

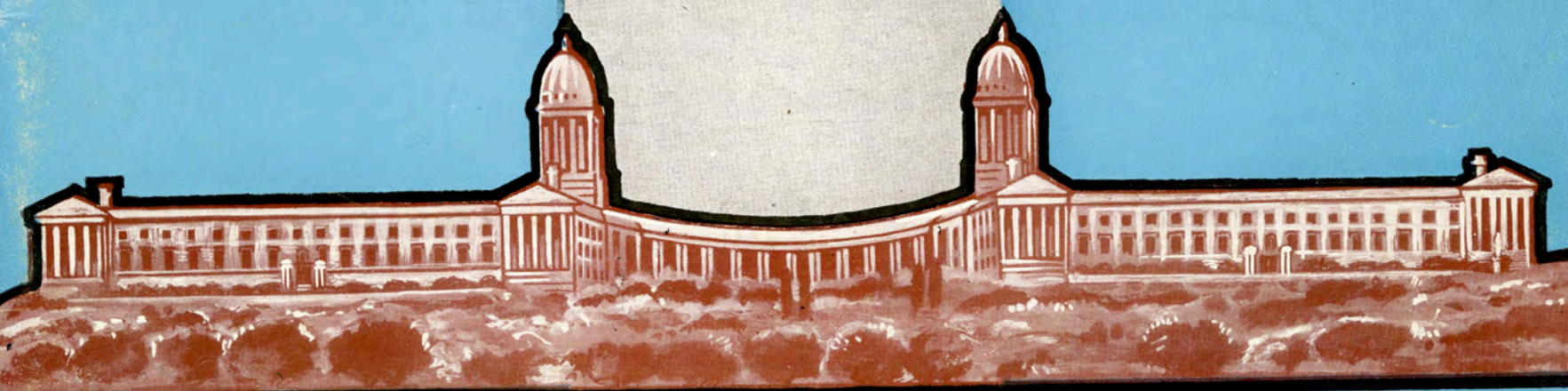
Vol. IX.

No. 57.

AUGUST : 1948.

PUBLIC WORKS OF SOUTH AFRICA

MERENSKY - BIBLIOTEEK
12 NOV 1948
UNIVERSITEIT VAN PRETORIA.
Klasifikasie 69(68).
Registernommer P.W.S.A.-9/57



Registered at the General Post
Office as a Newspaper.

Price per Copy : 1/6

Subscription : 15/- per annum.

Digitised by the University of Pretoria, Library Services, 2015



Voice of Progress!

EVERYWHERE, by everyone, the echo of this voice is heard . . . by industry and commerce in our thriving cities . . . by those who live on farms in the most remote parts of our land.

Rail transportation . . . basic factor in the Nation's progress . . . is today matched to the mighty task of speeding the wheels of industry and serving the needs of commerce and agriculture.

Vital, therefore, in the era of vast expansion which awaits our country is the programme of development, planned by the Railways of South Africa, to meet the Nation's needs.

And vital, too, is the spirit of co-operation between Industry, Commerce and the Railways, for the aim of all three is continued progress towards a sound and stable future.



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



PRIMROSE IRON-SPOT BRICKS

THE BRICK THAT HAS GAINED
SO MUCH POPULARITY IN
RECENT YEARS, AS SEEN IN
SO MANY OF OUR MODERN
BUILDINGS.



PRIMROSE BRICK WORKS

Telephones 58-1311/2/3.

(1936) LIMITED

Telegraphic Address:
"PRIMBRICKS."

P.O. Box 49, GERMISTON.



at crossings like this*...

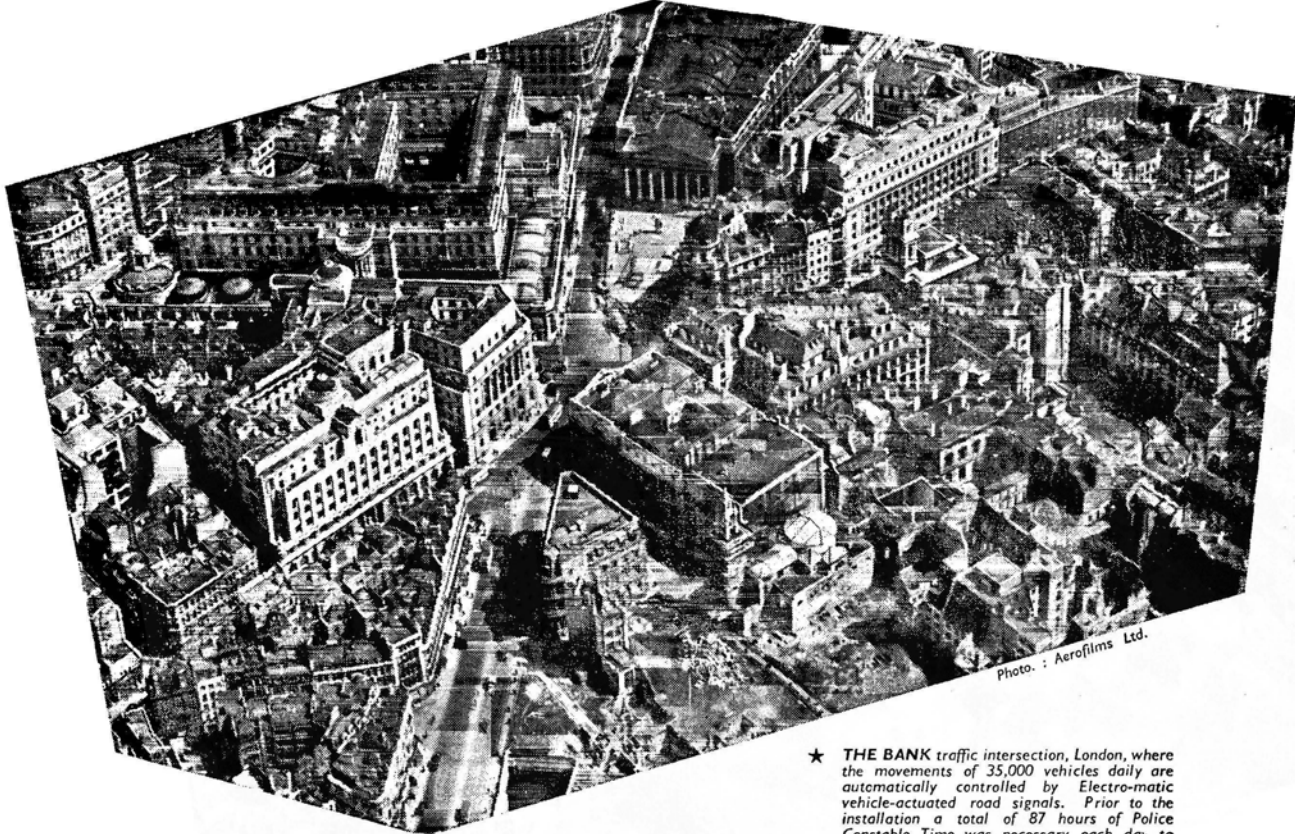


Photo. : Aerofilms Ltd.

★ 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.



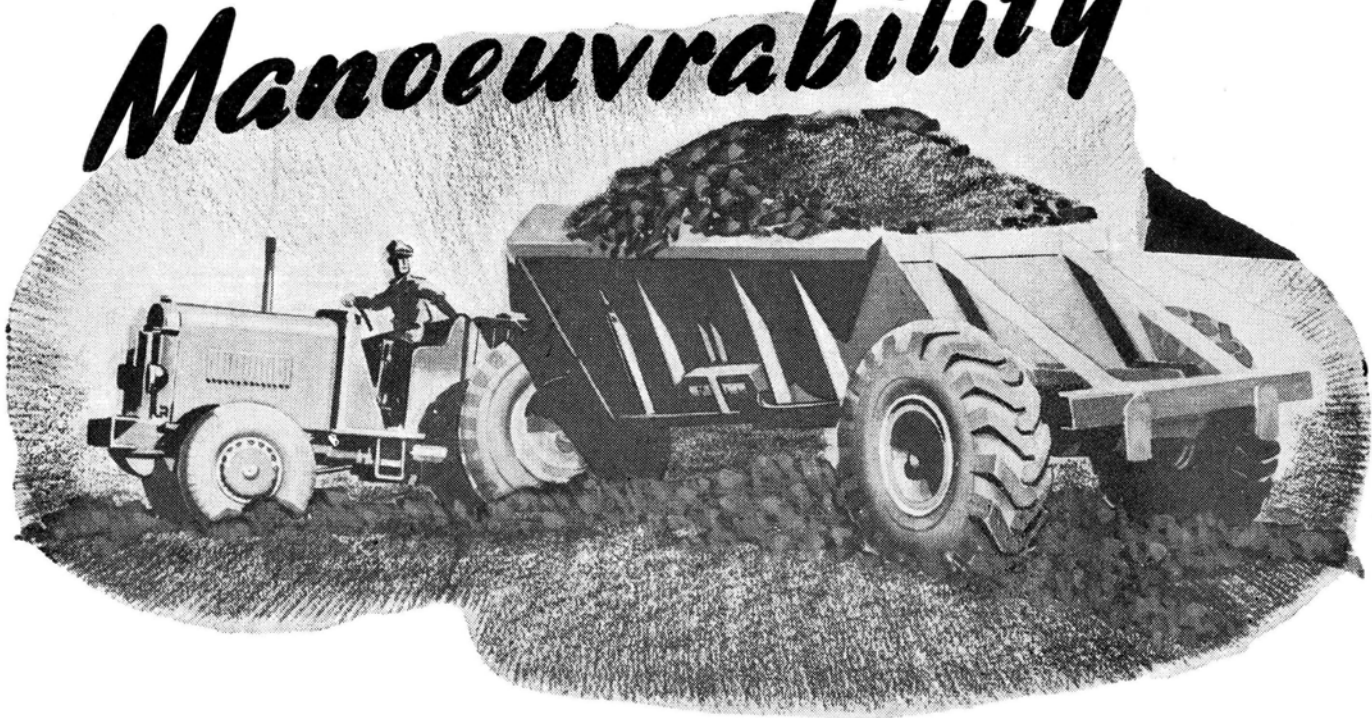
AUTOMATIC TELEPHONES (SOUTH AFRICA) LTD.

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

Manoeuvrability



means one good 'turn' after another

EUCLID BOTTOM-DUMPS

are moving earth the world over, and building a bigger reputation with every new construction job. Contractors are amazed that these massive EUCLIDS, powered with the brute strength of a 190 h.p. Diesel engine, can execute **right angle turns** on the roughest country, with the biggest load.

UNIQUE EUCLID UNIVERSAL HITCH . . .

. . . is the secret of EUCLID'S quicker turn-around . . . its faster, sharper turns. This unique feature gives unrivalled stability and manoeuvrability — and quicker turns means time saved on loading, hauling and on the fill.

ROCK RESISTING TYRES
which are 100% impervious to
damage by rock splinters, are fitted
to all EUCLID equipment.

Complete after-sales service. Write for full details to the

SOLE DISTRIBUTORS:

BLACKWOOD HODGE & CO (SA) (PTY) LTD

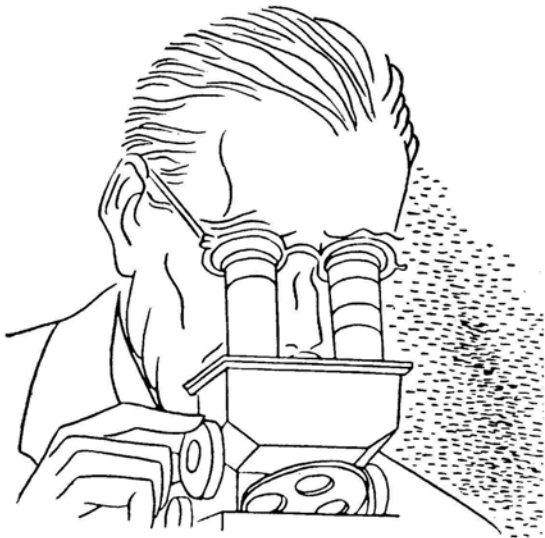
Lombardy Building 50 Kerk Street Johannesburg.

Telegrams Suntract Johannesburg

Telephone 22-3926

England, Ireland, U.S.A., Spain, Portugal, East Africa, the Rhodesias, Belgian Congo, India, Pakistan, Ceylon.

3969-1



G.E.C.
ACCEPTS
THE

Challenge

PROGRESS means change. Change means research, experiment. It calls for vision and imagination and the courage to go forward. G.E.C. accepts the challenge of the

future. G.E.C. has pioneered innumerable electrical advances. Some of the greatest scientific minds of the day are now developing new and better G.E.C. electrical products.

G.E.C.

PIONEERS IN ELECTRICITY

THE BRITISH GENERAL ELECTRIC COMPANY, LIMITED

P.O. Box 2406, JOHANNESBURG.
P.O. Box 1327, CAPE TOWN.
P.O. Box 922, DURBAN.
P.O. Box 42, PORT ELIZABETH.

144 Maitland Street, BLOEMFONTEIN.
P.O. Box 1070, BULAWAYO.
P.O. Box 845, SALISBURY.

Representing

THE GENERAL ELECTRIC CO. LTD., OF ENGLAND

COLLAPSIBLE GATES HAYWARDS



Haywards No. 1 Type Gates at Hayes Station, Kent.

HAYWARDS COLLAPSIBLE GATES are designed for a wide variety of situations. All sizes are supplied, from smallest to largest, and special requirements can be met according to developments in present day building practice.

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

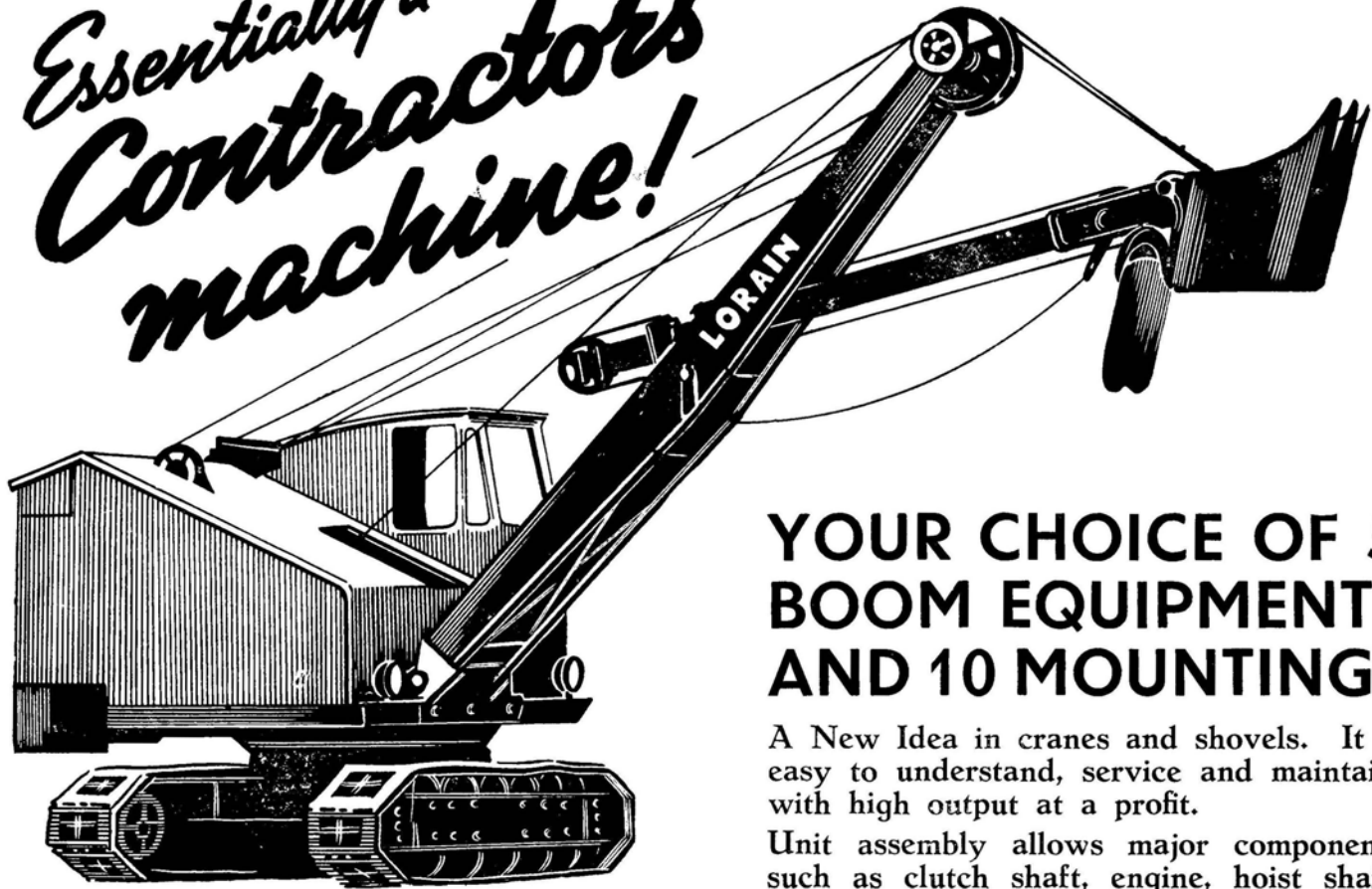
ENGINEERS, MERCHANTS & CONTRACTORS

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

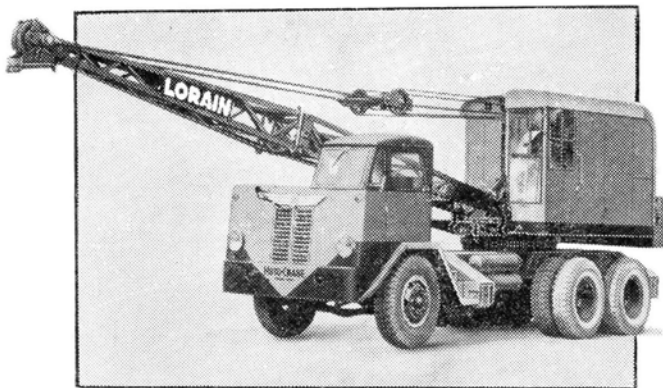
*Essentially a
Contractor's
machine!*



YOUR CHOICE OF 5 BOOM EQUIPMENTS AND 10 MOUNTINGS

A New Idea in cranes and shovels. It is easy to understand, service and maintain, with high output at a profit.

Unit assembly allows major components such as clutch shaft, engine, hoist shaft, cab, crawler, propelling mechanism, to be removed or exchanged as a complete unit. The Lorain has been proved as: Crawler mounted Shovels, Draglines, Clamshells, Cranes and Backdiggers: $\frac{1}{2}$ to 2 cubic yard capacity. All available on rubber-tired mountings for job to job mobility.



The **ROCK TESTED**
LORAIN



P.O. Box 50, Cleveland, Transvaal. Phone 25-2174.

Branches: P.O. Box 1701, Durban. Phone 27124.

P.O. Box 2027, P. Elizabeth. Phone 87056.

P.O. Box 3715, Cape Town. Phone 54640.

Rhodesia: BMS Engineering (Rhodesia) Co. Ltd.



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

"By Test  the Best"

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

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.

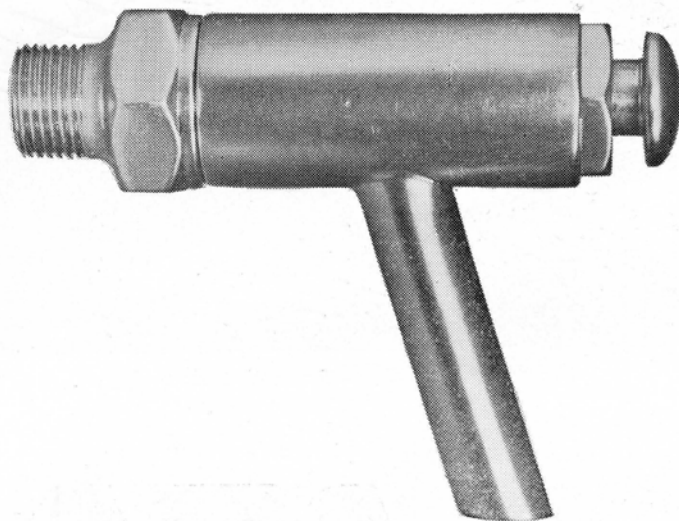
BOX 777.

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

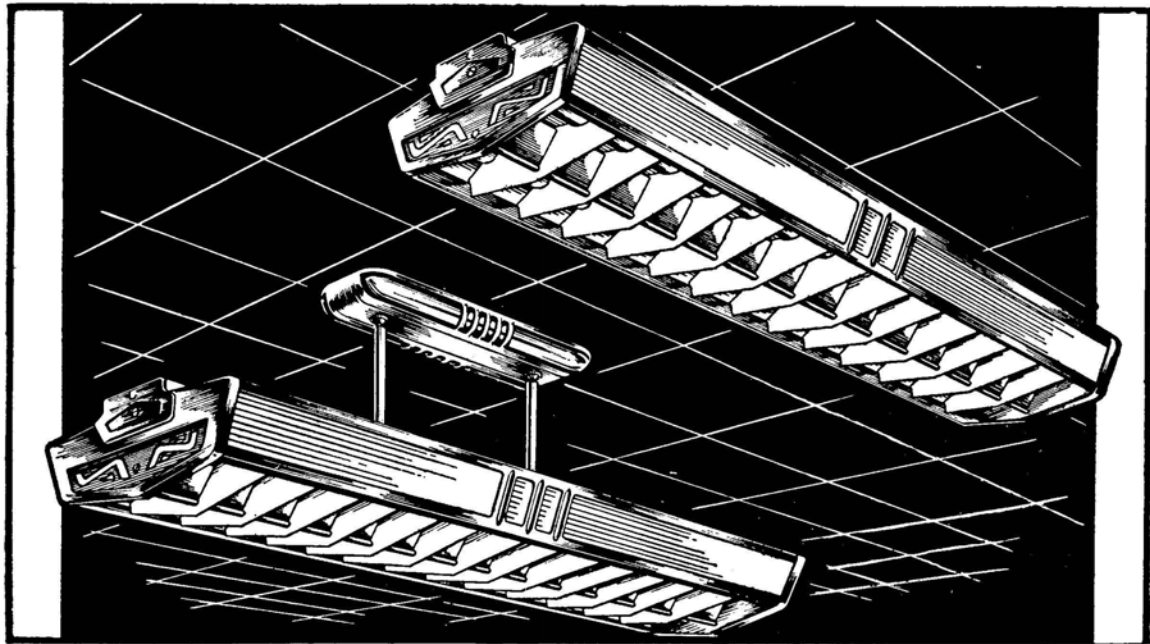
Telephones 66-2101/4

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.



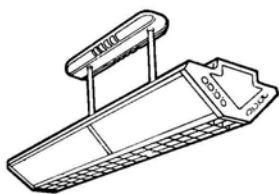
The "Viz-Aid" Suspension and Surface Types

Day Brite

T.M. Reg. U.S. Pat. Off.



The "Parkway" Surface Type



The "Coronado" Suspension Type



The "Day-Line" for two and three 40-watt and two 100-watt lamps.

FLUORESCENT LIGHTING

The "Day-Brite" line of Fluorescent Lighting Equipment embodies all the outstanding qualities of superior engineering and fine workmanship. Simple to install, easy to maintain, a wide range of styles and sizes are available for almost every lighting problem.



Sole Distributors in South Africa



190-196 MARSHALL ST.,
P.O. Box 2466

JOHANNESBURG
Phone 22-8955

" GIVE A DAY'S PAY — AND SAVE A CHILD "

HOUSING POLICY

The Long and the Short of it



First things first. Portal before permanency. Above all, quick action! Sites must be cleared and drainage ditches cut with whatever excavator equipment is available. The short-term housing problem cannot afford to look too far ahead.

But long-term planning calls for harder thinking. It demands the fullest range of the most advanced, tried-in-the-war earth moving machinery, backed by the specialised technical experience of leading excavator engineers. It plans in terms of "RUSTON - BUCYRUS."



Sole Distributors in Southern Africa:

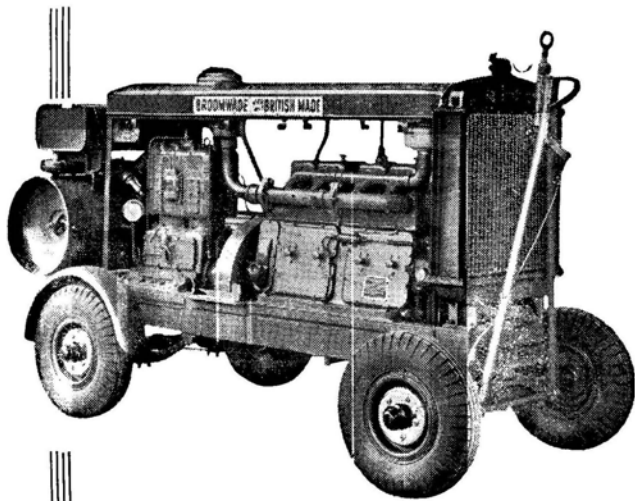


Branches
at:

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.

Hubert Davies & Co., Ltd.



Water, Electricity and Gas
Undertakings USE "BROOMWADE"

Portable Sleeve Valve Air Compressors, Road Breakers, Rock Drills, Clay Spades, Backfill Rammers, and Pneumatic Tools for repair work, for clearing mains, main and cable laying, testing mains, pumping, caulking joints, paint spraying, speedy replacement of services, reconstruction work, etc., etc.

COMPARABLE WITH A MODERN BRITISH WARSHIP
 IN EFFICIENCY AND DEPENDABILITY

"BROOMWADE"

Patent Sleeve Valve Portable AIR COMPRESSORS



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.

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.

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

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-SEVEN • AUGUST 1948

CONTENTS

THE IMPROVEMENT OF THE WATER SUPPLY TO THE
CITY OF KIMBERLEY, C.P.

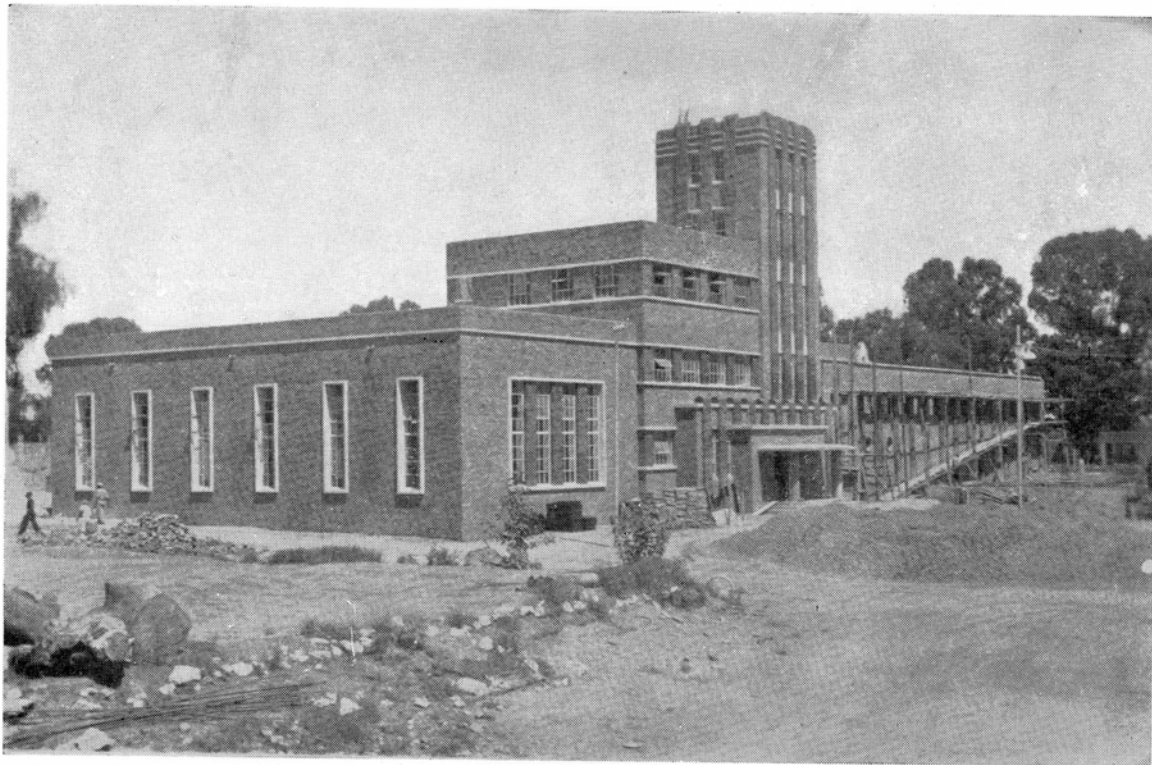
HYDRO-ELECTRIC SCHEME, UGANDA

PLANNING AND CONSTRUCTION OF A NEW TOWNSHIP

THE REGIONAL DEVELOPMENT OF WATER SUPPLIES
IN NATAL

OVERSEAS NEWS AND PRACTICE

TENDERS INVITED

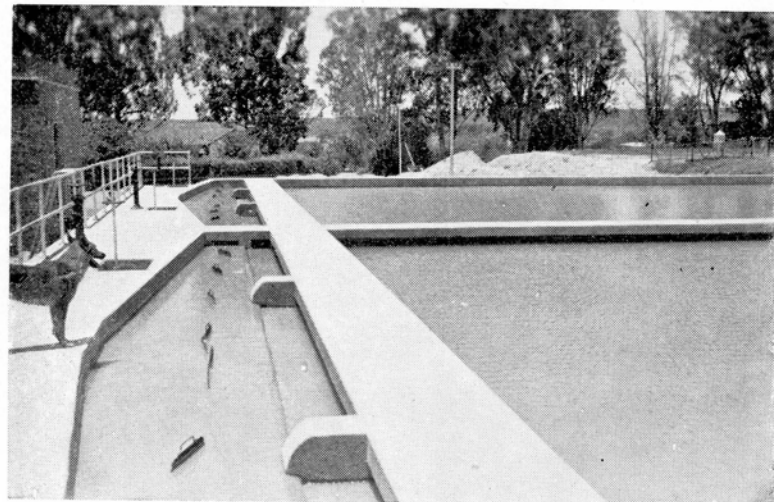


Purification Centre.

The wing in the foreground is the High Lift Pumping Station, and at the far end is the filtration plant. In the centre is the Main Entrance, with the chemical feeding plant, laboratory, change rooms and store rooms.

Inlet of Flocculator.

A close-up view of the inlet channel of the flocculator.



THE IMPROVEMENT OF THE WATER SUPPLY TO THE CITY OF KIMBERLEY, C.P.

KIMBERLEY was first supplied with water from the Vaal River at Riverton, 17 miles from the city, in 1882. The undertaking was then owned by a private company, the Kimberley Waterworks Company, and in the year 1923 it was purchased by the Municipality. At that time the works consisted of a steam pumping plant located at the Vaal River, where the river water was clarified in large sedimentation basins before being pumped to Kimberley. At the Newton Reservoir in the City, the clarified water was passed through slow sand filters and chlorinated before distribution.

In the year 1943 the steam plant, which was old and of insufficient capacity, was replaced by electrically driven centrifugal pumps, and a 33,000-volt transmission line erected to carry electrical power from Kimberley to Riverton.

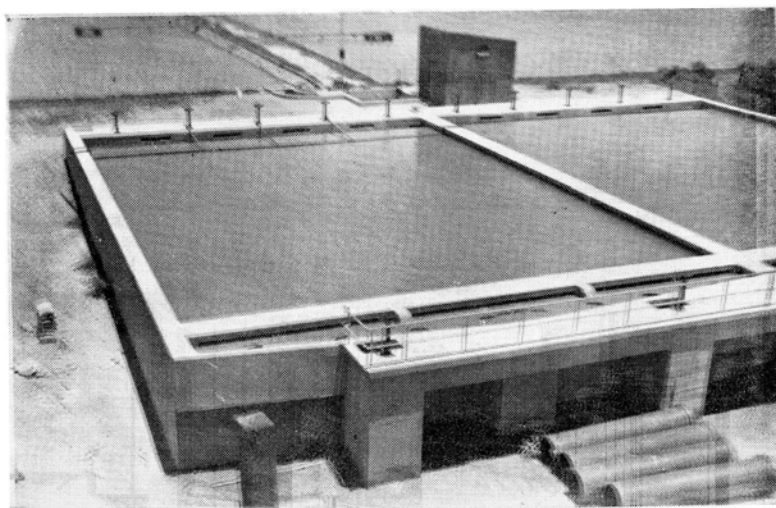
The City Council decided in the year 1945 to modernise the whole of the undertaking, and engaged Messrs. Campbell and Bernstein as Consulting Engineers, by whom the scheme, now nearing completion, was designed. This scheme incorporates up-to-date features in design and construction, as is shown by the following descriptive details :

The new Intake in the Vaal River will consist of a reinforced concrete tower 75 feet high, in which are installed 15" Drysdale Centrifugal Single Stage Low Lift Pumps, driven by 140 h.p. electric motors. These motors are installed at the top of the tower, and the pumps are positioned below the surface of the river. A travelling screen, extending from the motor room to a point below the penstocks, and driven by an electric motor, prevents the entrance of large particles of foreign matter. The Intake is connected to high ground on the river bank by means of an approach bridge, which is more than 500 feet in length and extends from the motor room floor to the entrance pier. This design feature was necessitated by the fact that the Vaal River has on occasion risen nearly 40 feet. The river water will be pumped through an 18" diameter cast iron main to the Purification Centre.

Flow Sheet.

Raw water is pumped from the Intake to the centripetal grit tanks in the Purification Centre, where grit and heavy sludge are precipitated and discharged as required by sludge valves provided in the bottom of the cone-shaped tanks. Chemicals for softening and coagulation are added here and also in a Distribution Tank, which is equipped with an air-operated mixing device. The water then flows into the combined Flocculator and Clarifier, then from the Clarifiers into the main Sedimentation Tanks, which provide for a long

period of quiescent settlement. The settled water flows to the Rapid Gravity Filtration plant, before passing into a 500,000-gallon Balancing Reservoir. The filtered water is drawn from this reservoir by "High Lift" Pumps, which feed an 18-inch and 24-inch diameter rising main 17 miles in length — the distance between the works and Kimberley. The static head is 450 feet, and the total head at 4.5 m.g.d. is about 700 feet.



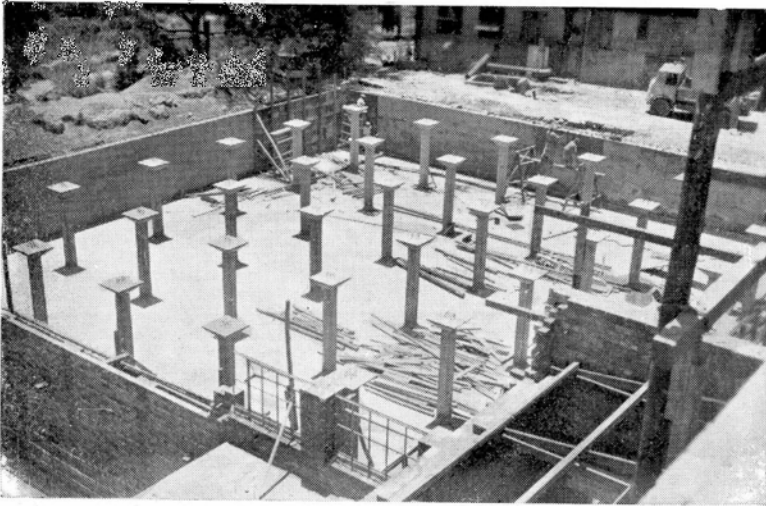
Flocculator and Clarifier.

The new Clarifier, with the old Sedimentation Tanks in the background.

Purification Plant.

Chemical Feeding.

An electrical goods hoist has been installed to carry chemicals up to the chemical storage floor, and an overhead gantry carries the chemicals to the various bins. This gantry also runs from the bins to the hoppers of the Candy Dry Feeders, which project through the floor to the Chemical Feeder floor below. The whole system is clean and economical of labour. A feature of this section of the scheme is the very flexible arrangement, five dry feeders and two solution feeders being installed, for lime, soda ash, aluminium sulphate, sodium aluminate, calgon and copper sulphate, or any other chemicals that experience may require. Calgon is fed into the filter inlet pipe to prevent the precipitation of calcium on the filter sand and in the water mains.



Balancing Reservoir.

Illustration shows the 500,000-gallon balancing reservoir under construction. It is underground in front of the main building, and is connected between the filtration plant discharge and the high lift pumping suction.

Chloramine Plant.

Chlorine and ammonia will be fed into the filter effluent pipe by means of recording machines.

p.H. Control.

Recording pH meters are to be installed to raw, clarified and filtered water.

Filtration Plant.

This consists of 6 Candy Rapid Gravity filters, fitted with electro-hydraulic controls. A control cabinet, from which all operations for cleaning are conducted, is installed in front of every one of the filters, each with a capacity of one-million gallons per day.

Metering System.

The flow of water in the various sections of the works is fully metered, and all meters are grouped on a large Meter Panel. This panel, manufactured by Messrs. Geo. Kent & Co., Ltd., is extremely attractive, and accommodates recording pH meters, Venturi meters, valve control signals, water level recorders, etc.

High Lift Pumping Plant.

This consists of 5 units, each of the 4 stage type centrifugal pump, manufactured by W. H. Allen & Co., driven by B.T.H. motors of 620, 620, 390, 390 and 325 H.P. The 620 and 390 H.P. units can be operated in parallel to pump 4.4 million gallons per day.

Building.

The Purification Centre is of modern design, with its elevations in face brick of dark brown and golden brown colour, and with window surrounds in cream. The Entrance Hall wall and columns are tiled in dark green and light mottled green, and the high lift pump room, auxiliary pump room, chemical room, chemical feeder room, etc., are all tiled up to a height of 5 feet.

Rising Main.

A seven-mile section of the 18-inch Rising Main has now been replaced by a steel main, lined with concrete to provide an internal diameter of 24½ inches, designed for a flow of 9-million gallons per day, when required.

Service Reservoir.

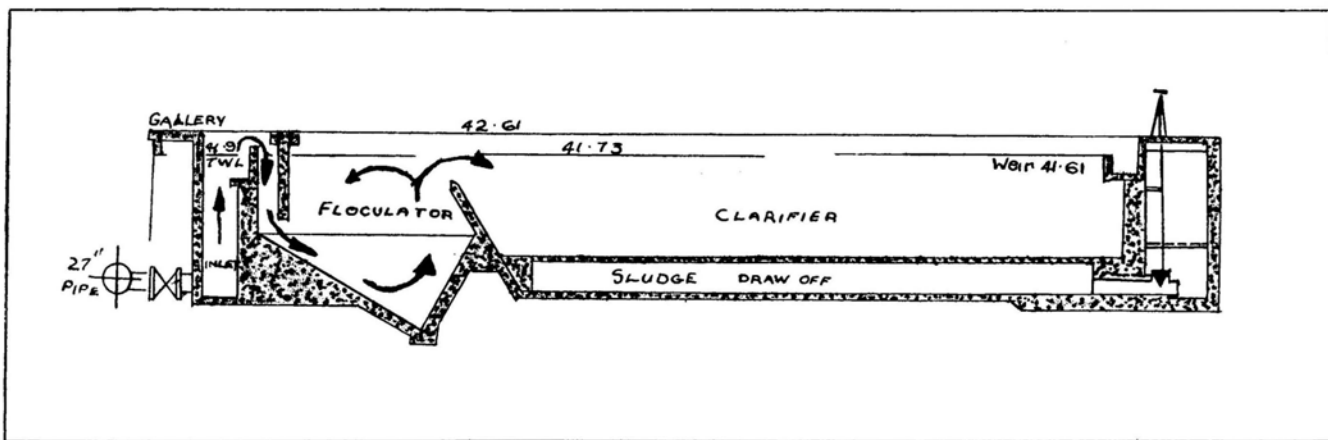
The construction of a 5-million gallon capacity reservoir has commenced. This will have mass concrete walls complete with reinforced concrete floor, columns and roof. The construction of a 100,000-gallon tank in reinforced concrete, elevated to provide a height of 75 feet from ground level to the bottom of the tank, and a new pump station and meter repair shop, are also included in this scheme.

Distribution System.

The distribution system was completely checked and re-mapped, and the whole system has been re-designed to ensure that an adequate supply of water of high quality will be available to every consumer, and particularly to the Industrial Sites.

General.

A water softening plant is incorporated in the new Purification Centre, and a fully equipped laboratory. The source of supply consists of a weir across the Vaal River which retains approximately 1,000,000 gallons of water. This weir is only 6 feet in height, and extra storage could be



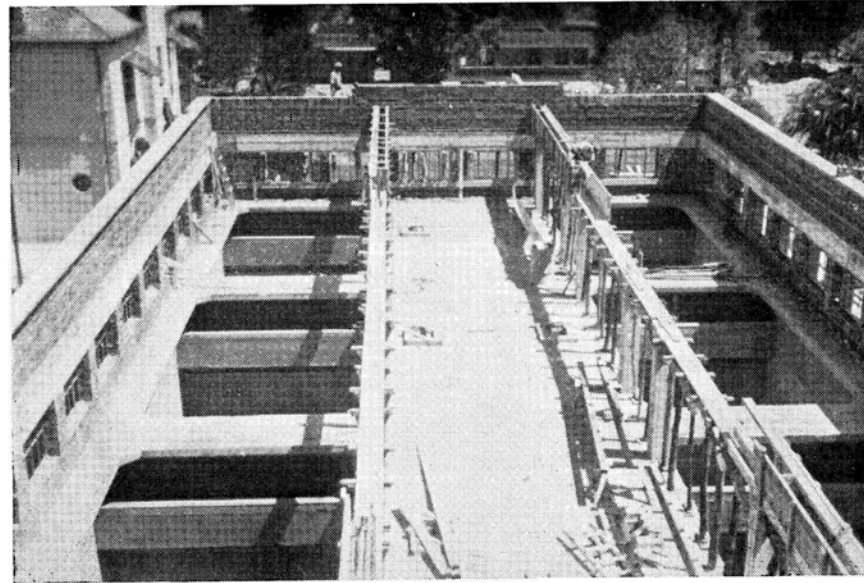
Sketch of Clarifier.

provided at a low cost, should the draw off from the Vaal River, in the Transvaal and Northern Free State, increase to such an extent that a greater reserve is desirable.

The sketch of the Clarifier shows how the incoming raw water in which pin-point floc is formed by the addition of coagulating chemicals, is caused to flow with a rolling motion in the flocculator section. The reaction in the flocculator is very efficient; the water passing into the Clarifier section is laden with heavy floc which sinks rapidly to the hopper-shaped bottoms, from which the silt is drawn off by sludge valves. The retention period is 2 hours, which is followed by quiescent settlement in the existing tanks, retained for that purpose, for from 8 to 12 hours, depending on the rate of draw off.

It is anticipated that the Purification Centre will be in operation by November, 1948, and the new Intake and Service Reservoir in June, 1949.

We cordially acknowledge the co-operation of Mr. W. P. Davis, M.I.Cert.E., A.M. (S.A.), I.E.E., City Waterworks and Mechanical Engineer, Kimberley, in the compilation of this article.



Rapid Gravity Filtration Plant.

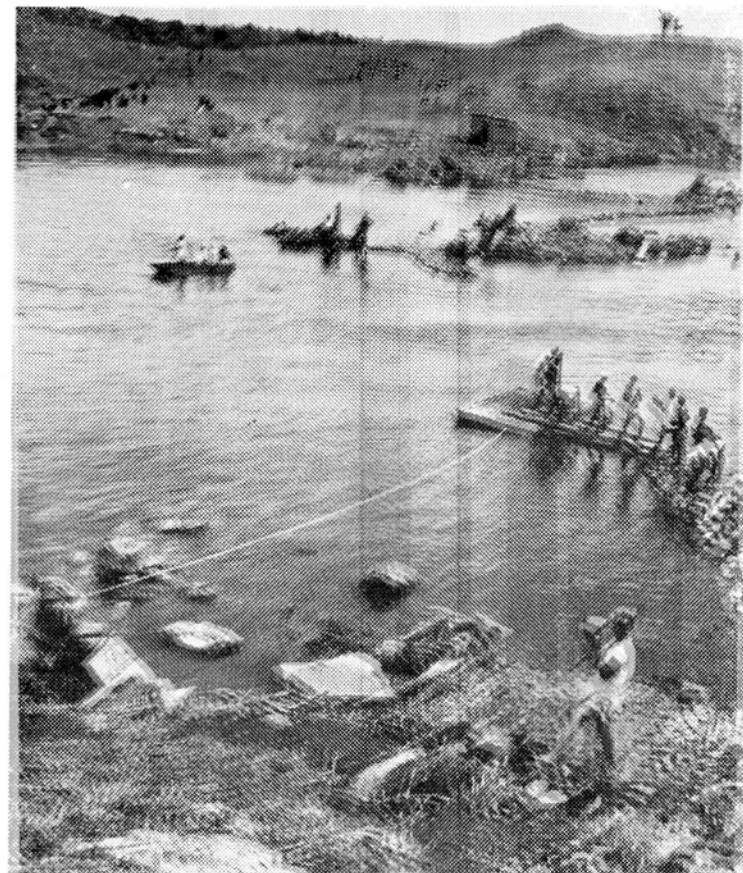
Illustration shows the above under construction, before the top floor was constructed. The centre portion is the pipe gallery, above which will be the operating gallery.

£7,000,000 HYDRO-ELECTRIC SCHEME FOR UGANDA.

The new £7,000,000 sterling hydro-electric scheme proposed for the harnessing of the Owen Falls in Uganda will have far-reaching effects on the economy of East Africa. The Owen Falls are near the town of Jinja, Uganda, on the Victoria Nile approximately one-and-a-half miles from the Ripon Falls where the river leaves the lake. The scheme provides for the construction of a 60-ft. high and 220-yds. long concrete dam which will provide control over the level of 26,200 square miles of Lake Victoria, and involve raising the level of the lake by 3 feet.

The total ultimate cost of the whole scheme, based on a power plant installation of 120,000 kilowatts, is estimated at £7,120,000.

To afford easy access to the mid-stream island from which this picture was taken, a stone causeway is being built from the west bank. The river at this point is only two or three feet deep.



THE PLANNING AND CONSTRUCTION OF NEW TOWNS.

by

P. R. ANDERSON, B.Sc. (Eng.), A.M.I.C.E.,
A.M.T.P.I. (Associate Member).

This paper, which makes particular reference to Vanderbijl Park, was presented at the 27th Annual Conference of the Institution of Municipal Engineers (South African District) held this month at Pietermaritzburg.

A. The Conception of Vanderbijl Park.

SOUTH AFRICA is at the first stages of a great change which has been likened to the Industrial Revolution of Great Britain which took place in the 18th Century. That this is so, is evidenced by the flow of capital into South Africa for industrial enterprises, and the surge of labour from the rural areas to the towns which is causing such concern to the Government and Local Authorities.

In South Africa not more than one-third of the population is resident in Urban Areas. In the industrialised United States of America this figure is two-thirds. In Great Britain, the figure is even higher. Quite clearly South Africa is in for an era of Urban expansion such as it has not experienced before and, most regrettably, is ill-equipped to handle. The experience of Vanderbijl Park, which can be likened to a Laboratory experiment under controlled conditions in the creation of that natural phenomenon, a town, must be of value as a testing out of theories both of the Government of Urban Areas and of the construction of towns. Its value should by no means be limited to the acquisition of knowledge in the planning and construction of "New Towns", but should also be of value in the extension of existing towns.

The "New Town" of Vanderbijl Park is a Planned Industrial Town, which rose directly from the necessity of the South African Iron and Steel Industrial Corporation, Limited, to increase their steel output. Since the site at Pretoria is incapable of further expansion, a search was made for a suitable area for the establishment of an additional Steel Works capable of producing two million tons of steel per year.

The first requirements of the new site were power, water, and cheap and suitable land. The secondary requirements were the availability of transport both by road and by rail. It goes without saying that the site required to be centrally placed with regard to the many raw materials necessary for the Steel Works, which raw materials are, unfortunately for South Africa, widely scattered. The site had also to be centrally situated to the market for the finished product. The availability of labour was not a serious consideration, as it was thought that labour was the most flexible of all requirements and would follow such a large industry once this was established. The high priority given to water in the selection

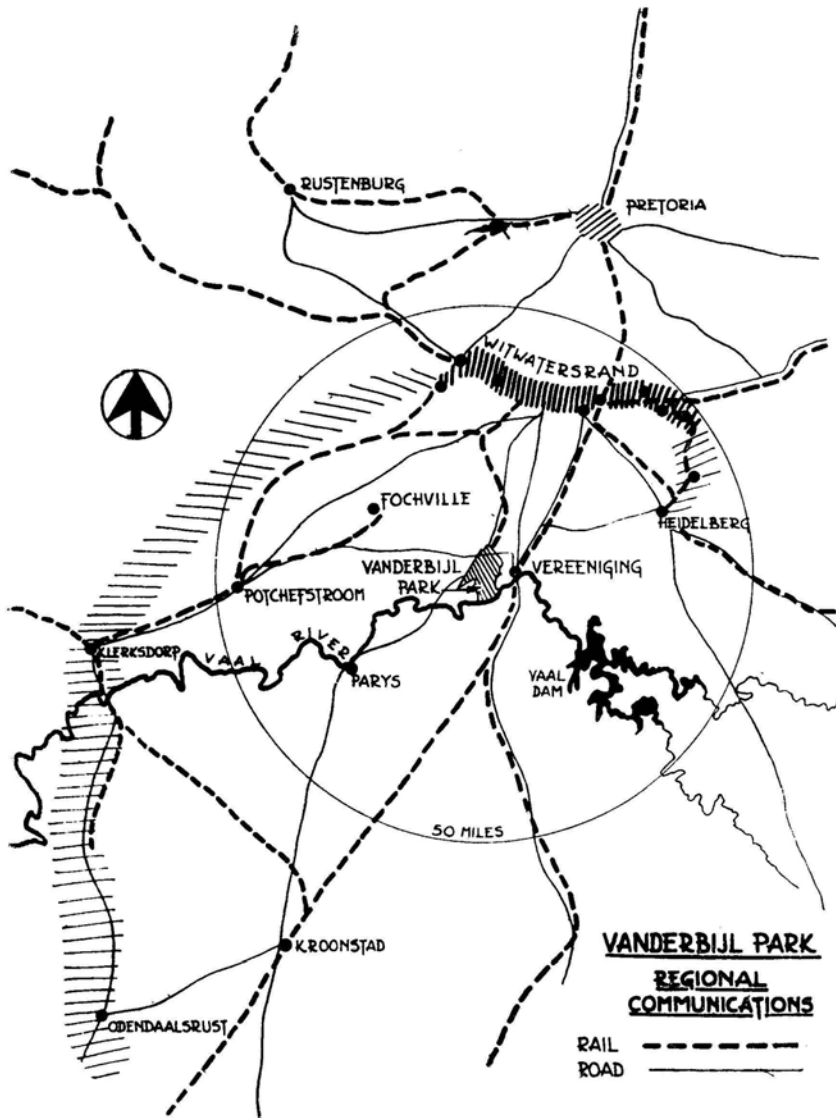
of the site need not be stressed in view of the many papers and articles underlining this all important subject in South Africa to-day.

A site meeting the above requirements was found immediately west of Vereeniging in the Transvaal. This site is within 15 miles of the two largest power stations in the Southern Hemisphere, let alone South Africa, and is upon the banks of the Rand Water Board Barrage on the Vaal River, which Barrage supplies the water for the Witwatersrand and Pretoria. The location of the site is shown on the accompanying diagrammatic Plan No. 1.

The Management of Iscor (the familiar shortening of the South African Iron and Steel Corporation, Limited), are well known for their concern for the interests and welfare of their employees. This is evidenced by the numerous and remarkably well run and supported institutions such as the Iscor Medical Benefit Fund, the Iscor Recreation and Social Club, the Iscor Housing Utility Company, etc., etc., and from this concern of the Management there naturally sprang a desire that the employees of the new Steel Works should be adequately housed, provided with the other amenities for their well being, and that they should not be in the hands of land and building speculators when compelled to move to a new site for employment. That this interest of the Management in the welfare of their employees pays dividends, is proved by the amicable industrial relations which have always existed at Iscor and which were borne out by Iscor's fine record both during and since the war.

The decision was accordingly taken that in addition to land for the Steel Works, a sufficient area should be purchased for the creation of a housing scheme for the employees.

From this decision it was the next and logical step, and a step the wisdom of which cannot be doubted, to provide for the establishment of those many heavy and light industries necessarily closely associated with the production of iron and steel. A "New Town" was to be planned and constructed of which the population, white and black, should number about 250,000 persons. The figure of 250,000 persons was chosen as the optimum figure for a town, which should be self sufficient, that is not a satellite town, and yet large enough to offer the residents a well assorted range of employment allied with ample opportunities of social well-being together



Plan No. 1.

with economy of public utility services and administration.

The area of ground purchased measures to-day 39.67 square miles or 25,386 acres.

The difficulties of the synthetic creation of a "New Town" cannot be over estimated. South Africa is without precedent of such an undertaking and indeed the world has but half a dozen examples in modern times of town building on the scale of Vanderbijl Park. There exists little to guide, but far worse than this is the paucity of knowledge of the existing conditions in towns and particularly of the conditions peculiar to South African Towns. This dearth of knowledge is little known, and seldom appreciated, but is the most serious of all handicaps, not only in the creation of "New Towns" but in the expansion of existing towns. Indeed, Professor J. D. Bernol, M.A., F.R.S., has stated that one does not know enough about towns to be able to plan them scientifically—there is considerable lack of knowledge on such questions as habitation, distribution, production and civic life. Social science is among the newest of sciences, still sadly in the state of determining facts from which to establish theories. This is all the more clearly brought home in an enterprise such as Vanderbijl Park, a test-tube town undertaken before

the essential virus of urban development has been isolated.

A process of trial and error has necessarily had to be followed and only because it is considered that the publication of what has been accomplished to date might be of value to others faced with similar and allied problems that this paper has been undertaken. Town Planning has been said to be the application of common sense to the problems of Urban Development. It is perhaps on this sound, if unexciting, level that the construction of Vanderbijl Park has been undertaken and those who may be expecting some striking and new departure in Urban Development on lines advocated perhaps by Frank Lloyd Wright or Eliel Saarinen will be disappointed. The responsibility for the expenditure of some millions of pounds and the ordering of the daily lives of many persons is most sobering and not a responsibility to be undertaken lightly.

It is right and proper that tribute should be paid to the inspiration and breadth of vision of the founder of Vanderbijl Park, and after whom the town is named, Dr. Hendrik van der Bijl. It is inevitable that at times the aims and objects of Vanderbijl Park are lost in the hurly burly of construction. It is at such times that the guiding hand of Dr. van der Bijl steadies the tiller and keeps the undertaking on its right course.

B. Organisation.

Before proceeding with an explanation of the planning and construction of Vanderbijl Park, it will be of value and assist towards clarity of thought if the organisation of the body responsible for Vanderbijl Park was explained and some account given as to how this body came about.

A new department, the Town Planning Department, was established by Iscor to plan the "New Town." It would appear inevitable, and more so with a venture of this nature where there existed little previous history to guide, that some time must be devoted to getting to grips with the problem, to the collection of data, and to the clarifying of the aims and objects. Nearly two years was spent by this department before any clear picture of the "New Town" began to take shape. Considering the magnitude of the undertaking, this time and expenditure of money cannot be considered lost and the subsequent speed of development was due in no small part to the thought and study of these two years. Indeed it is to be prayed that should ever another and similar undertaking be launched, there should be this initial study period before construction is put in hand. We cannot claim that the planning and construction of Vanderbijl Park is without faults, but we are indeed thankful that time did not force on us the decision to proceed with construction on some of our earlier plans.

In 1944 the decision was taken to establish, under Section 21 of the Companies Act No. 46 of 1926, an "association not for profit", better known as a Public Utility Company. This Public Utility Company replaced the Town Planning Department of Iscor. The Vanderbijl Park Estate Company was registered on the 28th December, 1944.

The directors of the Estate Company are nominated by Iscor, and the Estate Company is non-profit making in as much as there are no shareholders to receive dividends and any excess of income over expenditure is required to be spent in the interests of the town. That the Company by its constitution can have only one object, the interest of the "New Town," places it in a very strong position as compared with a normal commercial concern and yet, being a commercial

concern, it is able to take speedy and independent action such as would be permitted to no Local Authority.

The first act of the new Company was to purchase from Iscor at nett cost the balance of the area of Vanderbijl Park not required for the establishment of the Steel Works.

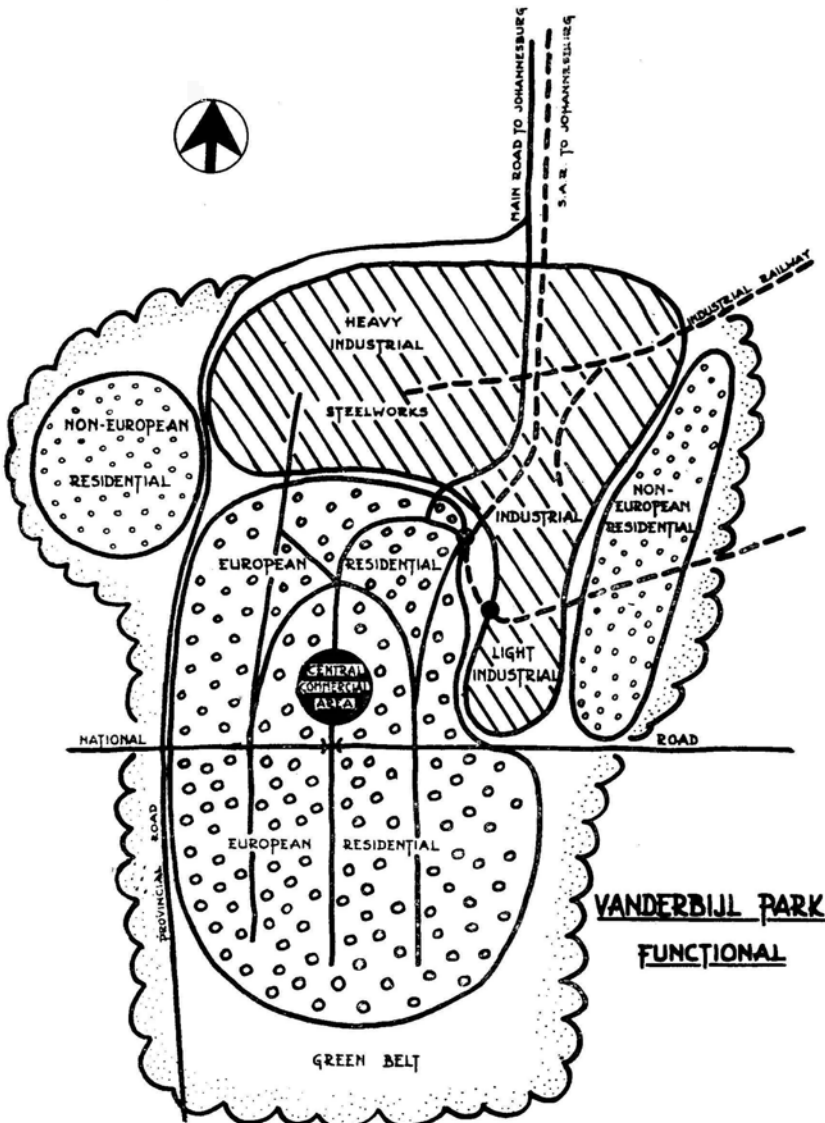
Parallel with these searchings for the right and proper body to undertake the planning and construction of the "New Town," were other searchings for a suitable Local Authority to carry out the requirements of the Local Government Ordinance (Transvaal). The area of Vanderbijl Park originally fell within the jurisdiction of the Peri-Urban Areas Health Board with headquarters in Pretoria, over 80 miles away. A Local Committee was constituted but the Peri-Urban Areas Health Board was very newly formed and was still clarifying its aims and objects. Vanderbijl Park suffered along with other Local Committees while a "modus operandi" was being hammered out. When the Peri-Urban Areas Health Board was declared "ultra vires" on a technical point and while the proper powers were being sought from Parliament to set it on its feet once again, the Administrator nominated a Health Committee for Vanderbijl Park, which Health Committee

remained independent when subsequently the Peri-Urban Areas Health Board was re-established.

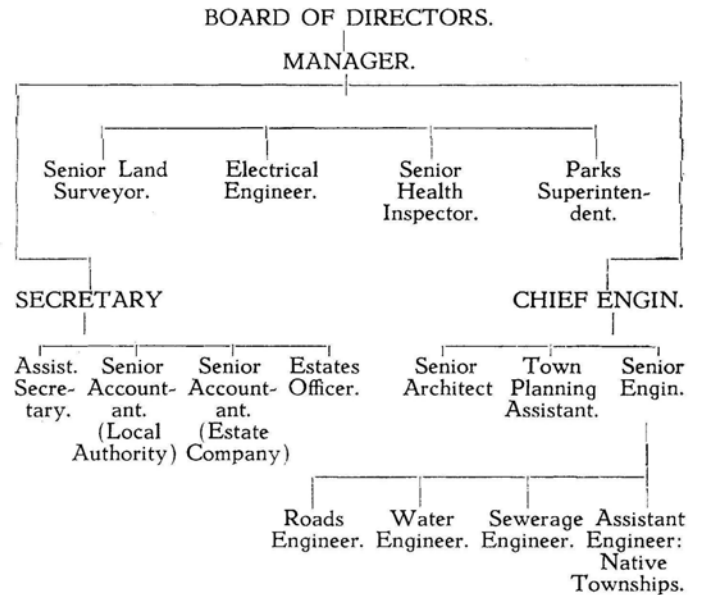
With a construction project the size of Vanderbijl Park and with nothing existing on which to secure a loan other than a faith in the future, it is clear that ways other than the normal must be sought to get the job done. To meet this difficulty the Health Committee has contracted out to the Estate Company, as it is legally entitled to do, all its responsibilities on the technical side, subject always to the approval of the Health Committee for charges made for services. The Health Committee has retained under its own direct control only such matters as it cannot contract out, and which indeed it should not contract out, as for instance control of Non-European Affairs and certain matters affecting Public Health and Licensing.

The contracting out of work by the Health Committee is obviously only an interim measure and the books of the Estate Company are so organised that it will be possible one day to hand over the work done to the proper Local Authority, with, we hope, the minimum confusion and discussion.

The staff chart of the Estate Company reads as follows:—



Plan No. 2.



The similarity between this organisation of staff and that of the City Manager System of the United States of America will be recognised. It is certainly an organisation which commends itself when a construction project must be carried out, where action must follow closely upon decision, and where decision cannot wait the slow and laborious passage through committees. In view of the oft expressed criticism that Local Authorities appear unable to get things done, a further study of the City Manager System is commended.

C. The Broad or Functional Planning of Vanderbijl Park.

The planning of a town can be likened in some respects to the design and construction of a machine. The pleasure of a machine, well designed, running smoothly, and serving its purpose efficiently, is not limited, in these days when all of us are to some degree mechanics, to engineers alone but can be appreciated by laymen as well. No excuse need therefore be offered if the Engineer's approach to Town Planning be similar to his approach to his other technical problems, for



Plan No. 3.

THE REGIONAL DEVELOPMENT OF WATER SUPPLIES IN NATAL.

by

E. A. MIDDLETON, B.Sc., A.M.I.C.E., A.M.I.W.E.,
Provincial Water Engineer, Natal.

This Paper was presented at the 27th Annual Conference of the Institution of Municipal Engineers (South African Districts) held this month at Pietermaritzburg.

SOUTH AFRICA'S attention is focussed with unprecedented attention on water, its conservation, development, and its uses. Statements recently made by the leading authorities in the country draw attention to the meagre state of our water resources, urging the proper conservation and planned development and the regulated and economic use of these as an essential to our future expansion and growth. As if to add point to these statements, nature and man have combined in the form of a severe drought and a titanic struggle to bring about a more rational appreciation of the vital part played by water in the social and economic structure of a nation. Those of us who have watched with alarm the steadily rising consumption of water as it rapidly approaches and overtops the maximum yield of the supply welcome the strong trend of talk towards these matters, for, uninformed as some of it is, it at least shows a healthy and growing understanding of one of South Africa's major problems, a problem which is not only ever present to local authorities but which faces the industrial expansion of this country with alarming reality.

The growing consciousness of the true value of water has prompted the author to present to this Conference a paper setting out the efforts which have recently been made to ensure that all communities in Natal shall enjoy the benefits of an adequate and wholesome domestic water supply.

Historical.

Anticipating the problems of reconstruction which would follow World War II, the Administrator of Natal appointed a Post-war Works Reconstruction Commission charged with the duty of investigating and reporting upon, among other things :—

- (a) the practicability of undertaking any general scheme of regional development within the Province, which by co-ordination of effort, would serve the needs of a number of towns and villages, particularly in regard to the supply of water and other essential requirements; and also the effect of such regional undertakings on the general development of the district; and
- (b) The priority and co-ordination of such schemes to meet industrial and population needs and to avoid future and remedy existing peri-urban slum congestion.

Of interest to this paper are the Commission's Second and Seventh Interim Reports on Domestic Water Supplies and matters relating thereto.

The investigations revealed a state of affairs calling for immediate action. The findings with regard to water supplied

to local authorities outside those of the cities of Durban and Pietermaritzburg are summarised below.

In the case of those towns which boasted a water supply, it was found generally that the method of purification and the standards attained were woefully short of modern accepted practice. The works themselves indicated a lack of foresight and courage in the future. Additions had been made from time to time in a piecemeal fashion and seldom were the works of sufficient size to encourage and meet even normal development of the community. The conditions which brought about this state of affairs were, principally, limited financial resources and lack of proper technical advice and control. In a few cases it could be said that the cause lay in a "penny wise, pound foolish" policy which failed to appreciate the importance of an adequate and wholesome supply of water to the health of the community and to its economic growth.

A more critical state was found to exist along the Natal South Coast, one of the most popular and extensive holiday resorts in South Africa.

Here it was revealed that, with but few exceptions, communities stretching southwards from Durban to Port Edward relied almost entirely on boreholes and rain for all their water requirements. When it is realised that practically all domestic waste is disposed of in Septic Tanks and French Drains, one may get some idea of the danger to health that exists in using water from boreholes in this area.

Such conditions could not arise if controlled planning had been enforced. They are the result of speculative and uncontrolled development, the worst enemy to healthy civic and economic evolution.

The problem then was :—

- (a) To provide a means whereby sound technical advice would be available even to the smallest community;
- (b) to ensure that water undertakings would measure up to modern standards, with a view to meeting both future requirements and providing water of the highest standards of purity. In other words planning of water works, whether large or small, and also the capital investment required to meet this, must be placed on a "long term" basis; and
- (c) to find some means of bringing the cost of adequate supplies within the scope of the smaller local authorities.

The Commission's recommendations were put forward in the form of a draft ordinance providing firstly for the estab-

lishment of a Statutory Board to have the following functions and duties.

- (a) to undertake the scientific and technical research on matters relating to water with special reference to the precipitation of rain in different localities; the situation and extent of catchment areas; the flow, direction of flow, purity and chemical composition of water in rivers, streams, springs, swamps and the like; the feasibility of conserving water for use for domestic purposes; the pollution of water used or which may require to be used for domestic purposes and the causes of such pollution and means to be employed in combating the same; and the purification of water however it may become polluted or contaminated;
- (b) to investigate new or additional facilities for the supply of water or for the co-ordination and co-operation of existing schemes so as to stimulate the provision wherever required of a cheap and abundant supply of pure water for domestic purposes;
- (c) at the request of the Administrator, to enquire into and report upon any matter affecting any existing schemes controlled by any corporation or local authority or by the Administrator in terms of the Village Water Supply and Public Works Act, 1897 and 1902 (Natal) and tender such advice in regard thereto as it may deem necessary or proper.
- (d) to advise any corporation or local authority when so requested by it, in regard to any matter affecting the establishment, maintenance or working of any scheme within its authority;
- (e) to report immediately to the Administrator and to the Chief Health Officer of the Union any evidence coming to its notice of bacteriological or chemical contamination of any water supply used for domestic purposes and transmit a copy thereof to the local authority as defined in Sections 7 and 9 of the Public Health Act, 1919, or the corporation in whose area such contamination has taken place, and also to the Secretary for Agriculture if such water supplies are used for the purpose of consumption by livestock; and
- (f) generally to advise and assist the Administrator upon such matters relating to schemes as are within his authority under this Ordinance or any other law;

and with authority to co-operate with the Irrigation Department or any person or bodies of persons for purposes of research or any other matter referred to above.

The establishment of such a Board with the functions and duties outlined above would meet the need for making available to the smaller authorities technical advice and guidance, and at the same time ensure that in future water works would be designed and constructed in conformity with accepted modern standards.

Secondly the draft ordinance provided for the constitution of Regional Water Supply Corporations, the functions and duties of which are:—

- (a) to establish or acquire and maintain and work a scheme or schemes for pure and adequate supplies of water to local authorities, Departments of Government, including the South African Railways and Harbours Administration, the Provincial Administration, persons, companies, and bodies or persons

corporate or unincorporate, engaged in mining, industry or the like, and other persons in local authority areas and townships situate within the defined area; provided that such supplies are required primarily for domestic purposes as defined in this Ordinance; and

- (b) to report immediately to the Administrator and to the Chief Health Officer of the Union any evidence coming to its notice of bacteriological or chemical contamination of any water supplies used for domestic purposes, and transmit a copy thereof to the local authority as defined in Sections 7 and 9 of the Public Health Act, 1919, in whose area such contamination has taken place, and also to the Secretary for Agriculture if such water supplies are used for purposes of consumption by livestock.

And thirdly it made provision enabling the Administrator to give financial assistance to local authorities wishing to carry out investigations into or to establish, acquire or extend a water supply scheme; and to make regulations governing the conduct of Regional Water Supply Corporations, the operation of schemes, the measurement of, charges for, standard of purity and the mode of supply of water.

With amendments, this Ordinance, known as the Water Supply Ordinance No. 21/1945, received the Governor-General's assent in November, 1945, and the Natal Water Supply Advisory Board was appointed in December of the same year.

In view of the implications of the Ordinance the Provincial Administration appointed an official to act as technical adviser to the Administrator, to advise on all matters pertaining to the development and use of water for domestic purposes.

The Regional Water Supply Corporation.

Two-and-a-half years have elapsed since this Ordinance was promulgated and a review of the events to which it has given rise show how greatly this progressive legislation was needed to meet the problems of water supply in Natal. But before going on to give a review of these events, a brief outline of the constitution of a Regional Water Supply Corporation will not be out of place.

The Ordinance gives the Administrator the power to define an area by proclamation and constitute a Regional Water Supply Corporation if this is considered to be in the best interests of the area.

For the purposes of the Ordinance a regional area is divided into two categories which are (a) local authority areas and (b) townships, the definition of a township being a township outside the area of jurisdiction of a local authority, including any area that has been sub-divided or laid out for building purposes or settlement or which is deemed by the Administrator to be destined for such purpose.

The Administrator appoints the members of the corporation, each local authority having the right to nominate one member, and townships to nominate such number of members as the Administrator may decide. Alternatively townships may be divided into two or more wards, each ward having the right to nominate one member. Members are appointed for four years, continuity being given by half the members first appointed retiring after two years.

A Corporation has the power to employ a full complement of technical, clerical and artisan staff, to fix and pay salaries

and wages, to raise money by way of loans, to purchase or lease land, water right and property of any description for the fulfilment of its functions, to acquire, construct and maintain waterworks; to enter upon any land for making surveys, to enter into contracts, to make and recover charges for any water supplied, and purchase water from other water companies or carry pipes across any public or private land.

Under the Ordinance a Corporation may supply water in bulk to local authorities within the defined area or in bulk or by retail to any consumer, whether local authority or individual on the "intake to tap" basis provided that no water shall be supplied to any individual consumer within the area of any local authority to which a Corporation is supplying in bulk. A Corporation may not supply water to any consumer outside the defined area nor to any consumer within the defined area but outside a local authority or township area, e.g., intervening farms, or agricultural holdings.

To defray expenditure a Corporation may assess, levy and collect an annual water rate on land within the local authority or township areas, or, if a water rate is not levied, sell water on the basis of a Schedule of Standard Charges approved by the Administrator, or both a water rate and standard charges may be imposed. The Ordinance allows great flexibility in this respect and no doubt each Corporation will adopt a method of meeting its expenditure best suited to its own particular area. The prices to be charged for water, whether by rate or tariff, are to be such as to cover interest and loan redemption charges, charges for renewing its existing assets and works, operation, distribution, maintenance and administration costs. Charges will be adjusted from time to time so that the Corporation's schemes shall be carried on neither at a profit nor at a loss.

Three points worthy of note are: firstly, that the power to define an area for the regional development and control of domestic water supplies and to constitute a Regional Water Supply Corporation rests with the Administrator, who may exercise his power at his discretion whether the local authorities are desirous of it or not. Secondly, that a Corporation is a Public Utility divorced from the influence of municipal politics; and thirdly, that it is given the same freedom as a local authority to conduct its own affairs. The Administrator has aimed at preserving the principal of autonomous control and responsibility and, apart from the normal control necessary to ensure the safety of public funds, the intention is that a Corporation should realise a full and proper responsibility in the supply of water to its consumers.

Progress Made Under the Water Supply Ordinance.

When the Ordinance was yet in draft form, authorities along the South Coast realised the many advantages which it would hold out for them. Two groups with their centres at Amanzimtoti and Port Shepstone instituted investigations along the lines of regional supply and presented a case to the Administrator for the formation of a Regional Water Supply Corporation in each area.

The Amanzimtoti Regional Water Supply Corporation was constituted on 4th July, 1946, and incorporated all authorities from the Southern boundary of Durban to the Illovo River. The Lower South Coast Regional Water Supply Corporation, constituted on 12th September, 1946, incorporated all authorities and three wards lying between Sunwich Port and the Impenjati River, but has since been extended to include Port Edward, the most southern point in Natal. Investigations

have been carried out to form a third Regional area comprising, Umkomaas, Scottburgh, Park Rynie and Umzinto, but up to date no solution has been found to overcome some practical difficulties this area presents. When this solution is found the water supply to local authorities and townships from Durban to Port Edward, a distance of about 112 miles, will be under the control of three Regional Water Supply Corporations.

The third Corporation, constituted in March, 1947, incorporated those authorities extending from Durban to Hillcrest, along the main Durban-Pietermaritzburg Road. The development of these townships, viz., Westville, Pinetown, Kloof, Hillcrest, Malvern and others is proceeding at such a pace that the lack of water is a positive danger to Public Health. Lying as these townships do along a ridge elevated far above any large perennial stream, and with none except the Umgeni River of sufficient size to meet a steady expansion and growth of the area, the only sound and economical solution lay in a combined effort. The Water Supply Ordinance provided the means for this to be done.

The most recent Corporation to be formed was that incorporating Dundee and Glencoe. These two towns, important centres in the Northern area of Natal, have for many years suffered from inadequate supplies and from exceptional periods of drought. The relationship in which they lie geographically immediately suggests a combined supply as the only sound solution. This was realised by the respective authorities, but negotiations fell through and all promise of a permanent solution to the critical state of their water supplies seemed as distant as ever. At this stage the Administrator took the initiative and exercised his powers under the Water Supply Ordinance. After a full discussion with representatives of each local authority, the Dundee-Glencoe Regional Water Supply Corporation was constituted in May, 1947.

Thus within two years of the promulgation of the Ordinance, four Corporations have been constituted, meeting the needs of thirty-one local authorities and wards and practically completing the immediate possibilities of regional control. Some facts and figures of these four Corporations are given in an Annexure to this paper.

One point that was raised early on in the history of the Regional Water Supply Corporation was that of financial assistance under the Irrigation Act as amended. This amendment, providing for financial assistance, applied to local authorities, but a Regional Water Supply Corporation is not a local authority as defined. Whereas each individual local authority incorporated in a Regional area would in all probability qualify for financial assistance under the amended Act, collectively as a Regional Water Supply Corporation no assistance can be received. This aspect of the matter was taken up with the Director of Irrigation who ruled that a Regional Water Supply Corporation could not be regarded as a local authority, and therefore did not fall within the provisions of the Act, but it has been proposed that by making provision for financial assistance on the Parliamentary estimates a way may be found of overcoming this impasse.

Future Regional Development.

With the immediate needs of the Province practically satisfied as far as the regional development and control of water supplies is concerned, attention is now turned to the future. Before attempting to formulate any programme for

future expansion, it is necessary to understand and keep constantly in front of us three very important points. The first is that the present generation owes a duty to posterity to ensure that nature's gifts are not squandered but conserved and developed along carefully planned lines. To-day we are paying the price for the heritage left us by past generations profligate in the uses of these gifts. To-day we have not only to undo the ravages of the past but to ensure that these will not again occur. The second is that planning must be properly integrated, not dealt with in watertight compartments. All the requirements of a healthy and vigorous evolution must be studied and co-ordinated. Social, industrial, agricultural and commercial needs must be thoroughly understood before any plan can be prepared as to the proper way of using and developing our natural resources. The third is that, although such planning is National in character, each Province, each community and, in fact, each individual must be given the responsibility and privilege of assisting in the formulation of the plan, and in its administration, if it is to be effective.

The author does not propose to say any more on this vast and contentious subject. He is principally concerned with water. But it must be realised that social and economic expansion cannot be divorced from the development of water resources nor can the development of water resources be considered without studying, and dovetailing into the social and economic trend.

Like the other Provinces, Natal is experiencing a considerable degree of industrialisation and has much to offer the industrialist, but the key to this expansion is, as ever, water. The Northern Districts, holding out great promise of becoming one of the major industrial centres of the Union lie in an area of low rainfall and are poorly endowed with water as compared with other parts of the province: the time is rapidly approaching when the Umgeni River will be fully exploited and unable to meet the growing demands of Durban and its environs: coastal Zululand, particularly that area lying to the North of Empangeni, is destined to see in the not too distant future considerable settlement and expansion; standards of living of the urban natives are gradually being improved and this improvement will eventually spread to the rural native population. These are a few of the factors which will tax our water resources in the future, to say nothing of the water that will be required for power generation purposes. Visualising this, one is forced to the question "What are our water resources?" and to the answer "We do not accurately know." Hydrographic data, in Natal particularly, is painfully inadequate and with the object of answering the above question the Administrator has been in consultation with the Irrigation Department to establish a formula whereby the work of the Hydrographic Section can be supplemented by that of the Administrator's technical sections, particularly with regard to data required for the development of domestic supplies. As a result the Irrigation Department has agreed to construct river gauges in addition to those which it would normally undertake, on rivers selected by the Administration, the reading and recording of which will be the Administration's responsibility. The spirit of co-operation which has marked these negotiations augurs well for the future. Hydrographic surveys do not give a "Quick return" but engineers everywhere appreciate the value of the long term record. If a start is made to-day on a comprehensive survey, those responsible for developing our resource thirty years hence will find the results of inestimable value.

In the assessment of our water resources, a work which must precede their development, attention must be given to two other features. These are silt and pollution. Of the former it can be said that this is a feature that will add to the problem of river development in inverse proportion to the success attending the country's efforts of soil conservation. In the author's opinion the quantity of silt transported will show very little abatement in the next fifty years. Silt has an adverse effect on river development and a properly organised silt survey should be instituted in order to gain a proper appreciation of the magnitude of this adverse factor, of the effects of soil conservation in its reduction, and to assist in formulating means and designing works to make allowance for it.

The potentiality of river pollution grows with the expansion of industry, especially when that expansion takes place in rural areas. As one of the effects of pollution by trade wastes is virtually to reduce the country's water resources it is not to be overlooked or treated lightly in any programme of National or Regional planning. The Water Supply Advisory Board and Regional Water Supply Corporations are charged with the duty of bringing to the notice of the Administrator and the Chief Health Officer of the Union any bacterial or chemical contamination of water supplies used for domestic purposes. This is a step in the right direction, but in the absence of adequate powers to deal with the agency responsible for contamination it does not help a great deal. There is need for much research into this problem of trade waste pollution, of the steps necessary to control it, of the degree of purification required and the methods of purification, and of the effects of untreated and treated trade wastes on fish and aquatic life. At the present moment legislation under the Health Act controlling trade wastes is applicable to specific areas, but presents no uniformity nor is it generally suitable. It is to be hoped that no time will be wasted in bringing under proper control this question of river pollution.

Then there is the question of the law regulating the use of water and governing riparian rights. There is no need to deal with this here except to refer the reader to Dr. F. E. Kant-hack's most timely remarks on this question in his presidential address to the Associated Scientific and Technical Societies of South Africa in 1946, and the Director of Irrigation's Report for the period 1st April, 1940, to 31st March, 1946.

Conclusion.

We are at the beginning of an era of long term planning, an era in which the results of planning are not immediately apparent and the benefits of which can not all be measured in cash. The author has attempted to place before the conference as briefly as possible what is being done in Natal to promote the development and use of domestic supplies and future regional planning. But only a start has been made. There is much to learn and much to do. This much is however evident that first things must come first, and a more accurate assessment of our water resources, and of the agencies tending to reduce them or to prevent their proper use, must be made before their economic development can be planned. It is also evident that the work of the various bodies engaged in the development of our natural resources and in national and regional planning, or in any phase of these, must be properly integrated if progress is to be made.

The efforts of the Natal Provincial Administration have

proved how great the need was to provide technical advice and assistance to the smaller local authorities. In the past two years the Water Supply Advisory Board has rendered advice and assistance to nearly fifty local authorities, in addition to regional water supply corporations, and in doing so has gained very valuable knowledge of the Province, its natural resources, its problems and local difficulties. Much has also been done to study and promote the development and use of water. Based on the experiences of the past two years, during which the Water Supply Ordinance has been operative, it is the author's contention that any programme of National Planning will be attended with a far greater degree

of success if a decentralised system of administration is adopted. A co-ordinating body is essential, and the lack of such a body is at the moment sorely felt, but the experience and organisation of local bodies should be made full use of to study needs and undertake local and detailed planning along broad principles laid down by and with the guidance of the co-ordinating body, to carry these plans to fruition.

In conclusion the author would like to acknowledge his indebtedness to the Administrator for permission to present this paper, and at the same time point out that in view of certain deliberations now taking place much of the subject matter originally completed had to be omitted.

OVERSEAS NEWS AND PRACTICE.

ORDNANCE SURVEY.

The Ordnance Survey is now completing a new survey of Britain. This survey will be more accurate than ever before, which should ensure that Britain maintains its reputation as the best-mapped country in the world.

THE first map-makers were men of resource. When facts failed, they drew liberally upon their imaginations to gratify their own ideas of geography or the wishes of their patrons. Modern cartographers are just as enterprising, but their resources are the resources of modern science. Map-making, like navigation, is no longer "by guess and by God." To-day it is largely by tape and by trig., that is, a combination of accurate field survey and mathematical calculation.

Importance of Ordnance Survey.

Britain was the first country to realise the importance to the State of having accurate maps of home territory. The Ordnance Survey was founded in 1791 (its name is a clue to the importance attached to it by the Army), to undertake the construction of a map of Britain on the scale of one inch to one mile. Teams of surveyors began the "first triangulation" of Britain, dividing the country up into about 250 imaginary triangles with sides averaging thirty miles in length. The principle of mapping by triangulation is based on the axiom that if one side can be established by actual measurement and two angles are known, the length of the other two sides and the remaining angle are easily found. In practice this method is only used in war-time or in exploration surveys. For accurate work the three angles are always measured, and adjusted to add up to 180 degrees plus the spherical excess, before the two unknown sides are computed. Mathematical calculation co-ordinates the fixed points of the many triangles needed.

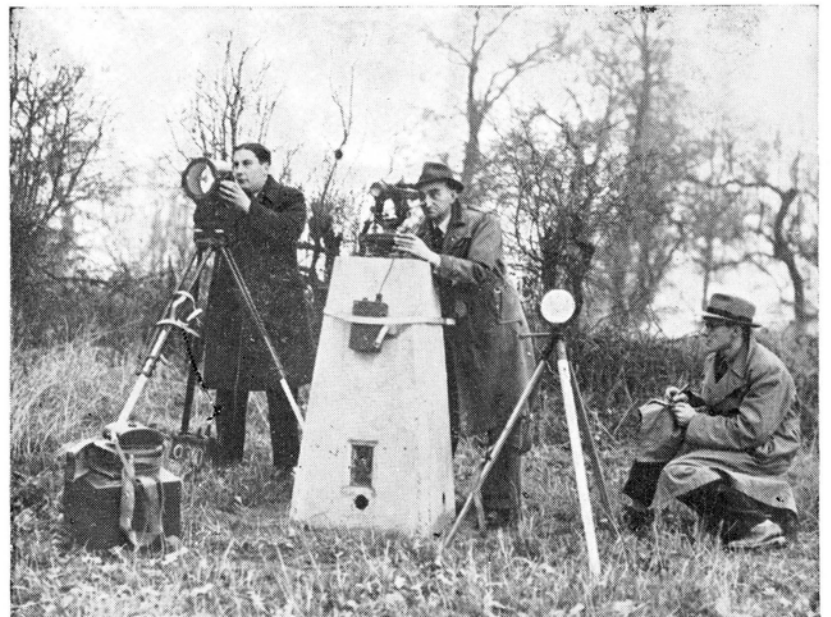


Fig. 1.
Survey team in the field. Resting his instrument on a concrete pillar, the observer takes a sight on another fixed point indicated by a lamp. Another surveyor stands ready to show his lamp after aligning it with the pillar, so as to facilitate a reverse sight in the opposite direction. The heliograph shown alongside of the pillar can be used in strong sunlight. On the right a member of the team is shown recording the readings.



Fig 2.

In transverse work, measurements are read off at right angles to a straight line already determined by chain measurement. Maps to the largest scale enable the width of a pavement or road to be read off accurately, correct to a foot.



Fig. 3.

Operator at work with a calculating machine used to check observations and measurements taken during a survey. Note the triangles on the map in front of him. It is necessary to arrange for check measurements to be made when discrepancies are detected.



Fig 4.

Glass negative is retouched to remove blemishes before handing over to the "helio" department for reproduction. Minute spots in the emulsion are filled in with opaque paint.

Sighting Points.

The secondary triangulation, some time later, broke down the primary triangles with sides of an average length of five miles, and the tertiary produced still smaller triangles. To-day there are thousands of fixed points in the country, each a sighting point, at the corners of one or more of these triangles. Hitherto, the surveyors marked their sighting points by burying bricks, which had the disadvantage that when the map came to be revised, it sometimes took hours of digging, in all weathers, to locate the vital landmark. Now the fixed points are obvious to all, because they are marked by concrete pillars, erected on foundations so keyed into the earth that nothing short of an earthquake will move them. On the top of each pillar is a stand for the three legs of the theodolite, used by the surveyor to measure the angles. Wherever tall buildings or trees interfere with the line of sight in flat country, high temporary towers, which are carefully designed, may be built so that the theodolite will not sway out of position while a sight is being taken. Each pillar has a "National Grid" reference number to locate it; the grid is a system of squares covering Britain, with a zero point just south-west

of the Scillies. Any place can be pinpointed by reference to its distance east and north of the zero point, using these squares to provide the measurements. In addition to the map to a scale of one inch to the mile, maps have been made of one-sixteenth, one-tenth, one-quarter, one-half inch, six inches, twenty-five inches, and (in some areas) fifty inches to the mile.

Ordnance Survey Maps.

A new Ordnance Survey map is being produced on a scale of two and a half inches to the mile, a scale particularly useful to the rambler. The complete map of Britain on a scale of 25 inches to the mile covers 51,546 sheets, and gives an amazing amount of detail. On a map to the scale of 50 inches to the mile, it is no exaggeration to say that every gatepost is marked. Significantly, Ordnance Survey hesitation about the greater use of aerial photography in map-making is partly based on the fact that an air photograph will not tell you (a) what a fence or wall is made of; (b) the exact size of a house — because of overhanging eaves; (c) the nature of shrubbery or undergrowth, or what exists beneath trees in leaf; (d) whether a certain path is of gravel or cinders, and so



Fig. 5.

Bromides are hung up to dry. These photographic prints are used when only one or two copies of a map in one colour are required.

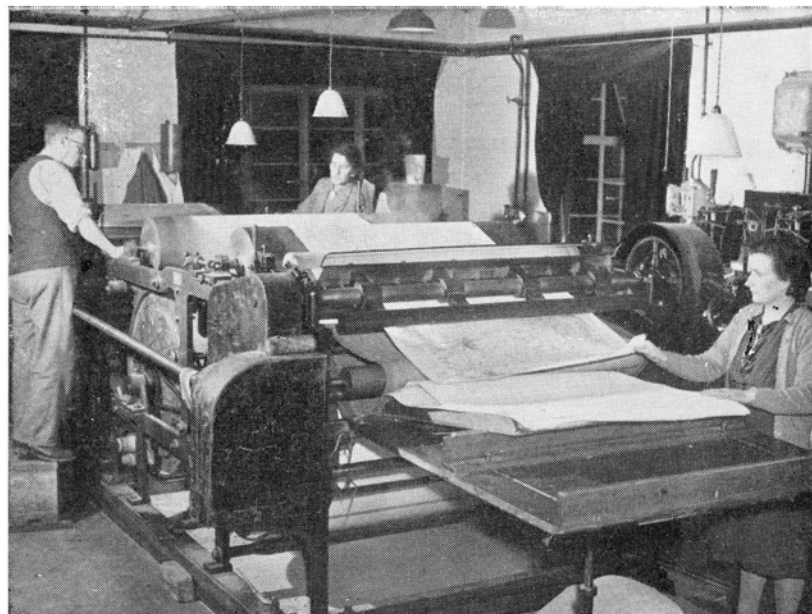


Fig. 6.

The machine illustrated, the only one of its kind in Britain, automatically mounts paper maps on linen.



Fig. 7.

An existing map in the course of revision. Corrections are marked on the enamelled square, composed of four standard squares each covering exactly a quarter of a square kilometre. The machined edges of each square are correct to thousandths of an inch.

on. All these seemingly unimportant details must be checked, even though they may not be required for incorporation in the map. These details provide valuable information which is recorded so as to be available to borough surveyors and other interested parties.

Field Survey.

This field survey is the work of mobile teams, who have to use caravans and lorries when they are in remote areas of the country. Working from co-ordinated points, they make traverses through the towns, measuring a succession of straight lines with a surveyor's chain, and measuring off the distance of objects at right angles to the chain. Their results are checked by calculation, usually by mechanical means, at headquarters. A discrepancy of more than a foot or so must be accounted for, by re-measurement and re-calculation, until accuracy is assured. In every case, the preliminary skeleton, drawn in red on an aluminium plate, is checked in the field by an examiner. There are at present about 2,700 field workers employed by the Ordnance Survey throughout Britain, while about 1,500 are engaged in map production at the two main centres in Southampton and Chessington.

New System of Revision.

To facilitate the periodic revision of Ordnance Survey maps, a new system has been introduced in recent years. Revision points, known as R.P.'s, are chosen on walls, gratings, drain covers, and anything else which is likely to be unmoved in ten to twenty years or more. The R.P.'s are photographed and their grid co-ordinates are calculated. Each photograph is filed for reference. In future, revision teams will have co-ordinated fixed points to work from, and there will be a great saving in time and labour. At present, the Ordnance Survey, which is officially part of the Ministry of Agriculture, is engaged on the final stages of an unusually elaborate survey. This is a publication which may be described as a modern Domesday Book in maps, of which 33 exist or are forecasted, each in two sheets measuring about 3 ft. 4 ins. x 2 ft. 8 ins. Several Government departments have collaborated in this atlas, which was begun during the war. Many kinds of physical and statistical details are given—types of farming land, quality of soil, distribution of population, situation of steel works, coal mines, iron ore workings (with details of labour employed, yield expected, etc.), power stations, transmission lines, roads, canals, fishing grounds—nearly everything a map can show. Such material will be invaluable to the town planners, and to the planners of industry and commerce. This new "national atlas" supplies these details in a convenient form, for the first time.



Fig. 8.

Large wall map of Wales, on a scale of 1 inch to the mile, covers about 144 square feet. This was specially commissioned by the Ministry of Transport

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.

AIR COMPRESSORS :

Johannesburg Municipality : Air compressing equipment. Stores Department, Johannesburg. No. 553. Due, 10/9/48.

BOILER PLANT, ETC.:

African Explosives & Chemical Industries, Ltd.: Supply and erection at the Modderfontein Dynamite Factory of the following: Three 30,000 lbs. per hour boilers together with all auxiliaries and instruments. **Alternatively :** Two 50,000 lbs. per hour boilers together with all auxiliaries and instruments. Tenders for the supply of new equipment only will be considered. The Controller of Purchases, 14, Hollard Street, Johannesburg. Due, 30/9/48.

BUILDINGS, ETC.:

Public Works Department, Pretoria : Springbok, C.P.—additional offices and alterations and repairs to public offices and post office. P.W.D. 82. Qumbu, C.P.—police station and quarters. P.W.D. 86. Due, 9/9/48.

ELECTRICAL EQUIPMENT, ETC.:

Cape Town Municipality : (a) Electric lamps, Specification 1499/1948, due 5/10/48; (b) Porcelain weatherproof pole fuse units for consumers' connections, Specification 1500/1948, due 6/10/48; (c) Overhead line material, Specification 1498/1948, due, 7/10/48; (d) Metalclad multi-hole connection blocks, Specification 1501/1948, due 8/10/48. City Electrical Engineer, Cape Town.

Durban Municipality : Electric cable, 11,000—6,600 and 660 volts, E. 2175, due 15/10/48; E.H.T. switch gear for 10 sub-stations. E. 2178, due, 5/11/48; 33,000-volt cable, etc., E. 2179, due 12/11/48; 6,600-volt switch gear, B. 2174, due 8/10/48; Transformers, E. 2673, due 1/10/48. Electricity Department, Durban.

Ermelo Municipality : Supply, delivery and erection at the Ermelo Power Station of the following generating plant: (a) 1 only 400 k.w. turbo-alternator with auxiliaries and steam boiler, etc., **alternatively** (b) 1 only 800 k.w. turbo-alternator with auxiliaries and steam boiler, etc. Town Engineer, Ermelo. (Copies of specifications and conditions on payment of £2-2-0 per copy). Due, 30/9/48.

Irrigation Department, Pretoria : Copper Conductors and armoured cables, Irr. 97. Diesel electric generating sets, Irr. 99. Outdoor miniature magnetic circuit breakers, Irr. 110. Due, 16/9/48. Transformer, Irr. 133. Due, 30/9/48. Electric stoves, hot plates and geysers, Irr. 96. Due, 9/9/48. Power and lighting transformers, Irr. 169; automatic lighting plant, Irr. 172. Due, 30/9/48. Controller of Stores, Irrigation Department, P.O. Box 277, Pretoria.

Johannesburg Municipality : Battery charging set, No. 543. Due, 10/9/48. E.H.T. switch board cubicles, No. 558. Due, 10/9/48. Stores Department, Johannesburg.

Kimberley Municipality : Supply, delivery and erection of electric motors and pumps complete, or, **alternatively**, for automatic sewage ejectors complete at Truter Street, Kimberley. (Deposit of £2-2-0). Contract S.D. 1/48. City Engineer, Kimberley. Due, 24/9/48.

Mariental Municipality, S.W.A.: Supply, delivery on site and complete erection or installation of the following: (a) Two crude oil engines and alternator generating sets, 40/50 k.w. fully installed. (b) One 5-panel switch-board, fully installed. (c) The complete distribution system, completely erected. (d) Tender for "house wiring" installations. Consulting Engineer: H. V. S. Muller, "Reflections," Murray Lane, Upington, C.P. (Deposit of £2-2-0 — extra copies of documents at £1-0-0 each). Note: Tenders for section (d) only will not be considered. Due, 27/9/48.

Pietermaritzburg Municipality : 6,600-volt outdoor ring main units, Contract 248/E. (3 copies of documents free of charge — extra copies at 5/- each). City Electrical Engineer and Transport Manager, P.O. Box 399, Pietermaritzburg. Due, 30/9/48.

Pietersburg Municipality : Supply, supervision of erection and setting to work of traffic light signals. City Electrical Engineering and Transport Manager, Pietersburg. (3 copies of documents free of charge — extra copies at 5/- each). Contract 246/T.f.c. Due, 28/10/48.

Pretoria West : Low voltage rubber insulated cable. Specification 324. Controller of Stores & Buyer, Pretoria West. Due, 13/9/48.

S.A.R. & H. Tender Board : Switch gear, No. 8205. Due, 9/9/48. Electrification — overhead equipment, No. 8297. Due, 21/10/48. Train lighting dynamos and cells, No. 7630. Extended, 6/1/49.

Union Tender and Supplies Board : Miscellaneous electrical material and appliances to State Alluvial Diggings. S.O. 2831 Alexander Bay. Union Tender & Supplies Board, P.O. Box 371, Pretoria. Due, 16/9/48.

ENGINEERING CONSTRUCTION, ETC.:

S.A.R. & H. Tender Board : Wheels and axles, automatic couplers and roller bearing axle boxes. No. 7600. Extended, 6/1/49.

LABORATORY EQUIPMENT, ETC.:

Division of Chemical Services, Cape Town : Chemicals and laboratory apparatus to Department of Agriculture. No. S.O. 2686, Cape Town. Due, 9/9/48.

Durban Municipality : Laboratory apparatus to Department of Health. S.O. 2347, Durban. Due, 16/9/48. Laboratory apparatus to Pathological Laboratory. S.O. 2749, Durban. Due, 23/9/48.

Union Tender and Supplies Board : Laboratory apparatus to Onderstepoort Laboratory. S.O. 2793. Due, 9/9/48. Dip testers to Onderstepoort Laboratory. S.O. 2834. Due, 23/9/48. Union Tender & Supplies Board, P.O. Box 371, Pretoria.

SEWERAGE SCHEMES, ETC.:

Cape Town Municipality : New disposal works, Athlone : (a) 6 Venturi flow recorders complete with indicators, transmitters and chart recorders; (b) One Flume rate of flow indicator. Contract D.E. 2/48. Development Engineer, City Engineer's Department, Cape Town. Due, 5/10/48.

Cape Provincial Tender Board, Cape Town : Sewerage rising main : pipes, valves, specials, fittings and jointing materials in connection with the reconstruction of the sewerage system at the Conradie Home, Pinelands. Contract 16/48. (2 copies of contract documents on deposit of £2-2-0). Consulting Engineer, Ninham Shand, 806, Groote Kerk Buildings, Cape Town. Due, 10/9/48.

STRUCTURAL STEELWORK, ETC.:

Natal Provincial Tender Board : Supply, delivery and erection of steel work for new workshop at Ladysmith. Provincial Engineer, P.O. Box 417, Pietermaritzburg. Due, 15/9/48.

VEHICLES, ETC.:

S.A. Railways Tender Board : Electric motor coaches and plain trailer coaches. No. 7697. Due, 20/1/49. Electric motor coaches. No. 7633. Extended, 7/10/48. Inter-urban coaches manufactured in South Africa. No. 7471. Extended, 6/1/49.

WATER SUPPLIES, ETC.

Irrigation Department, Pretoria : Water-level and flow metering and indicating equipment for Odendaalsrus Goldfields Water Supply Scheme. Irrigation Department, P.O. Box 277, Pretoria. No. Irr. 1. Due, 9/9/48.

Swellendam Municipality : Supply and installation of chlorination plant. Contract 17/1948. (2 copies of documents on deposit of £2-2-0). Consulting Engineer, Ninham Shand, 806, Groote Kerk Buildings, Cape Town. Due, 15/9/48.

MISCELLANEOUS :

Adjustable penstocks. City Engineer, Cape Town. A. 39/48. Due, 10/9/48.

Band-saw & planing machine to School of Industries : Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2818, Queenstown. Due, 9/9/48.

Bells and bell equipment for Public Works Department : Public Works Department, Pretoria. P.W.D. S. 221. Due, 9/9/48.

Bituminous roofing compound : S.A. Railways Tender Board. No. 8328. Due, 9/9/48.

Borehole casing : S.A. Railways Tender Board. No. 8058. Due, 9/9/48.

Brass and mild steel screws : S.A. Railways Tender Board. No. 8324. Due, 9/9/48.

Fabricated steel telephone poles : Department of Posts and Telegraphs, Pretoria. P.O. 958. Due, 14/10/48.

Fire engine (one, self-propelled) and range of fire-fighting equipment : Chief Fire Officer, Box 91, Umtali. Contract 1/F/48. Due, 20/9/48.

Furniture, etc : Stores Department, Johannesburg. Contract 578. Due, 13/9/48.

Garage Machinery to Department of Transport : Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2835, Pretoria. Due, 23/9/48.

Lathe to Department of Transport : Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2859, Pretoria. Due, 23/9/48.

Laundry hydro-extractor to Porter Reformatory. Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2819, Retreat. Due, 9/9/48.

Machine Tools to the Physical Training Brigade : Union Tender and Supplies Board. S.O. 2856, Kimberley. Due, 16/9/48.

Machine Tools : Stores Department, Johannesburg. No. 568. Due, 13/9/48.

Machine Tools : Stores Department, Johannesburg. No. 580. Due, 10/9/48.

Machine tools and accessories to West End Hospital. Union Tender and Supplies Board, P.O. Box 371, Pretoria. S.O. 2753, Kimberley. Due, 9/9/48.

No. 8 Union stoves for S.A.P. married quarters, Pretoria : Public Works Department, Pretoria. P.W.D.-S. 243. Due, 9/9/48.

Ozonising apparatus for various police mortuaries : Public Works Department, Pretoria. P.W.D.-S. 242. Due, 9/9/48.

1,500 padlocks : Stores Department, Salisbury. S. 16/49. Due, 14/9/48.

Printers' and bookbinders' requisites : Government Printer, Pretoria. G.P.-W. 97. Due, 23/9/48.

Radial drilling machine : Stores Department, Johannesburg. No. 563. Due, 10/9/48.

Steel files for Public Works Department : Public Works Department, Pretoria. P.W.D.-S. 233. Due, 9/9/48.

Steel water piping, 9" : Stores Department, Johannesburg. Contract 579. Due, 13/9/48.

Varnishes and enamels : S.A. Railways Tender Board. No. 8190. Due, 21/10/48.

Welding electrodes : S.A. Railways Tender Board. No. 8280. Due, 9/9/48.

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

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

ENCLOSED VENTILATED SEWAGE PLANTS



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

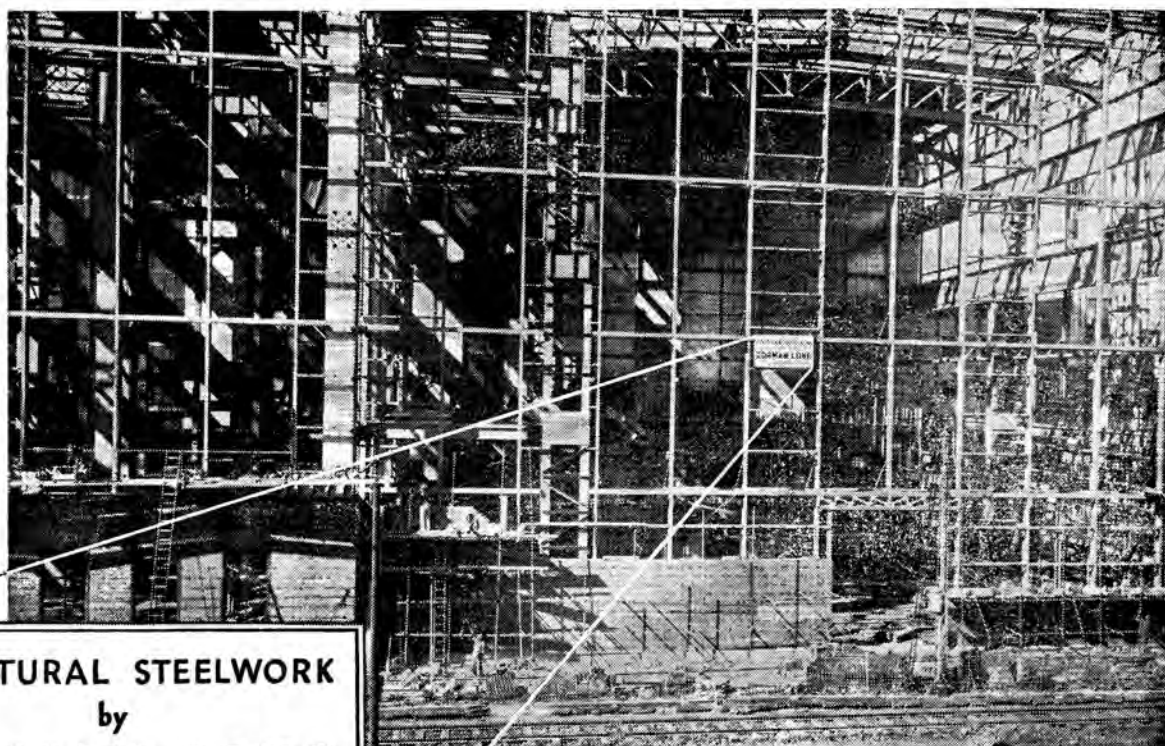
Complete elimination of all objectionable features. Final effluents characterised by 100% stability and highest purification, which factors insure freedom from subsequent decomposition and nuisance.

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

43 ANDERSON STREET

JOHANNESBURG

P. O. BOX 2155



STRUCTURAL STEELWORK
by
DORMAN, LONG
(AFRICA) LTD.

Table Bay Power Station Extensions, Cape Town
DORMAN, LONG (AFRICA), LTD.

Constructional Engineers, Contractors, Steel Merchants,
Manufacturers of Rolling Stock.

Head Office : 335 Eeom House, Rissik Street, Johannesburg. Works at :
Germiston, Durban, Cape Town, Port Elizabeth and Vanderbijl Park.

AA 71

RAND EARTHWORKS CONSTRUCTION Co. (PTY.) LTD.

●
EXCAVATION
AND GENERAL
CONTRACTORS
●

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

M. GREEN & Co. (Pty.) Ltd.

Equipment for Hospitals, Canteens and Institutions

- LEGION STAINLESS STEEL COOKING UTENSILS
- HERCULES HEAVY DUTY ALUMINIUM COOKING UTENSILS
- MELAMINE UNBREAKABLE TABLEWARE
- BOLTA TRAYS
- EDISON E.P.N.S. HOLLOWARE
- CUTLERY, GLASSWARE AND CROCKERY
- COLT DISHWASHING MACHINES
- REYNOLDS POTATO PEELERS, DOUGHMIXING MACHINES, ETC.
- THURMADUKE FOOD-WARMING TABLES
- HERCULES STAINLESS STEEL COFFEE URNS
- GENERAL CATERING EQUIPMENT

Phone 22-5148
96 Kerk Street
P.O. Box 688
JOHANNESBURG

Phone 251
P.O. Box 217
Windhoek
S.W. AFRICA

Phones 3-0184, 2-5075
112 Loop Street
CAPE TOWN

Phone 20783
95 Salisbury House
DURBAN

Phone 4128
54 Queen Street
PORT ELIZABETH

Phone 3087
4 Netherlands Bank
Buildings
Maitland Street
BLOEMFONTEIN

Telegraphic Address : "EQUIP" Throughout All Branches

CORROSION-PROOF ROOFING

R. P. M.

ROBERTSON

PROTECTED

METAL

EXTENSIVELY USED IN ALL PARTS OF THE WORLD AND FOR 20 YEARS IN SOUTH AFRICA.

BY

THE P.W.D., S.A.R. & H. AND LEADING INDUSTRIAL CONCERNS.

DEFINITELY A PROVEN PRODUCT IN THE SEVEREST CORROSION CONDITIONS.

AVAILABLE IN UNLIMITED QUANTITIES FOR QUICK DELIVERY.

EX IMPORT — SMALL QUANTITIES HELD IN STOCK.

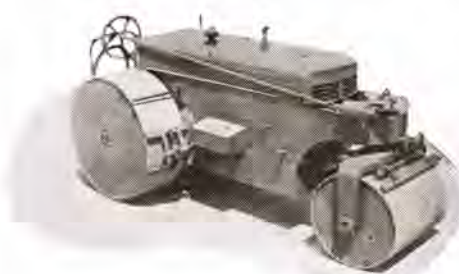
Sole Agents:

G. H. LANGLER & Co. Ltd. Box 3762, JOHANNESBURG

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.

NAIL & CHAIN LTD

Manufacturers of

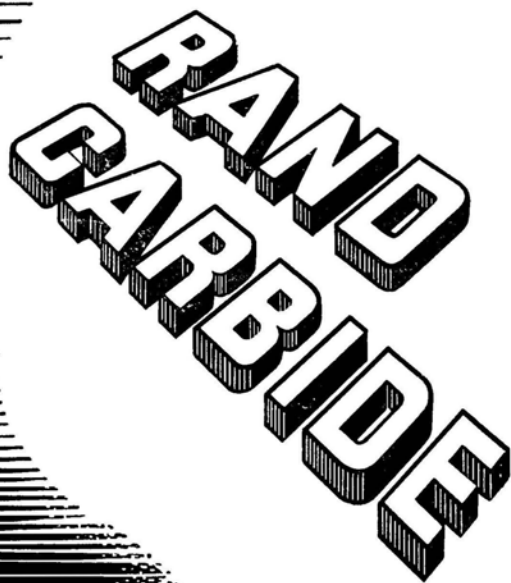
METAL WINDOWS
METAL SURROUNDS
METAL DOOR JAMBS
METAL CONTAINERS

and

ALLIED PRODUCTS

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

10, SHORT ST.
BOOYSENS
JOHANNESBURG



**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.



NATIVE HOUSING. ORLANDO

ROBERTS CONSTRUCTION CO.

LIMITED

CIVIL ENGINEERS AND CONTRACTORS

HEAD OFFICE — JOHANNESBURG — P.O. BOX 6280
TRANSVAAL — O.F.S. — NATAL

RUBEROID

PLUVEX Pure Bitumen Dampcourses can be relied on to remain damp-resisting under all climatic conditions, and will not squeeze out under pressure.

They comply with the British Standard Specification No. 743-1941.



No. 0 PLUVEX (5½ lb. per sq. yard) manufactured on a woven hessian base, heavily coated on both sides.

(P.W.D. Reference, sample No. 69, H.O. Case E : Dampcourse, Hessian base.)

No. 1 PLUVEX (7½ lb. per sq. yard). Pure Bitumen Dampcourse Hessian base.

ASTOS. A special feature Asbestos Asphalt (100%) Mineral Dampcourse.

Managing Agents in South Africa, Rhodesia, and Tanganyika :

J. H. VIVIAN & CO., LTD.

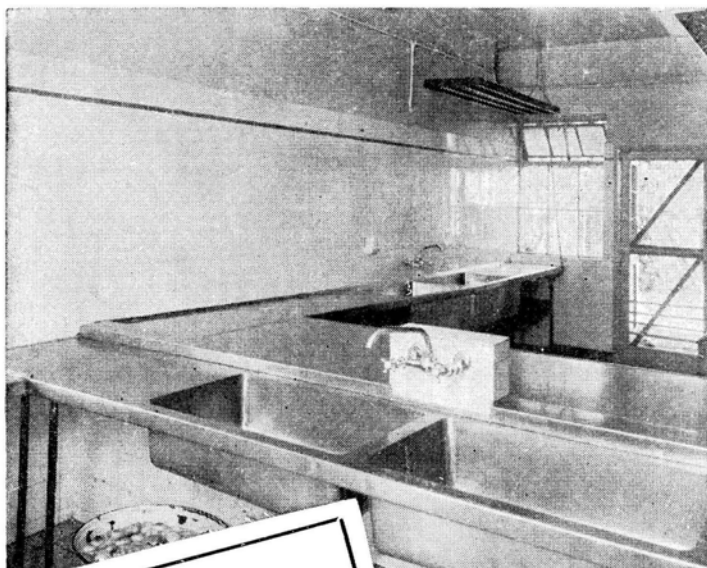
Box 301.
Box 1115.
Box 75.

JOHANNESBURG.
DURBAN.
PORT ELIZABETH.

Phone 33-9981.
Phone 2-8171.
Phone 5337.

Products of the
Ruberoid Co. Ltd.,
England.





Easy to Clean
 Strong, Long-lasting
 Sanitary Surfaces
 Resistant to Rust and
 Corrosion
 Low Ultimate Cost
 Customer Appeal

Showing a section of the complete Stainless Steel Kitchen installed by us at the Hotel Cecil, Newlands, Cape.

*Stainless
 Steel
 Pays
 in many
 ways*

Mr. E. A. Rietmann, Proprietor, Hotel Cecil, Newlands, Cape, says :

"My stainless steel kitchen, completed only a day or two before Christmas, clean, efficient and labour-saving, enabled us to serve a larger number of diners at our Christmas dinner in 30 minutes less time than the previous year."

THAT IS A TEST THAT PROVES THAT STAINLESS STEEL PLANNING PAYS.

Stainless Steel Equipment for all purposes can be manufactured to any specification and design — for Hotels, Hospitals, tea-urns, food bins, Brewery vats, jam boilers, etc.

Stainless steel sinks in standard sizes ranging from 4ft. 6ins. to 7ft. long are held in stock.

ALMOR STAINLESS STEEL EQUIPMENT

Enquiries to :



CHUBB & MAXWELL (PTY.), LTD.,

MARSDALE 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.



Announcement

AVELING-BARFORD Ltd.
GRANTHAM, ENGLAND

Manufacturers of Road-making, Contracting, Mining and Quarrying Plant — the originators and world's largest makers of Road Rollers

have pleasure in announcing that they have now appointed

HUBERT DAVIES & Co. Ltd.

as the Sole Representatives throughout the Union of South Africa for all Aveling-Barford products

R. H. MUNRO,

Factory Representative,
 Aveling-Barford, Ltd.

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

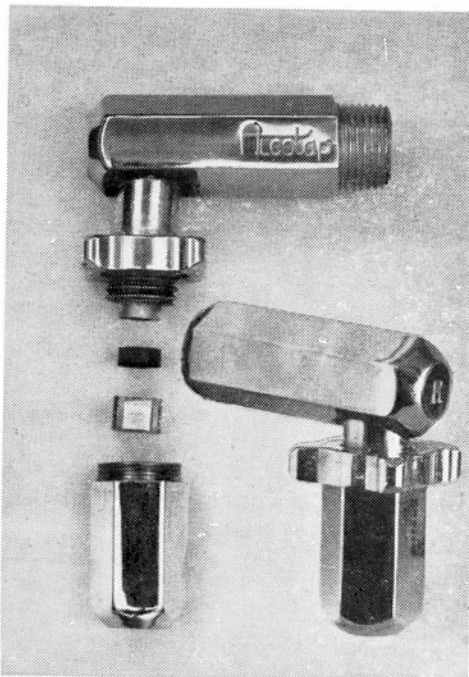
Prices will be furnished on application to:
THE SALES MANAGER. 'Phone 33-4158/9.

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

Works :
STEVENS ROAD,
Off Eloff Street Extension, Booyens,
JOHANNESBURG.
P.O. Box 155.

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

THE "ALCOTAP" IS A PRECISION INSTRUMENT



*The TAP of
the future . .*

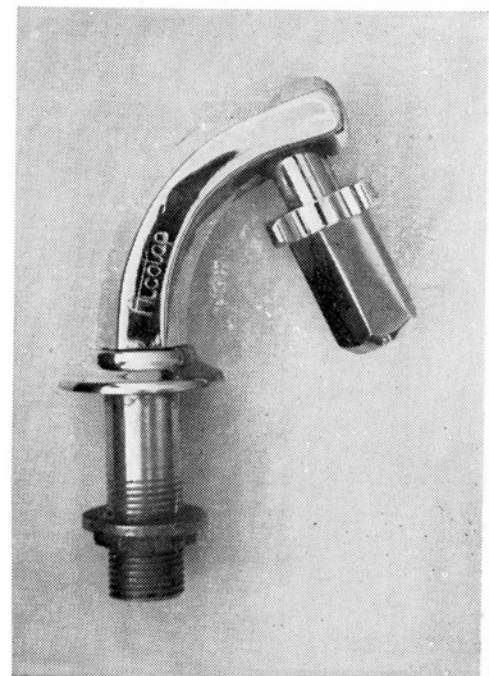
IT DOES NOT DRIP



1/2" BIBCOCKS

AND

PILLARTAPS

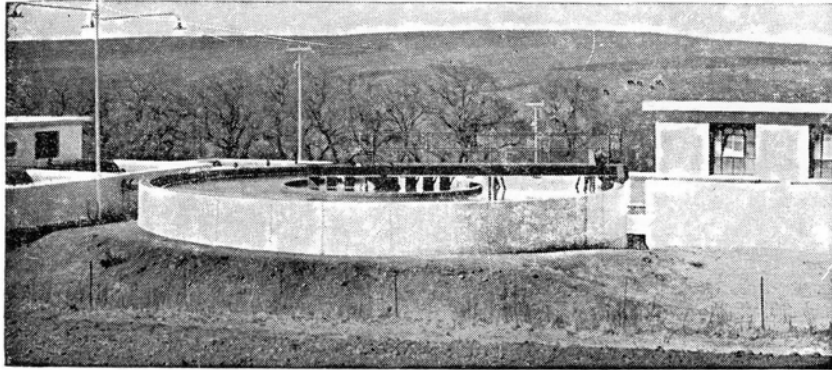


TRADE INQUIRIES TO THE MANUFACTURERS

CAVALEROS INDUSTRIES LTD.
P.O. Box 493. GERMISTON SOUTH AFRICA

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.

MANUFACTURERS OF:

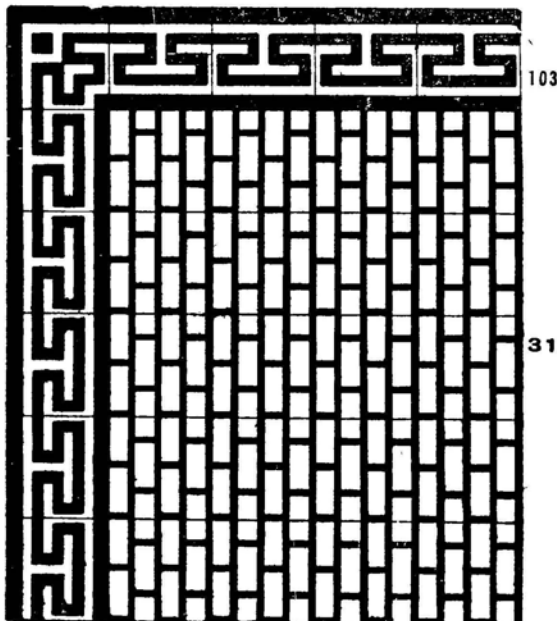
CEMENT & TERRAZZO FLOOR TILES, WALL TILES & STEP TILES

●
*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



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"

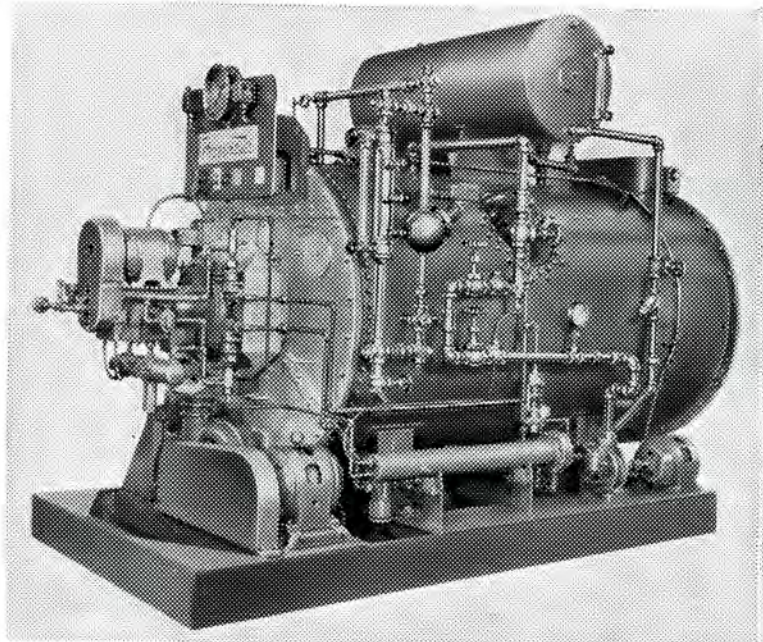
ALSO AT

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

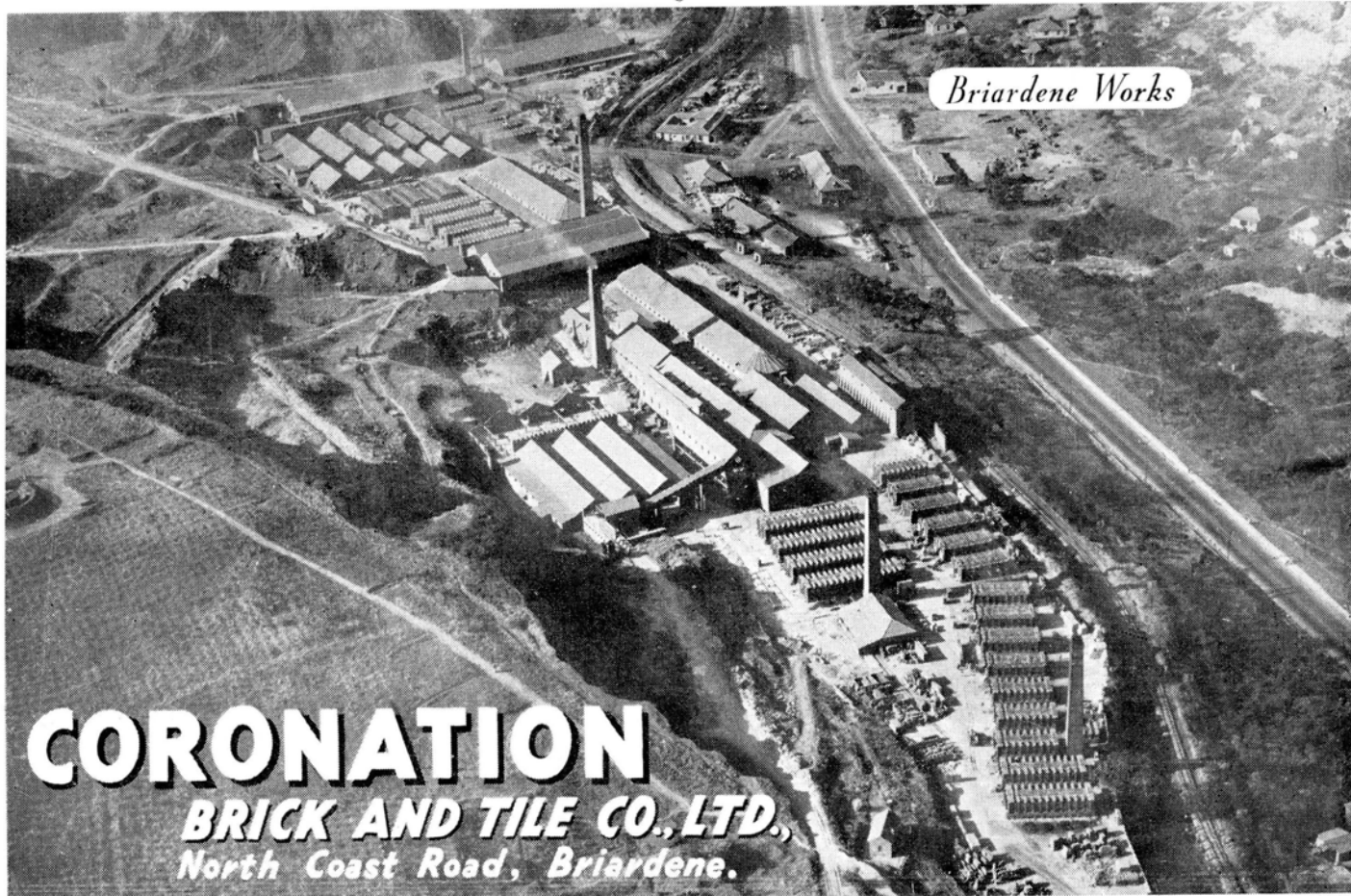
INDUSTRIAL EXPANSION OF SOUTH AFRICA

— Loads From 6 To 60 Tons —

ROSS TRANSPORT CO. LTD.

152, PRESIDENT ST.,
 GERMISTON.

Phones : 51-4402
 51-1179



THE PANTHEON
ROME



This magnificent piece of Architecture is still standing to-day — a testimony to the strength of the materials used in the construction. Cement was used even in those early days. The Old Roman cements were made of a mixture of slaked lime and volcanic dust. Even this crude combination produced an artificial stone, which has stood the test of time.

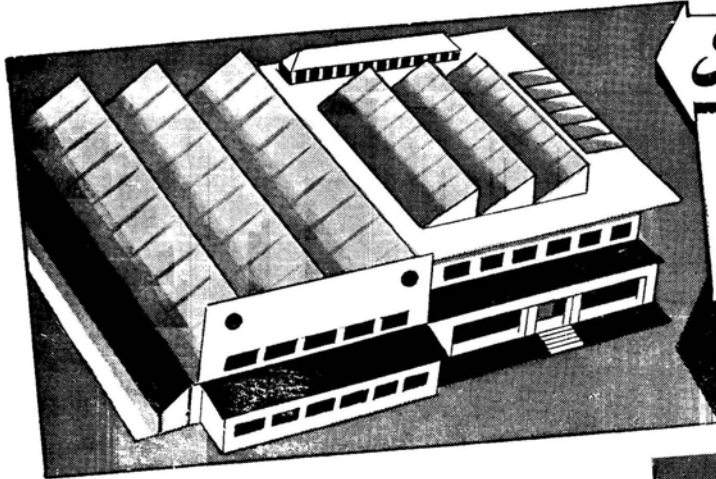
Modern cement has many advantages over the old Roman product. The materials are scientifically tested during all the stages of manufacture, from the original analysis of the raw materials, including the spot-testing throughout the process, to the final test of the finished cement.

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.



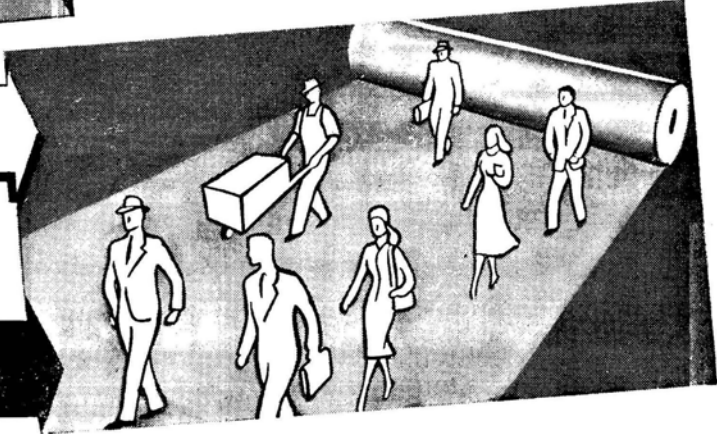
Shield Your Roof

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.

PITTSBURGH CORNING GLASS BRICKS

REID BROS. (SOUTH AFRICA) LIMITED

11/15 LOVEDAY STREET SOUTH, JOHANNESBURG

Telephone: 34-2181

P.O. Box 802

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 :

Also
at :

CAPE TOWN
DURBAN
PORT ELIZABETH
EAST LONDON

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

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.