiler are only the first instalment. There are to be 1,300 houses and flats of various types, and 17 public and other buildings, including a school, a church, and that characteristically English meeting-place, a public-house. This means a complete town in miniature, attractively laid out with gardens, flowering shrubs and recreation spaces.

The total capital cost will be approximately £200,000 of which about £60,000 will probably have been spent by the end of this year. The scheme has five main objects: to supply space heat and hot water from a central boiler station, to save fuel, to secure greater fuel efficiency than is obtainable from open fires, and provide warm, dry conditions in all rooms; to create cleaner and easier conditions for the housewife, and to eliminate smoke caused by open fire grates.

How it Works.

Cold water is piped into the boiler station from the district mains. It is heated in the boiler and then passes through two branch pipes.



PIPE LINES FOR HOT WATER.

Special glass wool insulation reduces heat losses to less than four per cent.



ILLUSTRATION SHOWS THE CULVERT BEING DUG.
The concrete sections house the glass fibre lagged hot water pipes, and adequate room is provided for inspection purposes.

The water supplied by one of these pipes is pumped through two 250-gallon calorifiers to provide constant hot and purified tap water, for the houses on the estate. The other branch pipe delivers hot water into the homes for radiator heating and in each case delivery is made by centrifugal pumps.

Water is permanently flowing in a circuit, with the water level in the calorifiers maintained on the simple ball-tap principle of the ordinary domestic cistern.

Hot water on tap circulates at approximately 140 degrees Fahrenheit, and 30 to 40 gallons a day are allowed to each house, according to the number of bedrooms. The hot water for radiators never loses more than 20 degrees of heat by the time it has flowed through the service mains, and been returned to the central station.

The biggest unknown factors in the scheme were the traditional English love of open hearth coal fires, and reluctance to experiment with "new-fangled ideas." On this score, the council has been pleasantly surprised by the very small number of disgruntled tenants.

This fact has been confirmed during a recent visit to the estate. Young wives said they now preferred this form of heating because their homes were warm all through and they no longer had to clear out ashes and lay new coal fires.

Nor do they have to worry whether the coal ration will last until the next delivery, they don't need any coal ration. Without lifting a finger, and with an outside temperature of 32 degrees Fahrenheit, the temperature of their living-rooms is maintained at from 60 to 62 degrees, and bedrooms and halls from 52 to 54 degrees for at least 16 hours every day, the temperatures being controlled by a stop valve on each

of the radiators. The circulation of water is curtailed only between 11 p.m. and 5.45 a.m.

Drying the Washing.

Even the cloak-rooms are warmed, and in the larger houses a drying-room solves the problem of drying clothes on a rainy day, an important consideration in the Manchester district of England, which has more than average rainfall.

What does all this cost the occupier? The gross charges are 13s. 2d. a week for a single-bedroom bungalow, 15s. 9d. for a two-bedroom bungalow, 23s. 4d. for a three-bedroom house, and 25s. 8d. for a slightly better house with three bedrooms.

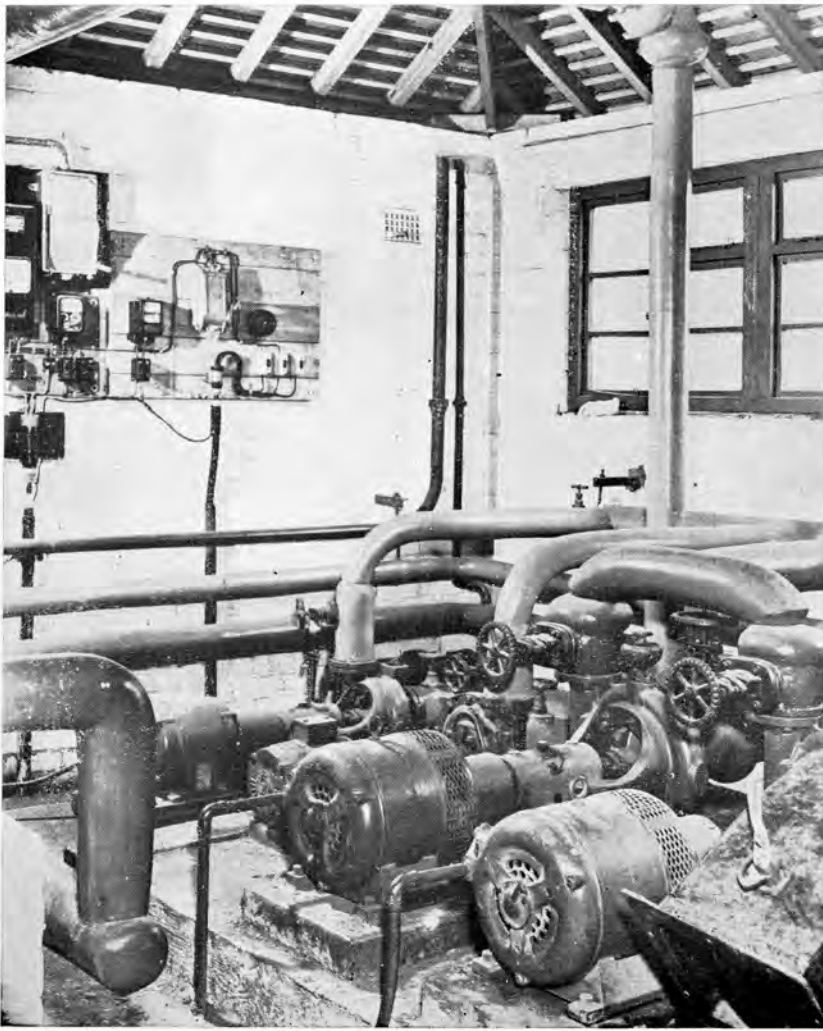
These figures include everything—rent, rates, hire of cooking-stove, and district heating charges. The actual heating charges in the four types of homes listed are 3s. (for the bungalows), 5s. 3d. and 5s. 10d. (for the houses).

It is cheaper for the housewife to pay these charges than to buy coal for open hearth fires.

As a concession to the English love of the hearth, the council has furnished each house, with a gas or electric fire, but only a few use these fires, even in exceptionally cold weather.

In its present stage the scheme does not pay for itself. The council anticipated a financial loss in the early stages, but when all the 1,300 houses are built there will be no loss—rather the reverse, but this new neighbourhood will not be completed for some years yet.

The manpower cost of operating district heating is negligible, one man keeps the present temporary boiler station in action, and only two men for day and night shifts, will be needed at the new permanent station serving 1,300 homes.



PUMP HOUSE.
Two water circuits from the boiler house are fed by pumps driven by electric motors.



CENTRAL BOILER HOUSE AND PUMPING STATION.



INSULATION BY MEANS OF A GLASS WOOL BLANKET.



DOMESTIC SCENE.
A sitting room. Heated by the district plant.

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.

Note : S.A.R. & H. Tender Board address is : 715, P.F.A.C. Building, 15, de Villiers Street, Johannesburg.

BUILDINGS, ETC. :

Department of Public Works, Pretoria : Petrus Steyn, O.F.S. — new woodwork room, Boys' and Girls' E.C.'s at school. P.W.D. 49. Due, 6/7/48.

Lakeview School, Bloemfontein District, O.F.S. — new woodwork room. P.W.D. 50. Due, 6/7/48.

Warden, O.F.S. — magistrate's residency. P.W.D. 48. Due, 8/7/48.

Johannesburg Municipality : City Engineer, Johannesburg. Erection and completion of portion Kensington Polytechnic Club House at Rhodes Park, Johannesburg. (Deposit of £1-1-0). Contract 1939. Due, 2/7/48.

Department of Public Works, Pretoria : New post office, Dundee. P.W.D. 47. Due, 1/7/48.

Nigel Municipality : Extensions to fire station. Contract 236. Town Engineer, Nigel. Due, 2/7/48.

S.A.R. & H. Tender Board : Erection and completion of four P.95 B/2 type houses (labour and material), three at Clairwood and one at Reunion. General Manager, 206, Helpmekaar Buildings, Johannesburg. (Deposit of £1-1-0). Due, 1/7/48.

Wepener Municipality : Erection of four or five semi-detached houses. Municipal Engineer, Wepener. Due, 9/7/48.

BRIDGES, EARTHWORKS, ETC. :

Wepener Municipality : Construction of a foot bridge. Municipal Engineer, Wepener. Due, 9/7/48.

ELECTRICAL EQUIPMENT, ETC. :

S.A.R. & H. Tender Board : Electrical Material. No. 8110. Due, 15/7/48.

Middelburg (Cape) Municipality : Electricity undertaking : Section 1. 11 kv. cable, cable boxes, laying, jointing, excavating and filling. Section 2. L.V. cable and cable boxes. Section 3. H.V. and L.V. switch gear and sundries. Section 4. Transformers. Consulting Engineer, J. S. Clinton, Box 4648, Johannesburg. Specification MC.4/1948. Due, 19/7/48.

Public Works Department, Pretoria : Supply, delivery and erection of two electrical dual purpose passenger or bed lifts to the National Hospital, Bloemfontein. P.W.D. 29. 6/7/48.

Durban Municipality : P.X.B. switch boards. P. 297. Telephone Exchange Department, Durban. Due, 19/7/48.

Kimberley Municipality : High tension switch gear. Consulting Engineers : Merz & McLellan (South Africa), Escom House, Rissik Street, Johannesburg. Due, 26/7/48.

Cape Town Municipality : Polyphase house service electricity meters. City Electrical Engineer, Cape Town. Specification 1488/1948. Due, 14/7/48.

Durban Municipality : Transformers. Electricity Department, Durban. No. E.2170. Due, 20/8/48.

Cape Town Municipality : Manufacture, supply and delivery of cables and jointing material. City Electrical Engineer, Cape Town. Specification 1492/1948. Due, 28/7/48.

Durban Municipality : Current transformers and switches. E.2168. Due, 6/8/48.

Naboomspruit Municipality : Supply, delivery and erection in the power station of the following plant : 50 k.w. Diesel engine generating sets ; 35 k.w. Diesel engine generating sets. The sets are required to run at about 1,000 r.p.m., the voltage to be 380. Town Clerk, Naboomspruit. Due, 31/8/48.

HEATING INSTALLATIONS :

Department of Public Works, Pretoria : Supply, delivery and erection of boiler plant, West Koppies Hospital, Pretoria. P.W.D. 38. Due, 5/8/48.

S.A.R. & H. Tender Board : Steam raising plants. No. 8028. Due, 26/8/48.

STRUCTURAL STEEL, ETC. :

S.A.R. & H. Tender Board : Structural steel work. No. 8012. Due, 29/7/48.

S.A.R. & H. Tender Board : Steel bridge work. No. 7734. Extended to 8/7/48.

SEWERAGE WORK, DRAINAGE, ETC. :

Port Elizabeth Municipality : The construction of foul water sewers, Newton Park, Area No. 5. No tender including a qualifying clause as to price will be considered. City Engineer, Port Elizabeth. (Deposit of £2-2-0 — extra copies of documents at £1-1-0 per copy). Contract 880. Due, 1/7/48.

TRACTORS AND ROADMAKING PLANT, ETC. :

O.F.S. Provincial Tender Board, P.O. Box 531, Bloemfontein. Miscellaneous plant. Provincial Roads Engineer, P.O. Box 517, Bloemfontein. No. 3/1948/49. Due, 13/7/48.

VEHICLES, ETC. :

S.A.R. & H. Tender Board : Inter-urban coaches manufactured in South Africa. No. 7471. Extended to 29/7/48.

VENTILATION, ETC. :

Post Office Savings Bank, Bloemfontein : Ventilating plant. P.W.D. S.215. Due, 1/7/48.

WATER SUPPLIES, ETC. :

Bellville Municipality : Municipal Engineer, Bellville. Certain sewerage pipes and specials, totalling app. 230,000 feet. (Deposit of £3-3-0). Due, 20/7/48.

Cape Town Municipality : Water Engineer, Old Drill Hall, Parade St., Cape Town. Pumps, motors, piping, valves, electrical equipment and other plant at the Wynberg Reservoir Pumping Station. (Deposit of £1-1-0). Form of tender A.8/48. Due, 16/8/48.

Controller of Stores, Irrigation Department, P.O. Box 277, Pretoria : Valves and fittings for O.F.S. Goldfields Water Supply. Irr. 38. Due, 29/7/48.

Harrismith Municipality : Consulting Engineers : Stewart, Sviridov & Oliver, Balgownie House, 66, Commissioner Street, Johannesburg. Water Supply : 6", 4", 3", 1½" and ¾" diameter steel and/or asbestos cement pipes, complete with valves, specials and accessories. (Deposit of £2-2-0). Contract 7/1948. Due, 1/7/48.

Hercules Municipality : Town Clerk Hercules. Pipes (steel and/or asbestos cement), valves, specials and accessories for water mains of 15", 12", 10", 9", 5", 4", 3", 2", 1" and ¾" bore. Contract A/1948. Extended, 1/7/48.

Lower South Coast Regional Water Supply Corporation, Natal : Consulting Engineers : Campbell & Bernstein,

P.O. Box 2, Overport. Waterworks plant and pipes comprising : (a) Supply, delivery and erection of filtration plant ; (b) Supply, delivery and erection of chemical feeding equipment ; (c) Supply, delivery and erection of chloramine plant ; (d) Supply, delivery and erection of complete metering equipment ; (e) Supply and delivery only of cast iron piping together with valves and fittings ; (f) Supply and delivery of miscellaneous waterworks equipment. Tenders invited for portions or the whole of the above. (Deposit of £10-10-0 — extra copies of documents at £3-3-0 per set). Contract L.1/48. Due, 2/7/48.

Pietermaritzburg Municipality : City Engineer, Pietermaritzburg. Blackridge water supply pumping scheme. Contract C.E.39/1948. Extended, 26/7/48.

Robertson Municipality : Town Engineer, Robertson. Augmentation of irrigation water supply — Pipes, specials and fittings. (Deposit of £2-0-0). Contract B/1948. Due, 5/7/48.

Robertson Municipality : Town Engineer, Robertson. Augmentation of irrigation water supply — Supply, delivery and erection of electrically-driven pumping units, pipes, valves and fittings. (Deposit of £2-0-0). Contract B/1948. Due, 5/7/48.

Salisbury Municipality : Consulting Engineers : Stewart, Sviridov & Oliver, Balgownie House, Commissioner St., Johannesburg. Water scheme — 30" diameter steel pipes and fittings (excluding valves). (Deposit of £10-10-0 — additional copies of documents at £2-2-0 per copy). Contract HW1/1948. Due, 16/8/48.

Wepener Municipality : Municipal Engineer, Wepener. Erection of reservoir. Due, 9/7/48.



**RAND
CARBIDE**

A South African Product of Quality

"Rand Carbide" is a South African product — no imported materials are used.

The Witbank Factory is in the same area as The Electricity Supply Commission Station, and is equipped with 3 large electric furnaces giving an annual output of 25,000 tons of carbide.

Through a well equipped laboratory the analysis of raw materials and the finished product ensures that "Rand Carbide" is of the highest quality.

RAND CARBIDE LTD.

Head Office : Southern Life Building,
Main Street, Johannesburg.

P.O. Box 4380. Phones : 34-2787/8

Factory : Witbank, Transvaal.

MISCELLANEOUS :

Belt Conveyors : S.A.R. & H. Tender Board. No. 8105. Due, 29/7/48.

Boilers : S.A.R. & H. Tender Board. No. 8159. Due, 5/8/48.

Chemicals to Chief Health Officer : Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2563, East London. Due, 29/7/48.

Centrifugal Pump : Stores Department, Johannesburg. No. 503. Due, 16/7/48.

Carbon brushes : S.A.R. & H. Tender Board. No. 8245. Due, 12/8/48.

Chain : S.A.R. & H. Tender Board. No. 8086. Due, 12/8/48.

Cast iron man hole covers and frames : Store-keeper, Germiston. Stores Contract 14. Due, 7/7/48.

Concrete mixers : S.A.R. & H. Tender Board. No. 8222. Due, 22/7/48.

Concrete mixers : S.A.R. & H. Tender Board. No. 8100. Due, 15/7/48.

Deodorant blocks for 1948 : S.A.R. & H. Tender Board. No. 8147. Due, 3/8/48.

Fittings for an additional cooling pond at the Electric Power Station : Town Clerk, Aliwal North. Due, 5/7/48.

Furnace : S.A.R. & H. Tender Board. No. 8048. Due, 29/7/48.

Linesmen's leather belts and safety straps : Department of Posts & Telegraphs, Pretoria, P.O. Box 928. Due 1/7/48.

Machine tools : S.A.R. & H. Tender Board. No. 8082. Due, 15/7/48.

Medical Equipment to Department of Health : Union Tender & Supplies Board, P.O. Box 371, Pretoria. S.O. 2635, Durban. Due, 8/7/48.

Mole drainers, agricultural cultivator type : Department of Posts and Telegraphs, Pretoria. P.O. Box 925. Due, 8/7/48.

Punching and shearing machine : S.A.R. & H. Tender Board. No. 8167. Due, 29/7/48.

Pantograph copper strips : S.A.R. & H. Tender Board. No. 8160. Due, 8/7/48.

Roofing felt : S.A.R. & H. Tender Board. 8129. Due, 1/7/48.

Screws—brass and iron : Department of Posts and Telegraphs, Pretoria. P.O. Box 927. Due, 1/7/48.

Steel sheets : S.A.R. & H. Tender Board. No. 8197. Due, 26/8/48.

Supply of 2,400 ft. of 2"/3" galvanised screwed and socketed piping : Municipal Engineer, Wepener. Due, 9/7/48.

Supply of one electric turbine water pump : Municipal Engineer, Wepener. Due, 9/7/48.

Surface grinder : S.A.R. & H. Tender Board. No. 8152. Due, 29/7/48.

Vertical coal-fired boiler : Stores Department, Johannesburg. Contract 486. Extended to 19/7/48.

Workshop machines : One 5-cwt. pneumatic power hammer : One tool and cutter grinder. Durban Municipality. E.2167. Due, 6/8/48.

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

We Bring You Springtime with a Switch

Air Conditioning Units

- AIR COOLING
- AIR HEATING
- AIR WASHING
- HUMIDIFICATION

THE "DOWNRIGHT"

CAINK CONDITIONER



Eminently suitable for:—
 ALL INDUSTRIES, HOSPITALS, HOTELS,
 SCHOOLS, OFFICES AND PRIVATE HOUSES.
 The Caink Conditioner will cool or warm your rooms, remove
 dirt and odours, yet it can perfume or disinfect your air.
 Excessive dryness is eliminated — it is the enemy of Sinus.
 Economical to install and operate.

Manufactured and marketed by:—

DOWSON & DOBSON LTD., Engineers

P.O. Box 7764. HEAD OFFICE: 29 WEBBER STREET, SELBY, JOHANNESBURG. Phone 33-5041.

Branches: CAPE TOWN, DURBAN,
 PORT ELIZABETH, EAST LONDON.

Agents at: BLOEMFONTEIN, BULAWAYO,
 N'DOLA.

ENCLOSED VENTILATED SEWAGE PLANTS



... as adopted throughout South Africa by the most progressive Public Bodies and Industrial Concerns.

Complete elimination of all objectionable features. Final effluents characterised by 100% stability and highest purification, which factors insure freedom from subsequent decomposition and nuisance.

Water Treatment & Engineering Co. (Pty.) Ltd.

43 ANDERSON STREET

JOHANNESBURG

P. O. BOX 2155

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.

Edw. L.
BATEMAN
Proprietor

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

millions of square feet of

“ Hercules ” Corrugated Asbestos Cement Roofing Sheets

have been supplied in the Union—and thousands of sheets to East, West and Central Africa. Here is striking testimony to the PROVED quality of this product.

★

“ Hercules ” Asbestos Cement Products also include:
 Plain and Reinforced Flat Sheets; Flue Pipes and Fittings; Extractors;
 Cowls, Guttering and Down Pipes; Boiler Lagging, etc.

★

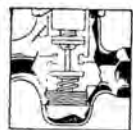
ASBESTOCEMENT MFG. Co., Ltd.

Established over 28 Years

21 PIM STREET: JOHANNESBURG



DISTINCTIVE
in principle and appearance
The **Shaff Tap**



In the Shaff Tap a great advance in design has been achieved. Graceful clean-cut lines, which give pleasure to the eye, enclose technical features that get rid of the bugbear of the dripping tap. Anyone can change the washer, which is a standard one, with ease and speed.

There is no need to search for the stopcock, for the Shaff Tap incorporates a secondary valve which cuts off the water automatically. The washer, which is held merely by a friction pin, comes away with the head. Modified in certain parts to accommodate these invaluable features, the Shaff Tap in the matter of material, tolerances and workmanship is manufactured to British Standard 1010. It is accepted by leading Municipalities throughout the Union of South Africa



**BIB, INCLINED BIB,
PILLAR AND MIXER TYPES**

An anti-splash device is now a standard fitting on all Shaff Bib Taps
Fully descriptive literature on request



JAMES SHAFFER LTD
120-132 Cricklewood Lane, N.W. 2

Telephone: Gladstone 3311/9 Telegrams: Shaff, Crickle, London

ALSO AT SOUTH SHIELDS

Representatives throughout the Union of South Africa:
Messrs. West, Price & Co. (Head Office) 609 Boston House,
Strand Street, Cape Town, Telephone 3-0905, P.O. Box 3923
and Johannesburg, P.O. Box 447, Telephone 33-8445.

★THE MAGINOT LINE—

Symbol of Colossal Failure
YIELDED ONE BLESSING
TO HOUSEHOLDERS!

AQUELLA



**AMAZING NEW
WATERPROOFING
STOPS SEEPAGE**



**JUST SCRUB IT
ON!**

*** AQUELLA WATER-
PROOFED
MAGINOT LINE**

The French Government were at their wits' end to stop seepage into the Maginot Line during 1939. A French scientist developed AQUELLA and was very successful in preventing water from flooding the Line. (See "Readers' Digest," Feb., 1946, issue.)

**AQUELLA
EXPANDS**

Contrary to the shrinkage phenomena of most surface coatings AQUELLA expands minutely upon curing. This ensures thorough filling of pores and gives a better bond.

Obtainable in Self
Colours.
Grey, Green, Rose
and Cream.



SEALS . . .

DAMP WALLS,
DAMP CELLARS,
SWIMMING POOLS,
POROUS MASONRY,
SOLVES BUILDERS'
PROBLEMS.

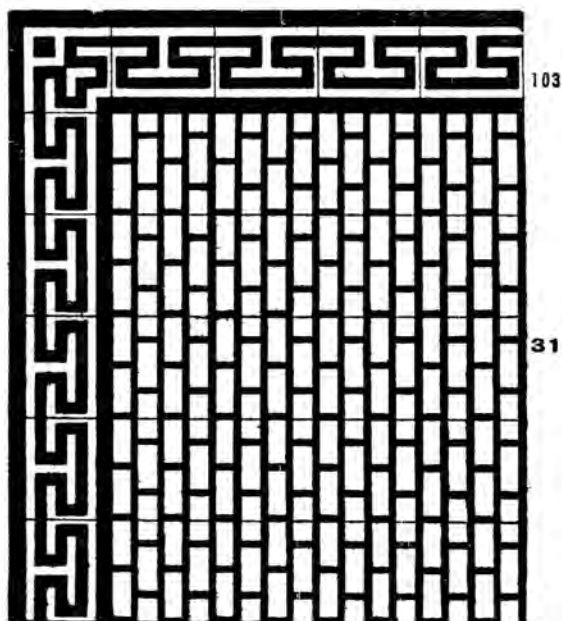


CHUBB & MAXWELL (PTY.), LTD.,

MARSHDALE BUILDING, COR. MARSHALL & LOVEDAY
STREETS, JOHANNESBURG.

P.O. BOX 5038 TEL. 33-5040.

And at Cape Town, Durban, Port Elizabeth, East London,
George and Worcester.



MANUFACTURERS OF :

**CEMENT & TERRAZZO FLOOR
TILES, WALL TILES & STEP
TILES**

●
*These may be made to your individual
specification in a large range of colours*

●
For further particulars apply to :

UNION FLOORING TILE FACTORY

6 Long Street (Jeppes South) Johannesburg
Telephone 24-2179

RAND EARTHWORKS CONSTRUCTION Co. (PTY.) LTD.

●
EXCAVATION
AND GENERAL
CONTRACTORS
●

120, CULLINAN BUILDING, SIMMONDS STREET, JOHANNESBURG
Phone 33-8527. P.O. Box 8694.

We Manufacture

CAST IRON
High and Low Level Enamelled
Cisterns

*Stocked by Members of the South African
Federated Sanitaryware Merchants' Associations.*

A. LEWTHWAITE (PTY.) LTD.
Manufacturing Engineers & Founders

Phone 61-1251 "MANUFACTA", ROODEPOORT P.O. Box 114

JOHN LAING & SON (S.A.) (PTY.) LTD.

BUILDING AND ENGINEERING CONTRACTORS

JOHANNESBURG

O & S Powermaster
Automatic Oil-Burning
STEAM GENERATORS

- ★ COMPACT
- ★ ECONOMICAL
- ★ EFFICIENT



"Powermaster" Steam Generators are available in light oil and heavy oil units . . . 345 to 6,900 lbs. steam per hour. Write us for catalogue bulletin containing full information —

Distributors for Southern Africa

M. B. KOVAL & CO.

74-76 LOOP STREET
 CAPE TOWN

P.O. Box 546 Phone 2-6118 Cables "Kovco"

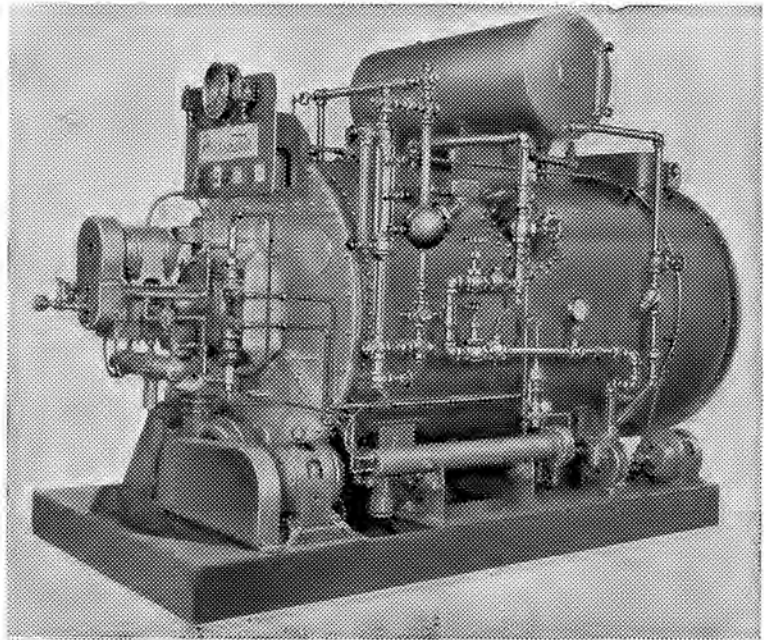
ALSO AT

122 MAIN STREET, JOHANNESBURG
 P.O. Box 4039

TIME AND LABOUR SAVED —
 COSTS REDUCED

STARTS AT THE FLICK OF A SWITCH

NO STACK — NO ATTENDANT



**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



THE PARTHENON-
ATHENS



THE most beautiful and inspiring of all Greek monuments. The Parthenon, was completed in 438 B.C. The cement used in the construction was probably "natural" cement — a crude combination of slaked lime and volcanic dust similar to that used by the Romans.

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.

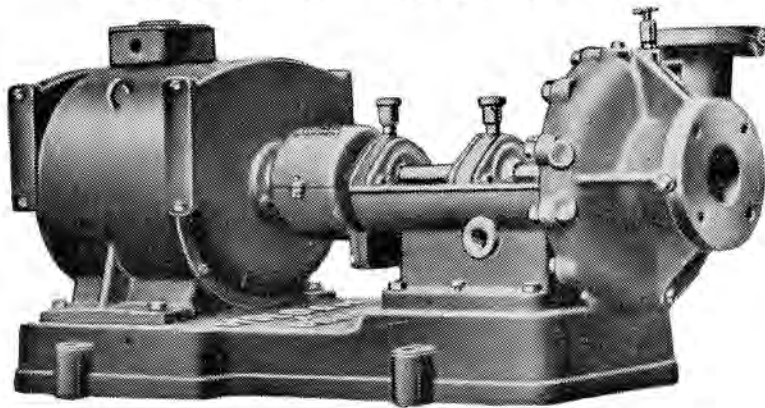
ANGLO-ALPHA CEMENT

ANGLO-ALPHA CEMENT LIMITED

Head Office: Anglovaal House, Fox Street, Johannesburg.

HOLDEN & BROOKE PUMPS

A RANGE OF SIZES IN STOCK



British made, high quality, high efficiency Centrifugal Pumps. Low, medium and high lift models; direct-coupled to electric motors or arranged for Vee-Belt drive. Equipped with ball bearings throughout. In sizes up to 3 in. available ex stock, and larger sizes ex import.

Other manufactures include Pumps for Air Conditioning, Sump Drainage and General Service, Calorifiers, Feed Water Heaters, Oil Separators, Injectors and Ejectors, Steam Traps.

Sole Representatives:

G. H. LANGLER & CO., LTD.

P.O. Box 3762 249, MAIN STREET, JOHANNESBURG Phone 22-6733

PITTSBURGH CORNING GLASS BRICKS

REID BROS. (SOUTH AFRICA) LIMITED

11/15 LOVEDAY STREET SOUTH, JOHANNESBURG

Telephone : 34-2181

P.O. Box 802

ROBERTS CONSTRUCTION Co.

(PTY.) LIMITED

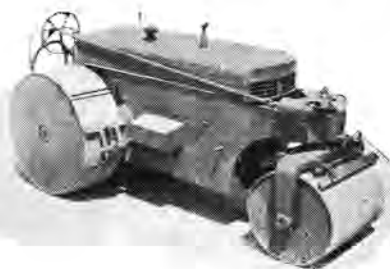
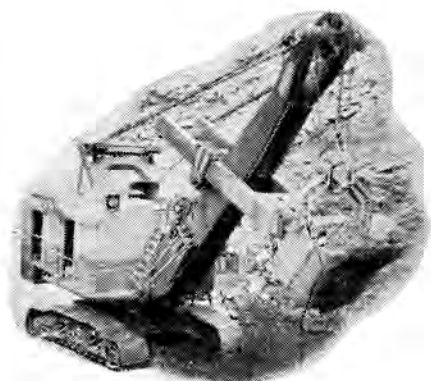
CIVIL ENGINEERS AND CONTRACTORS

JOHANNESBURG, DURBAN AND ODENDAALSRSUS

Use This New Service!

ALL TYPES CONSTRUCTION PLANT

For Hire



- Excavators
- Compressors
- Pneumatic Tools
- Concrete Mixers
- Vibrators
- Road Rollers
- Hoists
- Scaffolding
- Pumps and Hoses
- Mobile Cranes
- De-Greasing Plants
- Tractors
- Scrapers
- Trailers
- Brick Machines
- Earth-Moving Plant
- Transport Equipment

Phone : 33-2695.

Tel. Add. : "Planthire."

PLANT HIRE COMPANY

(S.A.) (PTY.), LIMITED

P.O. Box 3498, Johannesburg.

Marshdale Buildings,
Cnr. Marshdale and Loveday
Streets,
JOHANNESBURG.

Hunt, Leuchars & Hepburn LIMITED



Timber and Builders' Merchants

REINFORCING STEEL ENGINEERS, WATERPROOFING SPECIALISTS, WOOD
BLOCK FLOORING CONTRACTORS, JOINERY SPECIALISTS.



HUNT, LEUCHARS & HEPBURN LIMITED

P.O. Box 943,
Durban.

P.O. Box 47,
Johannesburg.

P.O. Box 653.
Pretoria.

NAIL & CHAIN LTD

Manufacturers of

METAL WINDOWS
METAL SURROUNDS
METAL DOOR JAMBS
METAL CONTAINERS

and

ALLIED PRODUCTS

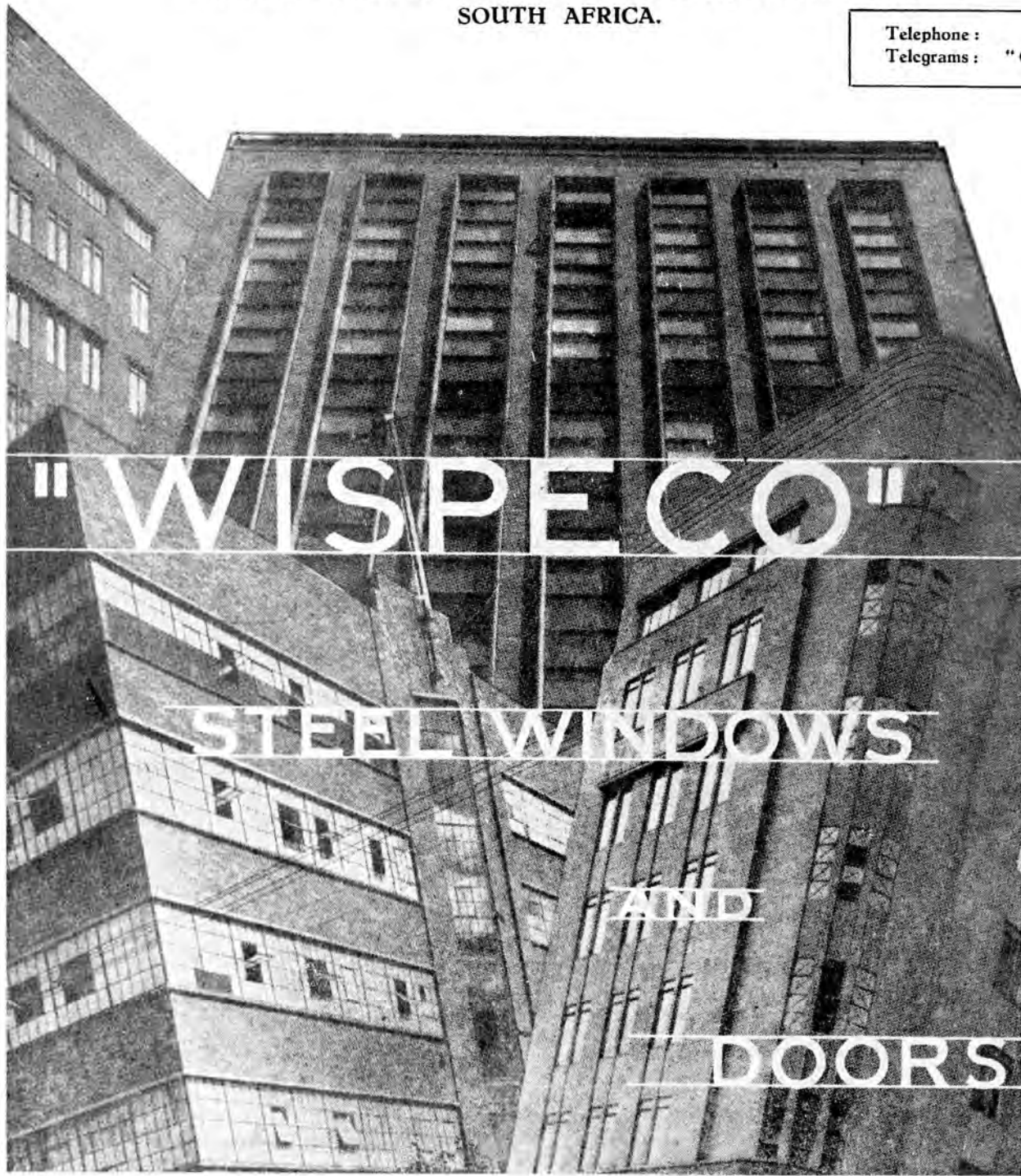
'PHONE 33-9544
P.O. BOX 7321
TEL. ADD.:
"NAILCHAIN"

10, SHORT ST.
BOOYSENS
JOHANNESBURG

WIRE INDUSTRIES STEEL PRODUCTS AND ENGINEERING CO., LTD.

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

Telephone : 33-9534
Telegrams : "Castings."



"WISPECO"

STEEL WINDOWS

AND

DOORS

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



LIME
and
TIME

- ★ Portion of one of our Buxton quarries. The contoured area is the "island" left at the discovery site of the "Taungs Skull."
- ★ Inset: The Taungs Skull, discovered in 1925.

*Aerial view: Aircraft Operating Co.
Inset: Courtesy The Star.*

THE NORTHERN LIME COMPANY is well aware that several of the more important and fast-growing Union industries depend upon adequate supplies of high-calcium Lime materials.

AS MAJOR PRODUCERS of these commodities, the Company regards the assurance of an unrestricted, long-term and economical supply as its obvious duty to present and future industry.



THE NORTHERN LIME COMPANY LTD.

Head Office:
3rd Floor, North British
Buildings,
JOHANNESBURG.

Telephones 33-4910 & 33-4919.
Telegrams: "Northern,"
Johannesburg and Taungs.

Works:
P.O. Norlim,
via TAUNGS.

Works and Quarries at Buxton and Thoming, near Taungs, C.P.