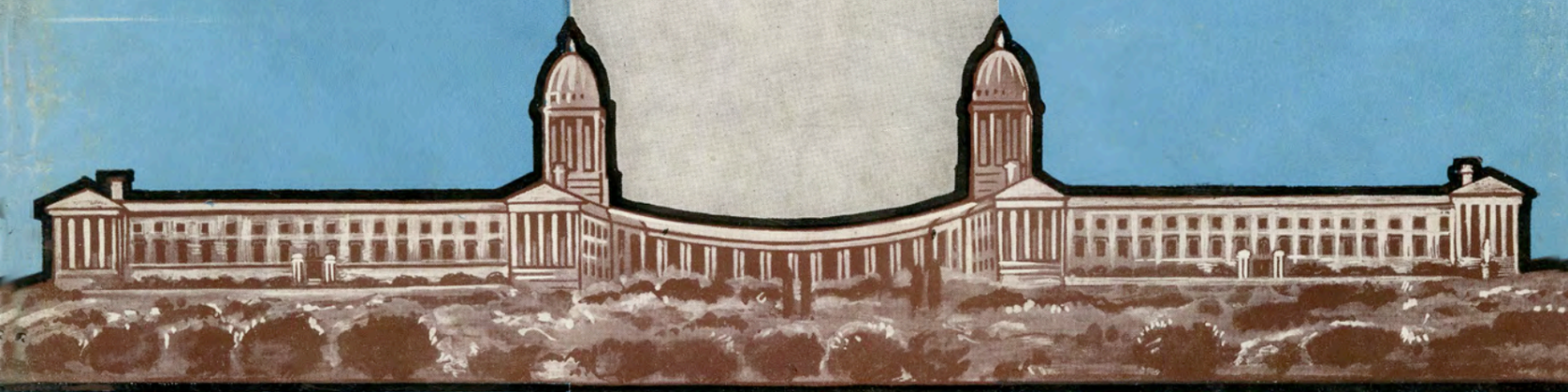
Vol. X. No. 69. AUGUST : 1949.

PUBLIC WORKS OF SOUTH AFRICA



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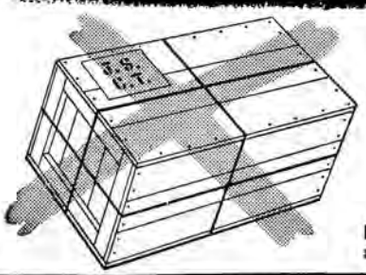
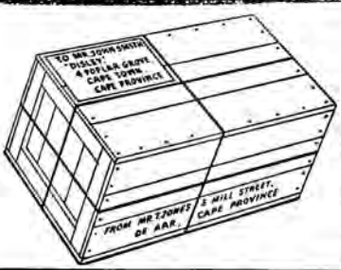
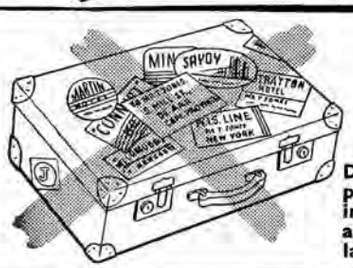
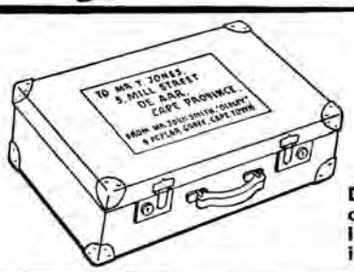
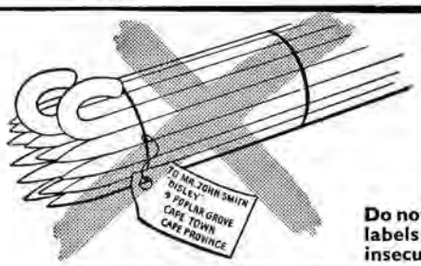
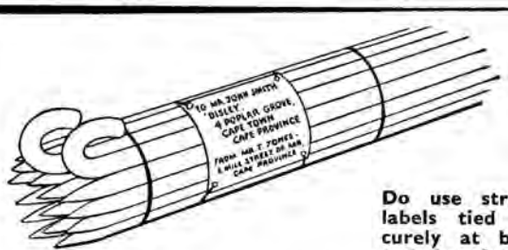
 Do not use abbreviations.	 Do paint or stencil all names and addresses distinctly and in full on the package itself, where possible.
 Do not send packages bearing old names and addresses or labels.	 Do remove or obliterate all old labels or markings.
 Do not use flimsy labels tied on insecurely.	 Do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

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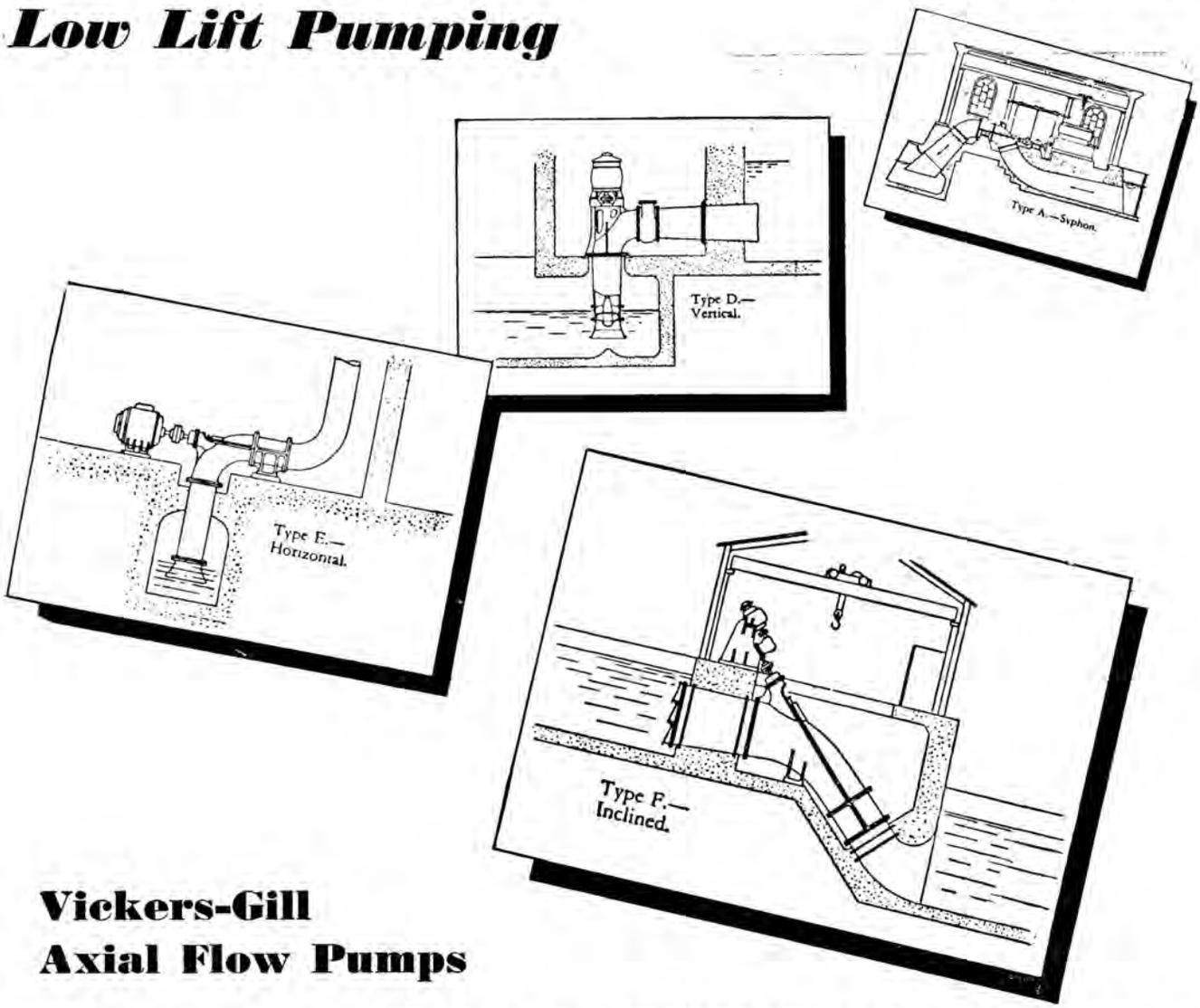

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These pumps are manufactured in single and multi-stage units capable of dealing with large volumes of liquid against heads up to, approximately, 60 ft. The above diagrams show a few applications designed to achieve the most economical operating conditions.

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

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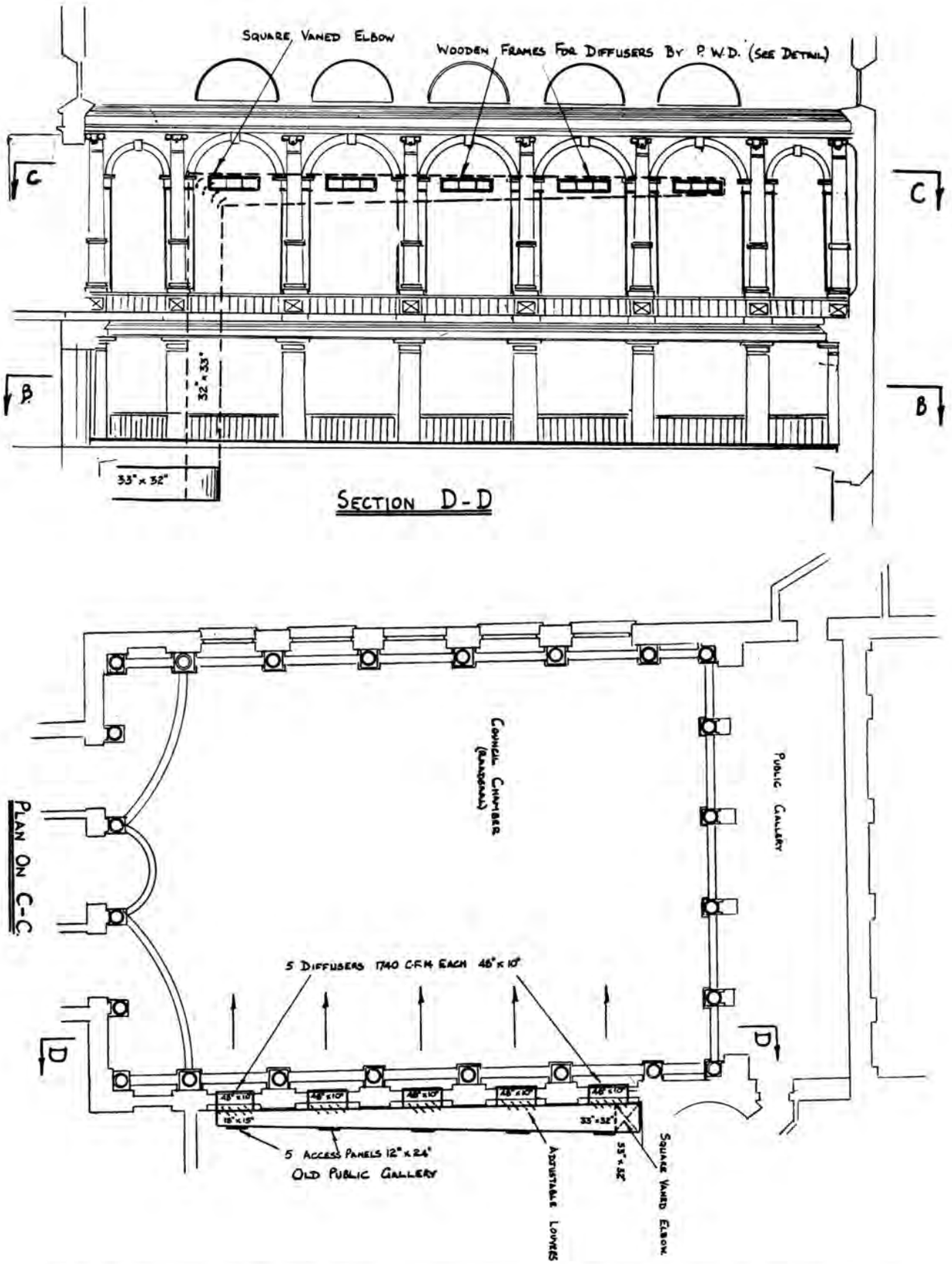


Sectional elevation and plan of the Chamber, showing the layout of the piping for the new air-conditioning plant in the Raadsaal, Pretoria

AIR CONDITIONING OF THE TRANSVAAL PROVINCIAL COUNCIL CHAMBER IN THE RAADSAAL, PRETORIA

By

H. C. CAWOOD, B.Sc., M.I.H.V.E.

Mechanical Engineer, Public Works Department, Pretoria.

IN 1947 money was voted by the Transvaal Provincial Administration for the air conditioning of the Provincial Council Chamber in the Raadsaal at Pretoria.

When built, the Chamber was heated by large steam radiators of the vertical tubular type. These were concealed in recesses with perforated steel doors and are still in position. Apparently the system was not a success as it fell into disuse and was replaced by a hot air system which discharged warm air into the Chamber through slots located below the windows in the south wall. Whilst the hot air system provided reasonable heat, it was dangerous as the wooden ducts conveying the hot air became over-heated and eventually caught fire in 1941. Fortunately the fire was quenched before it could do much damage or a priceless relic might have been lost to the nation.

Following the fire, the hot air system was scrapped and replaced by a hot water radiator system fed from a cast iron sectional boiler equipped with an automatic stoker. This system provided reasonable comfort in winter but could not, of course, deal with summer conditions, hence the decision to instal air conditioning.

As the buildings belong to the Union Government and it is also historically important, the work was undertaken by the Mechanical Engineering Branch of the Public Works Department.

Photo: S.A.R.

View of the exterior of the historic Raadsaal on Church Square, Pretoria.

Plant Location

It will readily be appreciated that to provide air conditioning in a building of this nature, proved no easy task. First of all a suitable location for a plant room had to be found, and secondly ducts had to be installed in such a manner as to leave the internal decoration of the Chamber unimpaired.

After considerable preliminary investigation, it was decided to accommodate the plant in a cycle shed situated on the Ground Floor beneath the West Gallery of the Chamber. This room had a steel ceiling and suffered from the disadvantage that noise might be transmitted through the ceiling into the void beneath the Chamber floor. It was decided, however, that such a contingency could be catered for by insulating the ceiling with acoustic material.

From the plant room it was possible to run the main supply duct to the Chamber without entering the Chamber itself. The route taken can be clearly seen on the drawing which shows a layout of the plant.

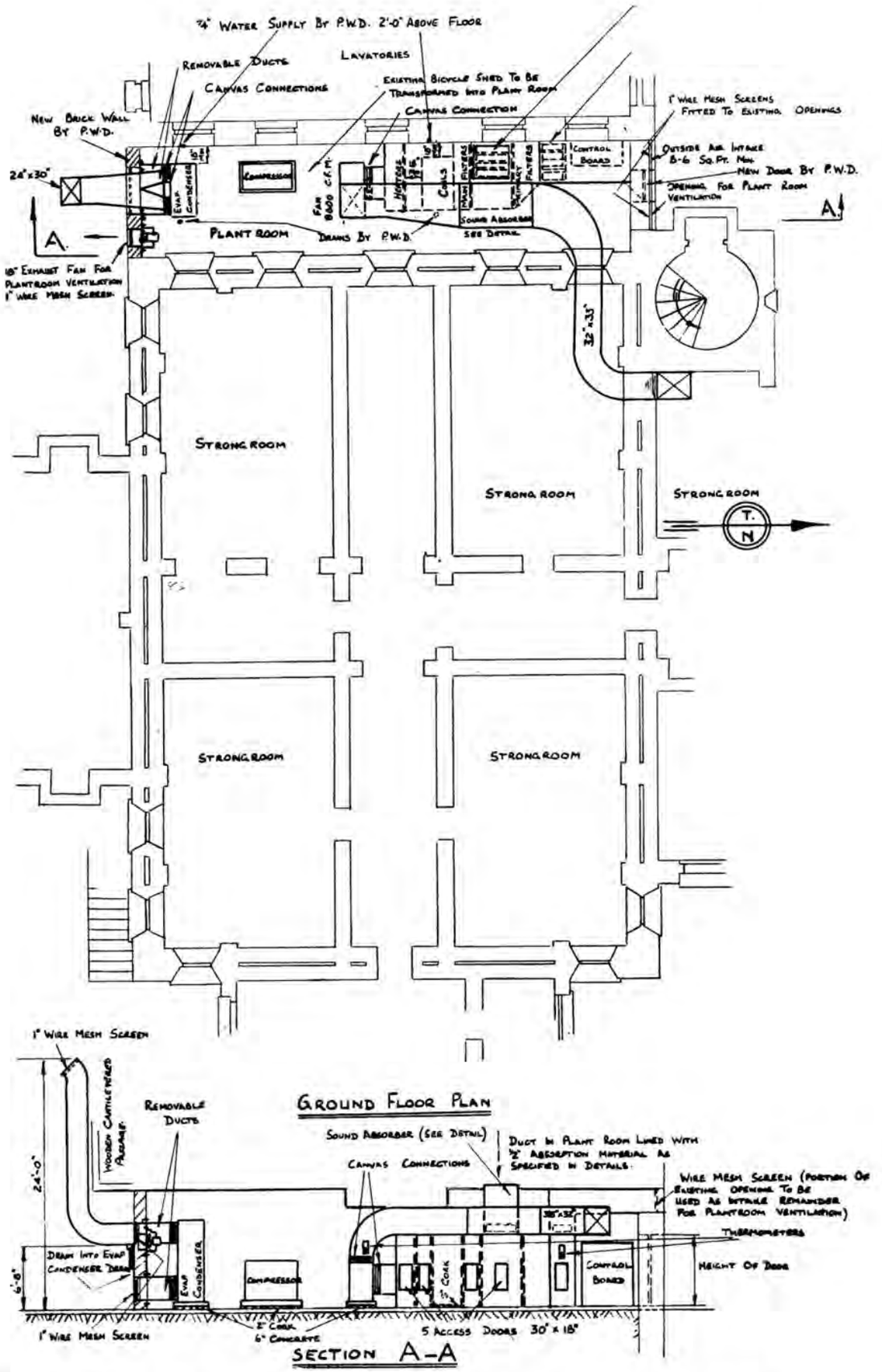
In order to harmonise with the internal decorations, five outlets, measuring 4 ft. long x 10 ins. deep, with vanes adjustable in the horizontal plane, were selected. These were located in the ornamental panels on the north wall of the Chamber, the diffusers being in line with the base of the moulded arches of the panels. The height of the outlets is approximately 22 ft. above floor level.

To reduce air noise to a minimum, the main duct was sized on a velocity of 1,200 ft. per minute and the outlets on a velocity of 850 ft. per minute. Adjustable vertical vanes were provided in the branches to the diffusers to ensure even distribution of the air.

For the return air the whole of the void beneath the Chamber floor was used as a return plenum. As openings into this void existed at the base of the raised galleries along each side of the Chamber, it was not necessary to provide return air grilles.

Sound Absorption

A most important factor in the design of any air conditioning system where absolute silence is essential, is the elimination of air noise created by the fan wheel and the sprays in the spray chamber. Even with low duct velocities and a low fan outlet velocity, this noise is present and can be most objectionable. To ensure that such noise was not transmitted to the Chamber, sound absorbers were provided in both the supply and return air ducts. These consist of cells formed in the duct by means of "Paxfelt" strips 1 inch thick spaced at 4-inch intervals. The length of the sound absorber in the supply duct which is the most likely source of noise was made 7 feet and in the return duct 4 feet. In fact space limitations



Ground floor plan and sectional drawing showing layout of the air-conditioning plant itself.

precluded the latter from being made the full length. The ducts were enlarged where the absorbers were installed to provide an equivalent free cross-sectional area.

In calculating the size of the plant, the following data were used as a basis :—

Maximum outdoor dry bulb temperature .... 90°F.
Wet bulb temperature at 90°F. .... 69°F.
Minimum outdoor dry bulb temperature .... 40°F.
Wet bulb temperature at 40°F. .... 37°F.
Room conditions (Summer) : 75°F. and 50% rel. hum.
Room conditions (Winter) : 68°F. and 45% rel. hum.
Occupancy .... 100 persons
Lights .... 1,000 watts
Outside air and infiltration : 2,900 cu. ft. per minute.

These figures produced the following loads :—

Total air quantity to be circulated : 8,600 cu. ft. per min.
Cooling load : 230,000 B.T.U. per hour, i.e.,
19.2 tons of refrigeration.
Heating load : 27 K.W.

In arriving at the heating load of 27 K.W. allowance was made for the heat supplied by the existing central heating installation. The electric heaters are, therefore, simply for tempering and for humidification purposes during the winter months. With a total air circulation of 8,600 cubic feet per minute, the rate of air change amounts to 4 per hour or 86 cubic feet of air per person per minute. This is regarded as eminently satisfactory for a room with a very high ceiling — 38 feet in this instance.

Drawings and specifications were completed in September, 1947, and a contract for £4,319 for the installation was awarded in December of the same year. Due to delays in obtaining certain materials, and, due to the fact that a new high tension supply had to be installed to deal with the extra load imposed by the plant, completion was not effected until May, 1949.

Main Features of the Equipment

The supply fan is a locally manufactured, forward curved blade, centrifugal fan capable of handling 8,600 cubic feet of air per minute at 1½ inch water gauge, and is driven by a 6 B.H.P. 1,420 r.p.m. motor by means of Vee belts.

Cooling is provided by a four row, finned tube, direct expansion, cooling coil connected to the compressor. The finned coil is mounted inside a plenum chamber constructed of heavy gauge galvanised sheet steel and angle iron. To facilitate cooling and to provide humidification in winter, the coils are sprayed with water by means of a pump direct by coupled to an electric motor, and capable of delivering 50 gallons per minute at 30 feet head. The plenum chamber is, therefore, fitted with a sump, the water level in which is maintained at a constant level by a ball valve.

At the inlet end of the spray chamber are located two sets of filters — a primary set of crimped wire for filtering the outside air, and a secondary bank of cotton fabric for filtering the whole of the circulated air. At the outlet end, i.e. between the moisture eliminators and the supply fan, are mounted the electric heater elements. Five large access doors giving ready access to the filters, sprays, cooling coil and heaters are provided in the side of the plenum chamber.

The compressor is of the six-cylinder, water-cooled type, rated at 20 tons refrigeration at 40°F. suction temperature and 112°F. condensing temperature, and at a speed of 330 r.p.m. It is driven by a 25 H.P. slip ring motor running at

Interior of the chamber of the Raadsaal. The louvres for air-conditioning are high up on the left hand wall.

1,420 r.p.m. by means of Vee belts. The refrigerant is Freon gas which is non-inflammable, non-toxic and odourless. The condenser is of the shell tube type, and also serves as a liquid receiver. It is mounted on the wall above the compressor, the ends being readily accessible for cleaning the tubes.

Cooling System

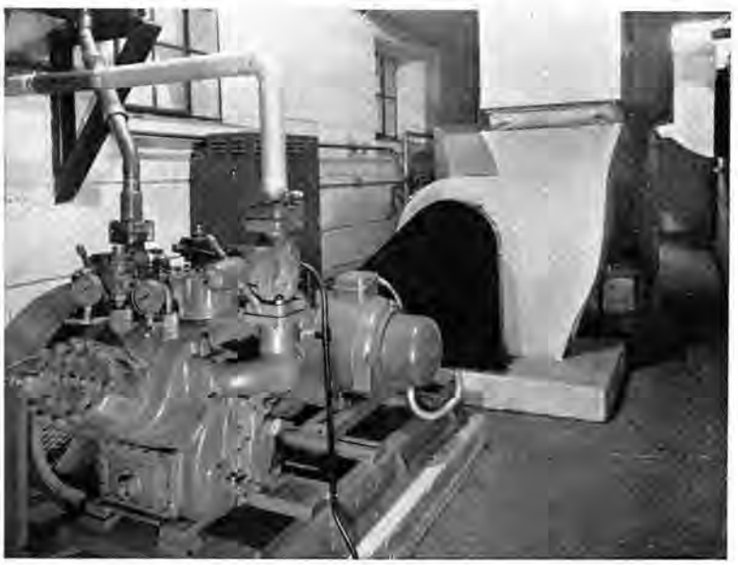
Water is circulated through the condenser by a pump direct coupled to an electric motor, delivering 32 gallons per minute at 20 feet head. The circulating water is cooled by means of a cooling tower situated inside the plant room.

Like the spray chamber the cooling tower is constructed of heavy gauge galvanised iron and angle iron, and is fitted with a sump. The tower is of the induced type with a double entry centrifugal fan mounted at the top of the tower above the spray nozzles. Water is drawn from the sump by the circulating pump, passes through the condenser and discharges through the nozzles at the top of the tower. Outside air is sucked in at the bottom by the fan and discharged to atmosphere through a duct carried to a height of 24 feet above plant room floor level. Thus the air and the water flow counter each other giving maximum cooling effect.

To protect the cooling tower against corrosion, the whole of the inside is heavily coated with a bituminous compound. Besides being fitted with an access door for routine maintenance, it is also built in sections to enable the fan assembly to be removed for recoating with bituminous compound.

The whole of the exterior of the plenum chamber, fan and ducting is insulated with 1 inch of slab cork. The cork is fixed with bitumen, plastered with ½ inch cement plaster and painted with two coats of aluminium paint. This makes a most attractive finish and has the advantage of being highly reflecting and moisture proof.

To eliminate vibration the supply fan, compressor and pumps are mounted on concrete bases insulated from the floor by a layer of slab cork 2 inches thick. The coil section of the plenum chamber and the cooling tower are also mounted on 2-inch cork pads. Supply and return ducts are isolated from the main fan and the plenum chamber, respectively, by means of flexible canvas connections.



The air-conditioning plant on the ground floor of the Raadsaal building.

The control diagram is shown schematically on drawing No. M.E. 500 A/30. The compressor is controlled by a thermostat in the return duct, set to start the machine when the temperature rises above 74°F. The compressor starter is interlocked with the cooling tower fan motor starter to prevent the compressor from starting until the cooling tower is in operation.

A duct type, two-step thermostat in the return duct controls two banks of the electric heater battery. The third bank is controlled manually by means of a tumbler switch. The automatically controlled banks come in at 68°F. and 65°F. respectively.

Humidity Control

Through a manual selector switch, the dehumidified spray pump can be made to operate in any of the following ways: (a) manually; (b) by a room type hygrostat for humidification in winter; and (c) by the thermostat which controls the compressor, in order to provide better performance and coil flushing during periods of refrigeration. No humidity control for summer operation has been provided as the relative humidity in Pretoria is not so high as to warrant special measures for its control. When the compressor cuts in on temperature, the performance of the coil is such as to provide air of a sufficiently low moisture content for comfort. As a precaution against fire, thermostats are provided in both the supply and return ducts to stop the supply fan when the temperature in the ducts rises above 150°F.

The hygrostat for humidification in winter referred to, a thermometer and a relative humidity indicator are mounted on a polished sindanyo board fixed to the wall of the Chamber behind the last row of seats.

Regulation of the amount of air recirculated is obtained by means of louvre-type dampers mounted in the outside air intake and in the return duct. Seventy-five per cent. of the outside air damper is interlinked with the return air damper in such a manner that the one is open when the other is closed. Both are operated by one lever which can be set in any position. The remaining 25 per cent. of the outside air damper is used for minimum outside supply and is separately regulated.

Although conditions were quite unsuitable for a refrigeration load test, a trial run was carried out early in June. From the noise aspect the trial was a complete success. With the fan only running, not a sound could be heard in the Chamber. With all the plant in operation a very slight machinery hum was just audible but it was not of sufficient magnitude to be in the least objectionable.

During the trial the fan was tested and found to be delivering the full output specified. Air movement in the Chamber was also found to be very satisfactory. The compressor and coil too, functioned well as was evident from the frost which formed on the latter when the former ran at full capacity. As the compressor is fitted with an automatic unloader which cuts out three cylinders when the suction pressure falls below a predetermined level, there is no danger of the coil freezing up. A full load test will be carried out when warm weather sets in towards the end of October.

THE CEMENT GUN

It does in three hours what formerly took three days: At any rate, this is the verdict of a St. Louis contractor on this cement gun which charged with water, sand, cement and gravel, travels under its own power from the charging point to the spot where the mixture is required to be poured. By pressing a button, operations begin, and another button is pressed to start pouring operations. In this picture shuttering for house foundations is seen receiving its quota of sand and cement "mix." Despite such modern equipment, the American building industry trails far behind that of Britain.

Photo: Indian Concrete Journal.

MARION ISLAND METEOROLOGICAL STATION

By

A. D. MACKAY, B.Sc., A.M.I.C.E.

District Representative, Public Works Department, Pretoria.

TOWARDS the end of 1947 the Public Works Department was entrusted with the task of designing, fabricating and erecting certain buildings and ancillary works on Marion Island, in the South Indian Ocean, where a meteorological station was to be established.

The island was uninhabited and the physical conditions which prevailed thereon were virtually unknown. Recourse was had to such literature on Antarctic and southern exploration and settlements as was available in an endeavour to determine the main requirements which should be fulfilled to enable personnel to reside permanently on the Island in reasonable safety and comfort. A preliminary South African Naval expedition explored the possibilities for landing cargo, and a small bay on the eastern shore, now known as Transvaal Cove, was selected; this choice fixed the site for the future settlement. The naval expedition brought back information to the effect that the terrain was treacherous bog of considerable depth, with hard ground or rock outcrop entirely absent.

Marion is one of a group of two islands, the official name of which is the Prince Edward Islands. Marion is the larger of the two, being 60 square miles in area. The other island, Prince Edward, is less than half this area, and lies some 10 miles to the north-east. Marion Island is situated in latitude 46°53′ S. and longitude 37°45′ E. The group lies just over 1,000 miles south-east of Durban.

On 29th December, 1947, the Union flag was hoisted on Marion Island and His Majesty's sovereignty proclaimed; on 4th January, 1948, a similar ceremony took place on Prince Edward Island.

Climate and Weather

It is desirable, before indicating the nature and extent of the work carried out by the Public Works Department, to describe some of the physical features of Marion Island, with particular reference to climate and weather.

Records have been kept over a period of some fifteen months. The mean annual temperature is 40.4°F., the lowest minimum so far recorded is 24.7° and the highest maximum 60.8°. The mean temperature of the warmest month is 44.2° and of the coldest month, 35.9°. The rainfall from April, 1948, to March, 1949, was 76.39 inches, more or less constant month by month. The average daily summer sunshine 2½ hours, and winter sunshine 1½ hours. During winter months snow falls on three to four days a month. The mountain peaks are always covered with frozen snow. Calm weather is exceptional: winds are the daily routine. Gales up to 80 miles per hour and over frequently occur. The general direction of the gales is from W.N.W. to N.W. The islands are, of course, situated between latitudes 40° and 50° S., i.e., in the "roaring forties."

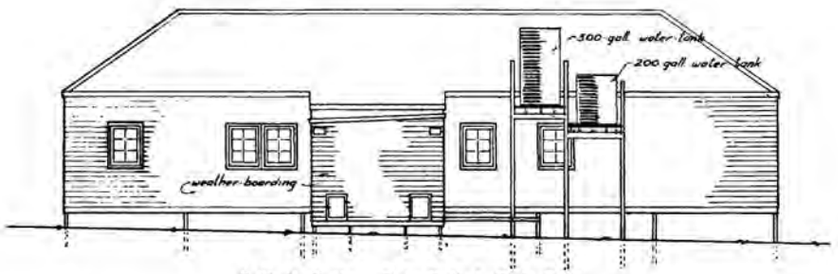
View of Marion Island from H.M.S.A.S. Transvaal.

Geologically the islands are very young, and consist of lava. The most interesting geological feature is the immature drainage system; the coastal plateau is a water-logged bog of varying depths. The general picture, then is one of swamps, bogs, lakes, streams and waterfalls with central peaks of permanently snow-clad lava. The highest point, known as Jan Smuts Peak, is some 3,990 feet above sea level.

First Expedition

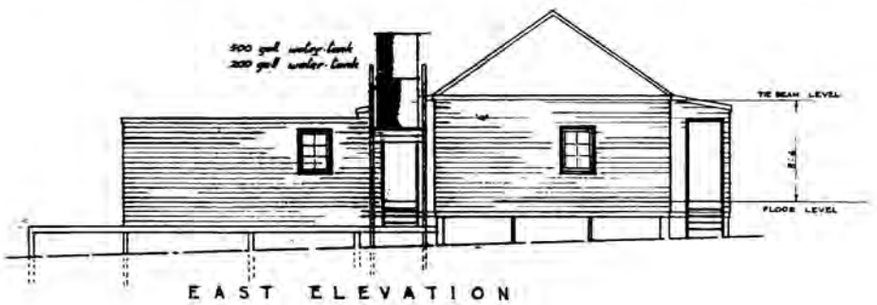
The buildings were pre-fabricated in Pretoria and were of two types: (a) storerooms; and (b) living, administration and technical accommodation. The structures were designed in the first place to ensure warmth, and in the second place to withstand high winds and heavy falls of snow. Briefly, the construction was, for the storerooms: Floors, 4½″ x 1½″ joists with a double layer of ⅞″ T. & G. flooring boards; walls: made in sections, measuring overall 10 ft. x 10 ft., of weatherboarding, three-ply malthoid, 4¼″ x 2½″ framing, three-ply malthoid, and finally, ¾″ timber lining internally; roofs: 4½″ x 1½″ principals, covered with ⅞″ boarding and two layers of malthoid, treated with synthaprufe. For the living, administration and technical buildings, the floors were as described above, the walls were similar to those of the storerooms with the addition of ⅞″ T. & G. boarding and a layer of anti-condensation paper, and the framing was filled in with sprayed asbestos. The roofs were similar to those for the storerooms. All hips and ridges were covered with 22 gauge copper sheeting. As a precaution against high winds, no eaves were provided.

To provide for contingencies, sufficient material was fabricated to erect one additional store, and 20% spares for all other buildings. Copper nails and zinc-coated iron wire

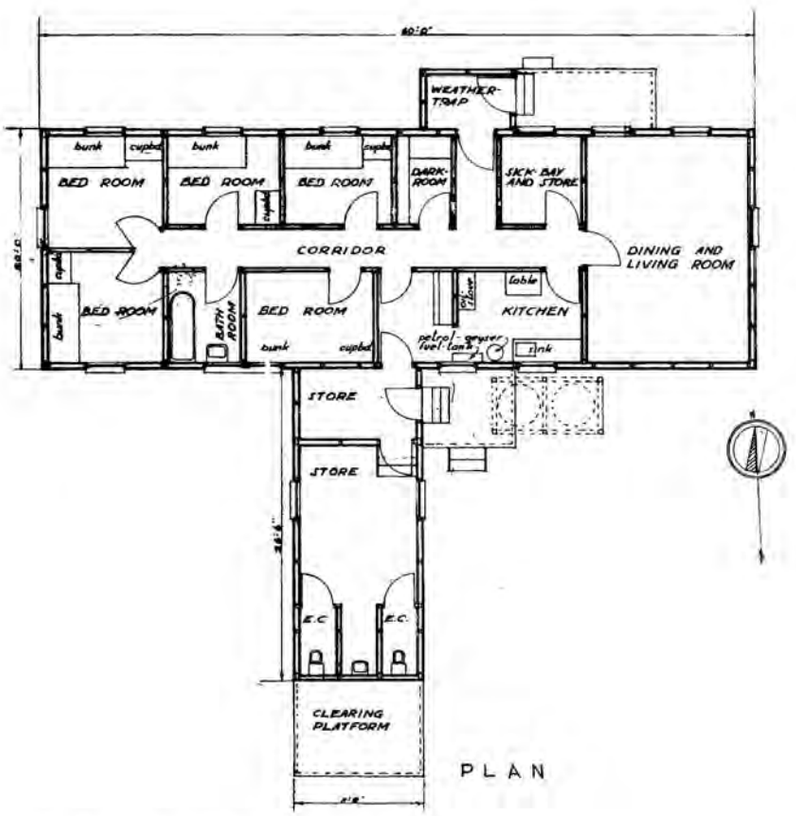


SOUTH ELEVATION

NOTE
depth to which piles were driven varies from 15'0" to 2'0"



EAST ELEVATION



PLAN

GOVERNOR'S HOUSE

nails, as well as zinc-coated bolts and nuts, and brass screws were used throughout.

The biggest individual section was the 10 ft. x 10 ft. wall unit which weighed 1,150 lbs. when dry. All prefabricated units and all timbers were spray-painted one coat in the workshops. Every package and unit was stencilled with weight, dimensions, and erection markings. External doors were fabricated to match the walls and were double rebated. Windows were designed as fixed lights, double glazed, externally with ¼" plate glass and internally with 32 oz. glass. Double-louvered ventilators were provided, with slides. Roof ventilation consisted of 6" copper pipes with revolving cowls.

Experience has shown that the buildings so designed have more than fulfilled their function, and that certain modifications can be introduced in future structures. For instance, windows need not be double glazed, should be made larger, and in certain cases should be made to open. Eave gutters should be provided; external doors should be duplicated to provide wind-traps. It is found that zinc-sprayed iron wire nails are better in all respects than copper nails.

Ancillary Services

For sanitation, internal chemical closets of "Destrol" type were provided. Provision was made for hot water by means of thermostatically controlled paraffin geysers. Baths, wash-hand basins and sinks were supplied. Provision was made for electric lighting throughout, with 32 volts D.C. The installation was carried out in "pyrotenex." Large cabinet-type paraffin burning cooking ranges were provided. Heating was by means of both pressure type and the ordinary wick type paraffin heaters.

Up to now, the work had been of a routine, if somewhat unusual nature. There then followed the major task of transporting to the Island several hundred tons of cargo; of transferring it from a notoriously hostile and treacherous sea on to a bleak, barren and uninhabited sub-antarctic isle; of erecting permanent buildings and works on a "terra incognita", the meagre reports on which were particularly disquieting.

The P.W.D. party consisted of one senior technical officer and two carpenters, while the labour force was made up of navy and army personnel. The first problem was the loading of the cargo on the "S.S. Gamtoos," a vessel of barely 800 tons: the stores consisted not only of P.W.D. building material, but also of meteorological and radio equipment, of food, clothing, furniture, medical stores, fuel and a host of other material and equipment inseparable from the initial establishment of a permanent settlement. The loading of "Gamtoos" therefore had to take into consideration the strict order of priority for unloading at the other end.

Landing Arrangements

A frigate of the S.A. Naval forces had preceded the "Gamtoos," and the Commanding Officer had erected a wooden landing platform and gangway, suspended from the top of a vertical cliff, known as Gunner's Point, which forms the northern arm of Transvaal Cove. This expedient was necessary, as the beach itself consists entirely of large boulders, up to five or six feet in diameter, and the swell breaking on this so-called beach renders the approach of a boat extremely hazardous. A ship's boat could, however, approach the lee of the cliff under favourable weather conditions, and tie up alongside the suspended landing platform, from which a suspended gangway gave access to the beach above the reach of the swells. All smaller packages were transferred from the ship, which was anchored about a mile off shore, to motor or rowing boats, which came alongside the platform. The goods were then carried along the gangway to the beach.

The main buildings on Marion Island, with the Governor's house on the left. The meteorological office is on the right, the radio station masts in the background with the power station in the centre. The Stephenson's screens for recording rainfall, sunshine and temperature are in the middle foreground.

The prefabricated sections of the buildings were hove into the sea, and taken in tow by a motor boat to within 100 feet of the shore, where they were made fast to a rope line secured on shore at one end and to a buoy at the other end. Rowing boats, manned by Cape Coloured seamen then operated close inshore to secure lines to the floating gear, thereby enabling it to be hauled to the beach.

Manhandling heavy goods over the boulder beach was humanly impossible; a slipway of 8 feet by 8 feet oregon bearers with 9 feet by 3 feet runners was constructed, running some distance into the sea, and extending up the beach to a point where low cliffs marked the upper limit of the boulders. All floating gear was hauled up this slipway by means of a winch. Heavy cargo which could not be floated ashore, was transhipped to broad-beamed flat-bottomed barges which were towed to the buoy by motor boats, and thereafter hauled to the platform hand over hand along the fixed rope; the goods then had to be manhandled out of the barges and on to the landing platform.

The landing operations were exhausting, difficult and extremely dangerous — one boatman lost his life — courage of a high order was essential, and the battle against rain, icy sea and spray, continuous winds of gale force, and extreme cold, cannot be comprehended except by those who have experienced it. All seaward operations were directed by the Navy and no praise can be more sincere and no acknowledgements more heart-felt than those hereby accorded to the officers and men of the S.A. Naval Forces, without whose share in the work the venture would have been impossible.

Transport Problems

The next step was the transportation of the cargo from the beach to the site for the settlement on the plateau, about 100 feet above sea level. The intervening cliff was 20 to 30 feet high, of rock and boggy slopes and ledges. A derrick was erected at the summit, a block and tackle installed and the heavy and bulky packages were hoisted up by this means; a series of wooden steps and stretches of "duck-walk" were

constructed up the cliff to facilitate the manhandling of lighter parcels.

Reference has been made to the bog — this is the most outstanding and most prominent single difficulty encountered on the island: walking is a laborious process and a sudden descent up to the waist, or deeper if prompt assistance is not forthcoming, is of frequent occurrence; to carry a load, without sinking, is quite impossible. The pioneering party was therefore confronted with the problem of transporting tons of stores and equipment from the top of the cliff to the site of the settlement, over distances varying from 150 feet to 500 feet. These distances might appear insignificant, until it is realised that one's walking progress on Marion Island is limited to about half a mile an hour, and the physical exhaustion after walking a mile is equivalent to that of a 10 or 15 mile walk on ordinary dry land.

Various means were devised for transporting men and goods: "duck-walks" were made for walking on, and across bad patches wire netting and coco-nut matting were laid down, for hauling heavy articles slipways of 9″ by 3″ bearers and runners were constructed, and long lines of men laboriously trudged up and down, carrying packages or hauling heavy goods and the struggle against lashing rain and icy winds went steadily on.

The "Gamtoos" reached Marion Island on 20th January, 1948, and it was not until six weeks later that the pioneering party had a roof over their heads. They slept under tarpaulins on the rocky summit of Gunner's Point — the only solid surface in the vicinity; they were never dry, day or night; their hours of work were fourteen a day, from dawn to dusk; they spent many days of enforced inactivity enduring gales of such fury that the ships had to take refuge out to sea, and no work could be attempted.

One can but pen a tribute of admiration to these men.

Foundation Difficulties

In the actual erection of the buildings, the first problem to be solved was that of foundations, and this proved unexpectedly simple. If one holds a steel jumper vertically a few feet above the surface and lets it drop, it will disappear — it simply falls through the water-logged bog. Piling, therefore, for foundations proved a simple matter; 9″ x 3″ timbers were roughly pointed and pushed down until they struck rock. The first two buildings to be erected were two stores each 30 ft. by 20 ft.; the piles varied in depth from 14′6″ to 6′, and were spaced at 10′ centres, and surmounted by 9″ x 3″ bearers. The next building was the living accommodation, 60 ft. x 20 ft., followed by the meteorological building. The last to be erected was the wireless station: here rock outcrop was encountered just beneath the surface, and the foundations were concrete piers. To save time aluminous cement was used; as no sand of any description was available, "no fines" concrete was resorted to: volcanic tufa was knapped, packed in layers of 6 inches and a slurry of cement and water was worked into each layer.

The foundations for the wireless masts and stays were constructed as follows: the bog was blasted out by means of guncotton to depths varying from 5 feet to 11 feet, until rock bottom was reached; the shuttering was then placed, and "no fines" concrete placed.

One can but imagine the feelings of elation and satisfaction when the first wireless signals to and from the Union were transmitted!

The retractable landing stage and two cranes on the summit of Gunner's Point.

The party returned to Cape Town on 27th March, 1948, having spent approximately ten weeks on the island. More work remained to be done, but the weather was deteriorating rapidly, and the withdrawal of sea communication was, for various reasons, considered essential.

Second Expedition

The second operation took place during March, 1949, when the Public Works Department again undertook further construction work on the island. Needless to say, advantage was taken of the experience gained during the initial operation.

The first priority was to improve, speed up and if possible, render less dangerous the operation of landing cargo on the island. The construction of any form of mole, jetty or harbour, while of course not impossible, is entirely out of the question, as the cost of such an undertaking would be unjustifiable under present circumstances. The landing stage, suspended from the top of Gunner's Point cliff, and constructed by the first naval party, was completely destroyed by a storm in August, 1948. The idea of this structure, however, was constage with a gangway to the beach was designed, and subsidered, and its possibilities explored, and a retractable landing sequently installed.

The second modification was the breaking down of the prefabricated buildings, and of the cargo generally, into much smaller units. This, of course, entailed more work on the island, to re-erect the buildings, which in turn necessitated a larger force of skilled labour. An augmented labour force was desirable for another reason: all the work on the island is a race against time: the ship has definitely limited endurance; adverse weather conditions can impede or entirely prevent offloading and landing operations for days on end; and finally, ships and men on an expedition of this nature, represent very heavy expenditure.

The second expedition left Durban on 14th March, 1949, carrying, besides relief stores for the personnel on the island, certain P.W.D. cargo, comprising two additional buildings, two 30 cwt. scotch cranes and the retractable landing stage, together with a works officer and seven carpenters; the ship arrived off Marion early in the morning of the 18th. During the suc-

ceeding week unexpectedly good weather favoured the rapid handling of the cargo and all stores and equipment were safely brought ashore in the space of five days.

Improved Landing Methods

The procedure on this occasion was as follows: First the 30 ft. jib of one crane was towed to a spot in the lee of the 60 ft. high vertical cliff of Gunner's Point, and was parbuckled up to the summit by man-power. The jib was then fixed projecting over the face of the cliff and used as a derrick for hauling up the remaining components of the crane. The heaviest single part was the cast iron base plate, weighing just over 1,000 lbs., and every available hand was required to raise this piece.

Meanwhile the work of preparing emplacements for the two cranes was in hand. The summit of Gunner's Point promontory is approximately 300 feet long and 80 feet wide, composed of incredibly rugged volcanic rock — not a level place of one square foot was available. Emplacements for the cranes were therefore blasted out, and sufficient areas were roughly levelled to take the cranes and to provide working spaces around them.

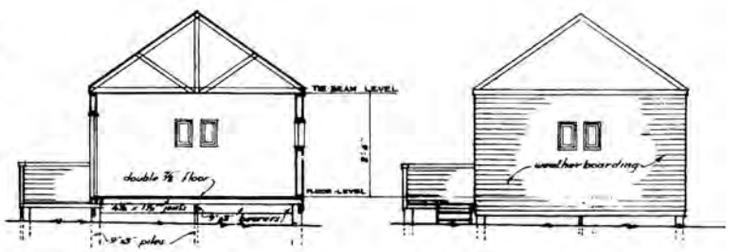
At the end of the third day No. 1 crane was assembled and concreted into position near the seaward end of the promontory, its position being such that it could handle goods deposited on the suspended landing platform immediately below — which, of course, had not yet been installed. On the morning of the fourth day, this crane was put into commission, and the landing of stores was simplified and enormously expedited. Up to a ton of goods at a time were brought alongside the cliff face by the ship's motor boat, the crane hook was made fast to the cargo nets and the motor boat was relieved of its burden, and on its way back to the ship for another load, in next to no time.

No. 2 crane was erected at the landward end of Gunner's Point, in such a position that it could deal with cargo deposited on the beach, i.e., at the shore end of the suspended gangway leading from the landing stage to the beach.

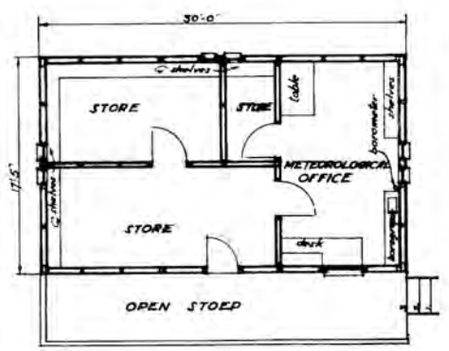
Meanwhile the offloading of the remainder of the cargo was proceeding apace: thanks to continued fine weather and relatively calm seas and the breaking down into small parcels of the prefabricated buildings, no great difficulty was experienced in floating all timber ashore. The motor boat towed the packages to a buoyed line under the lee of the cliff, and

The Radio Sonde Hut under construction.

EAST ELEVATION



SECTION D-D NORTH ELEVATION



PLAN

METEOROLOGICAL STATION AND STORE

a shore party manhandled them up on to the boulder-strewn beach. The steel parts of the retractable landing gear were hoisted to the top by No. 1 crane.

As on the first expedition, the seaward operations were carried out by the Navy with the skill, daring and efficiency which is a byword with that Service, and which leaves the landsman lost in admiration.

New Landing Stage

The retractable landing stage and gangway are essentially simple in conception and construction. Vertical frames, built up of 3″ x 3″ x ⅜″ T-sections, support 9″ x 3″ timber floors; the landing stake is 5 ft. wide by 10 ft. long, and the gangway is 2′3″ wide, in lengths of 10 feet. The 10 ft. lengths are connected to each other by stout continuous hinges, so that longitudinally the structure has flexibility to take care of the swells of the sea. Timber cantilevers project horizontally from the top of the cliff, and the structure is suspended from these by means of ⅝″ diameter steel wire ropes. The platform and gangway can be raised or lowered, either as a whole or in 10 feet sections by means of "creepers"; these are small friction winches which may be seen any day when workmen are engaged on hanging scaffolding on the face of a tall building.

As the erection of this structure had to be carried out practically at sea level, over very deep and sometimes rough water, precautions had to be taken to avoid losing any essential parts, such as hinge pins for example, and such parts were attached to light lines, until securely fixed in position.

Upon completion of off-loading operations, or should rough weather come up during the progress of the work, the landing stage and gangway are raised to the top of the cliff. The fierce storms, more particularly in winter, and the exposed

Gunner's Point Store on Marion Island.

position of the cranes and landing gear, cause deterioration and damage, and a routine has been established whereby the permanent personnel of the island carry out continuous inspection, servicing and maintenance.

The erection of the two new buildings presented no special difficulties — the construction was rapidly completed and the expedition sailed from the island on 12th April, 1949, leaving the permanent occupation party of seven men to their long and lonely vigil. The pioneering work has been successfully accomplished, but a great deal still remains to be done. Life on an island in the southern seas is not easy: bog, rain, wind, blizzards and cold render the outlook drab and dreary and refinements of comfort are the just due of those who man this outpost of the Union. Improvements in heating, sanitation, lighting and power, recreation facilities and transportation over the bogs and marshes, are under consideration, and no doubt, from time to time further tasks will be entrusted to the Public Works Department. All construction work on this bleak and lonely ocean outpost involves danger and hardship: nevertheless the problem is, not to coerce men to undertake the work, but to limit the numbers of eager volunteers, for Marion is still an island of high romance.

TOWN PLANNING LEGISLATION IN SOUTHERN RHODESIA

By

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and

W. G. SHEPPARD, A.M.T.P.I.

THIS interesting paper which shows, among other things, the extreme difficulty of framing adequate, equitable legislation concerning Town Planning, was read at the recent conference of the Institute of Town Clerks in Durban. The authors describe, in these extracts, the history of town planning and also some of the difficulties that have occurred in carrying them into practice.

THE object of this paper is to bring to the notice of delegates, particularly those from the Union of South Africa, what has been and what is being done in Southern Rhodesia in regard to town planning legislation . . . the main purpose of town planning legislation is to right the wrongs that have been permitted in the past through the lack of proper measures of control, and to ensure that past errors are not repeated.

Town planning legislation is probably of more importance when related to already developed areas than it was when related to new areas and towns about to be developed. What was sought has not always been achieved by legislation which has been introduced in Southern Rhodesia, as the following observations will show.

The 1930 Town Planning Act

The first move to secure the introduction of town planning in Southern Rhodesia was made in 1929, when a representative of the Bulawayo Municipality told the delegates at the Second Municipal Conference:

"That the Bulawayo Council was very anxious to get some legislation through last session and prepared a draft Bill . . . Salisbury also prepared a Bill . . . The Government also prepared a draft Bill . . . the Government's scheme seemed to be very admirable in its way *but it was more for the starting of towns where there are as yet no towns, but it was hardly a suitable Bill for a Municipality which is already started.*"

A Salisbury delegate said there were certain trades "which would be better in definite areas, such as kaffir stores, which should not be allowed in the neighbourhood of stations as they gave a bad impression to visitors arriving in the town; but local authorities had no powers to set aside special trading areas for that class of business."

The Conference supported the proposal that application be made for legislation on the lines of the draft Bill by the Municipality of Bulawayo.

The Government decided to give the Municipalities exactly what they asked for, and amended the Municipal Act so as to give each of them the power

"with the sanction of the Governor, to adopt a zoning and town planning scheme, or either, for the eventual lay-out of any . . . land which is likely to be used for residential, industrial or similar purposes, and to fix and determine in like manner the minimum areas into which any property . . . may be sub-divided. Such scheme shall be limited to the allocation of districts or zones for residential, industrial, commercial and similar purposes, and to the assignment of positions for arterial roadways, tramways, drainage, sewereage and water supply undertakings. When the Governor has approved of any such scheme or any amendment thereof, any subsequent sub-division of the land shall conform with such scheme . . . no stand or plot shall be used for any purpose inconsistent with the zone in which it is situated." (Sections 191-201 of Act 30 of 1930.)

The 1933 Town Planning Act

In 1933 the zoning and town planning provisions of the Municipal Act to which reference is made in the preceding paragraph were repealed and replaced by the Town Planning Act No. 34 of 1933. This new Act provided in Part II for the establishment of new townships on land situate outside a municipal area, and in Part II for the preparation of town planning schemes. It was provided, among other things, that town planning schemes may make provision for the definition of zones for industrial, commercial and residential sites, and the zoning of areas to be used exclusively or mainly for specific purposes, and as is usual in such schemes, persons injuriously affected thereby were allowed in certain circumstances to claim compensation. In very many respects its provisions appear to have been based on the Transvaal Townships and Town Planning Ordinance No. 11 of 1931.

Section 39 of this new and improved Town Planning Act provided that where at any time after 31st July, 1933, and pending the preparation and approval of a scheme, it appeared to a Council that any projected building or other works intended to be erected or undertaken within the area of such Council would not conform to any scheme under consideration, or would interfere with the amenities of the neighbourhood, the Council could conditionally refuse its consent to the erection of such buildings or to the carrying out of such work, or could definitely prohibit the same.

These new provisions relating to "the zoning of areas to be used exclusively or mainly for specific purposes," and to the right to prohibit the carrying out of work not in conformity with a town planning scheme approved or in course of preparation, were accepted by local authorities in 1933 in the confident belief that they were being given wider powers than they possessed under the 1930 Act, and most certainly in the belief that they were not thereby being deprived of what may be described as the keystone of a town planning scheme, namely, the right to control the *use* of land and buildings.

Powers Not Conferred

Local authorities, however, were shaken somewhat rudely out of that belief when in 1941 the City Council of Salisbury applied to the High Court for an order interdicting and restraining an owner of property from using or permitting to be used or occupied a certain dwelling in such a manner as not to conform to the Council's town planning scheme, the preparation and approval of which was then pending and under consideration, on the ground that the building was being occupied or used as two flats by two tenants contrary to the scheme and not as one dwelling house in accordance with the plans filed and approved by the Council.

The learned judge said that a town planning scheme in course of preparation and under consideration was strictly provisional in its nature until approved and gazetted, and pending approval of the scheme the only power given to a Council of interference with the common law rights of owners in the area affected were those conferred by Section 39 of the 1933 Act, **which were limited to the prohibition of the erection of contemplated buildings or works — no power was given to prohibit rights of user.** It was obvious, therefore, that any rule or regulation framed under a provisional scheme which purported to confer rights of interference with user must be closely scrutinised and strictly interpreted. His lordship went on to say that the expression "erected and used" which was contained in the provisional town planning scheme, at any rate until the scheme had been approved and gazetted, should not be interpreted as giving the Council powers of prohibition of use **not conferred by the Act itself;** he added that there was nothing in the Municipal Act conferring the right to prohibit the use of buildings as flats in the area in question. (City Council of Salisbury v. Menzies (1941), S.R. 190.)

Fresh Powers Sought

The reaction of the Salisbury Council to the foregoing judgment was to ask the immediate introduction of legislation to provide that, where it appeared to any town planning authority that the use to which any land or building, or any part thereof, is being put does not conform to, or interferes with, the amenities of the neighbourhood, or would be in contravention of a scheme then in course of preparation, the town planning authority may prohibit such use.

In support of the above application the Council quoted many authorities, some of which are repeated hereunder as a matter of interest:

(a) 1936 Report of the Council's Town Planning Consultants: "The primary object of defining areas in which the use of land and character of buildings is laid down, is to secure that the various activities of the town develop

harmoniously and fit into their proper place as parts of the complete economic unit instead of being in conflict, one expanding at the expense of the other, with the resultant loss in land values, amenity and efficiency and an increased cost of administration. The existing distribution of land and building uses, the facility for extending and the cost of providing necessary sanitary services, the preservation of amenities and property values, and the probable trend and extent of future development all have to be taken into account in making zoning regulations. The restrictions should be sufficiently rigid to establish and maintain the conditions necessary to the proper development of the predominant use and at the same time sufficiently elastic to prevent unnecessary hindrance to legitimate types of development. This can best be done by adopting for each zone the principle of specifying the building uses which will be allowed as a matter of course (the predominant use), the uses which will be allowed by special consent of the Council, and the uses which are definitely prohibited."

(b) "Recent Advances in Town Planning," by Thomas Adams: "Zoning is the regulation by law of the uses of land and buildings . . . for the purpose of securing health, safety, convenience and general welfare" (p. 184).

(c) Legislation already exists controlling land use, e.g. the Advertisement Regulation Act prohibits with certain exceptions the erection or display of advertisements on main, district or branch roads or within 100 yards of any such road, while the Dairy Regulations provide that no milking place shall be situated within a distance of 300 feet from any residential quarters. It was pointed out by way of illustration that if local authorities were not given power to control land use it would make possible the establishment of such businesses as fish friers and junk yards in residential areas, of manure manufacturers adjacent to Government buildings, and hide and skin merchants in proximity to, say, the General Post Office.

(d) "Municipal Law," by Dönges (p. 516): "The power to control, in the interest of the inmates-to-be and the neighbours, the class and the construction of buildings would be of limited value unless it was accompanied by a power to control the uses to which buildings are put."

(e) Power to control future user has already been given to the local authorities in the Union, e.g. Section 189(m) and Section 80(19) of the 1935 Orange Free State and of the 1939 Transvaal Local Government Ordinances respectively, give power to make by-laws for determining areas within which specified trades, business or callings may not be established or carried on.

(f) The use of land and buildings was controlled as far back as 1810, for on 15th October in that year Napoleon Buonaparte published a decree providing that any use of property which involved the emission of an unhealthy or unpleasant odour would be permitted only by special consent.

The 1945 Town Planning Act

Further representations were made from time to time for a complete revision of the Town Planning Act, but it was not until 11th January, 1946, that the present Town and Country Planning Act was brought into operation. While **this new Act does not contain all the provisions which local authorities would like to see,** it is nevertheless a very great improvement on its predecessor, the 1933 Act . . .

Part I provides for the establishment of a Town Planning Court to hear appeals by persons aggrieved by decisions of town planning authorities. The Court consists of a president and two other members; the president must be a judge, a retired judge, a retired magistrate or an advocate of not less than ten years' standing. A matter of law, or any question whether a matter for decision is a matter of fact or a matter of law, is decided solely by the president. At a hearing before the Court any person may appear either in person or by any person appointed by him in writing, or by counsel or attorney. Appeals on points of law, or against the president's decision whether a matter is one of fact or law, or with any award of compensation made under Sections 35 or 41, may be made to the High Court, while appeals on questions of law may be made to the Appellate Division of the Union of South Africa. The Court is empowered to make rules regulating its procedure, while the Chief Justice and other judges of the High Court are empowered to make rules for regulating appeals to the High Court. The Act provides that the rules made by the Town Planning Court shall be as simple and informal as possible; the rules for appeals contained in Government Notice 329 of 1946 provide :—

(a) For notice of appeal to be given to the Registrar and the respondent within 28 days of notification of the decision made;

(b) For submission within 14 days of the notice of appeal of the "appellant's case," the president being allowed to purge defaults in the timeous submission of such cases;

(c) For the submission to the Registrar and the appellant of the "respondent's case" within 21 days of receipt of the appellant's case;

(d) For an "agreed case" being submitted where no dispute upon the facts exists;

(e) For the parties calling evidence where the facts are in dispute;

(f) For the Court to determine the appeal after hearing evidence and argument, and for reserved judgments being delivered in writing to both parties.

Appeals have already been made to the Town Planning Court, and the wisdom of setting up this special machinery to settle disputes has been made evident to all those who have taken part in the proceedings.

Government Notice 400 of 1946 contains further rules made by the Chief Justice and other judges of the High Court, and provides that within 28 days of any determination or award of the Town Planning Court or decision of the president against which an appeal may be made, any party thereto may note an appeal by lodging a written statement with the Registrar, a copy being served on all parties to the proceedings . . .

Unsatisfactory Features

Part II of the Act deals with the preparation, approval and enforcement of schemes for urban and rural areas, and compensation for injurious affection thereby, and generally speaking, these provisions traverse the same ground one is accustomed to find in modern town planning legislation. Nevertheless certain unsatisfactory features have already become apparent notwithstanding that the Act is of such recent origin.

For example, Section 22 authorises the responsible Minister to allow a local authority to prepare a town planning scheme for any land within a distance of five miles beyond its boundaries, but makes no provision whatever for the local authority being reimbursed for any expenditure it may incur in so doing. The planning of an area extending five miles beyond the borders of a Rhodesian city such as Salisbury, a city which has thousands of acres of commonage or townlands, involves an area within a radius of approximately 9½ miles from the centre, containing roughly 224 square miles. This area, it should be noted, is almost twice the size of the area in the Administrative County of London, with its population at the 1938 census of just over 4 million. Had the Salisbury Council accepted the task of planning such an enormous area it would not only have had to plan its own area of 37½ square miles, but an additional area of 206 square miles, or 5½ times the area in respect of which the Council is obliged to prepare a town planning scheme . . . A simple calculation will show that with a density only one-tenth that of London the Salisbury commonage will accommodate a population of 128,000, while the larger area referred to previously will house nearly three-quarters of a million — a population of Johannesburg's size numerically but 2.3 times as large in area. These figures are quoted to show how unwise and how wasteful it is to sanction the premature development of such enormous areas, all of which must be provided with road systems, water, electricity, sewerage and other public utility services.

Local authorities protested against this measure which forced them to disburse funds collected from ratepayers upon the harmonious development of areas owned and occupied by non-ratepayers and (it is believed) with one exception declined to plan beyond their areas of jurisdiction . . .

Section 32 provides that every local authority shall be the responsible authority for its own scheme area and the Minister shall be the responsible authority for areas within the scheme area but not under local government control. If any area, for which the Minister is the responsible authority, is subsequently included within the area of a local authority, such local authority then becomes the responsible authority for the scheme and the Minister may then recover any costs incurred by him by way of compensation, etc., from such local authority.

Little Accomplished in Outside Areas

The Government, however, was adamant in its refusal to recompense a local authority which carried out town planning functions beyond its borders, and instead set up committees known as the Salisbury and Bulawayo Planning Committees "to advise on the broad lines of the town and country planning of the regions round Salisbury and Bulawayo respectively," and also committees for the Eastern and Midlands areas of the Colony. It is of interest to recall that, at a meeting which preceeded the setting up of the Salisbury Committee, a Government spokesman confidently predicted that it would have completed its work within six months. Needless to say, that period has already expired and the fringe of the subject has been scarcely touched. The committees are composed of representatives of the two City Councils, the almost non-existent peri-urban local authorities, Chambers of Commerce and Industries, the African Welfare Society, the Railways, the Electricity Supply Commission, various Government Departments, the National Farmers' Union, and the Immigration and Development Association of Rhodesia; as is to be expected with such wide representation, all manner of questions are being brought under the head of the "broad lines of town and country planning."

British portable builders' hoist invented by an ex-bricklayer.

Section 43 of the Town Planning Act provides that compensation shall not be payable in respect of the injurious affection of property by the coming into operation of any provision of a town planning scheme which prescribes the space about buildings, fixes building lines, restricts the manner in which buildings may be used, and among many other similar things requires, in the case of the erection of any building intended to be used for purposes of business or industry, the provision of accommodation for loading, unloading or fuelling of vehicles, with a view to preventing obstruction of traffic on any road. It has been noticed, however, that this exclusion of the responsibility for payment of compensation does not extend to any provision in a town planning scheme requiring the owner of a building to provide parking facilities for motor vehicles used by persons working or living in such building. Application has accordingly been made for this very necessary amendment to the Act.

The Government has responded to the above request by acknowledging that the principle behind it is sound and that the need for action is urgent . . . The Government considers, however, that the principle should be achieved by inserting a section in the Town Planning Act authorising the planning authority to require such parking accommodation in specified classes of buildings (cinemas, meeting halls, hotels, etc., are quoted as examples), the amount of such accommodation being determined in each particular case after consultation with the Chief Officer of Police for the area. The proposed new section will specifically exclude claims for compensation for injurious affection . . .

New Peri-Urban Townships

Part III of the Act deals with a question of grave importance to local authorities in general, and to Salisbury in

particular, and that is, the establishment of new townships on the perimeter of the areas of jurisdiction of existing local authorities. In the past local authorities have been perturbed principally because these "dormitory" suburbs have usually had no form of local government, because the disposal of house waste, sullage water and even excreta, has been (and in many cases still is) by individual effort, because the protection of underground water supplies against surface contamination has been unsatisfactory, while pit latrines and privies have been sited without regard for the water supplies of the owners much less with any consideration for the water supplies of neighbours. It is true that considerable improvements have been effected in these respects during the last ten years, but the efforts of the local authorities to stem the further extension of the already numerous peri-urban suburbs have been completely unsuccessful . . .

A further and more serious complication exists because each stage in the process of European development involves a parallel degree of development for the native, who requires the same facilities in the way of housing, essential services, health and welfare services as the European by whom he is employed. . . . The unwillingness on the part of the central authority to link up European development with native development is exemplified by reference to Section 48 of the Land Apportionment Act (the object of which is, broadly speaking, to apportion the land in the Colony into Native, European, forest, unassigned and undetermined areas) which actually and inexplicably legislates that the provisions of the Town Planning Act shall not apply to the establishment of any native township or native urban area.

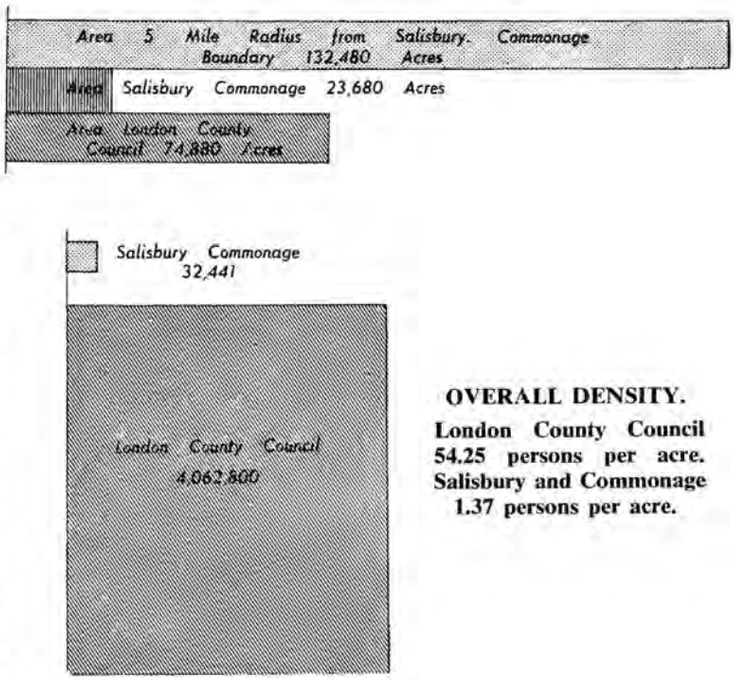
Subdivision of Land

Part IV of the Act deals with the sub-division, with the permission of the Minister of Internal Affairs, of all land in the Colony other than land falling within the limits of a Municipality commonly known as the commonage. It will be noted from this definition that a Municipality is deprived of the right to control sub-divisions of land situated within the boundaries of its area of jurisdiction which is neither within the municipal area nor a part of the Commonage — in other words, a piece of commonage land which has been alienated but has not been brought within the municipal boundaries and, for example, a railway reserve . . .

Part V applies to the sub-division of land falling within the limits of a Municipality, and as the case in respect of Part IV, no person may do anything with his land which may lead to the subsequent sub-division of it unless the consent of the Council has been obtained for the sub-division. These provisions are designed to prevent, for example, the erection of a second dwelling on a piece of land as a preliminary to an application for permission to sub-divide . . .

Part VII allows any person to apply to the Minister of Internal Affairs for the alteration, suspension or removal of any condition or covenant registered against the title restricting or in any way affecting the use or occupation of any stand situated in an approved township. Simple and inexpensive machinery is thus made available to the owner of land to obtain, for example, the removal of a restriction in his title against the use of the land for business purposes.

Miscellaneous matters are dealt with in Part IX . . . Several unavailing attempts have been made to obtain legislation to provide that a town planning scheme shall override not only a Council's bye-laws, but the provisions of title deeds. If,



OVERALL DENSITY.

London County Council 54.25 persons per acre. Salisbury and Commonage 1.37 persons per acre.

for example, a stand in a good residential area is bequeathed subject to the addition of a condition to the effect that it shall henceforth be used solely for the purpose of carrying on the business of a fish frier, and such use is in conflict with the provisions of the scheme, it is felt that the scheme should automatically override the title and thus make it unnecessary to set in motion the provisions of Part VII of the Act . . .

The Land Redistribution Act

It is doubtful whether in any town (or city) the need has not arisen to replan or redesign sub-divisions of land which were authorised in the past, where, for example, the owner planned the sub-divisions on paper without any particular regard to the topographical features of the ground. Incredible though it may sound, **cases are known in Southern Rhodesia where stands are hanging precariously over the edges of ravines, while others, during rainy seasons, are situated in the bed of a stream.** There are numerous other cases where replanning is necessary not only in the public interests but in the interests of the owners of the stands.

To meet the conditions mentioned, the Land Redistribution Act 3 of 1947 was promulgated, and the procedure to be followed thereunder is for a motion to be introduced to Parliament which, if approved, enables the responsible Minister to appoint a local authority or some other person to be the redistribution authority.

The authority then prepares a **redistribution scheme** which must provide for the following matters :—

(a) The amalgamation for redistribution purposes of all land in the scheme area (which means the area embraced by the redistribution scheme), inclusive of Crown land, streets and public places.

(b) The allotment of land to the Governor, a local or other public authority of land for public purposes, and for streets and public places.

(c) The assignment to as many owners of land in the scheme area as is possible of one or more holdings of land.

(d) The preservation to each owner of such special advantages by way of position, frontage or otherwise as were attached to his original holding.

(e) The extinction of any existing servitude and the provision of any new servitude necessary for the enjoyment of any final holding granted to any owner under the scheme.

(f) The demolition of buildings classed as insanitary under the scheme or which are of a character or situation inconsistent with the scheme.

(g) The amount of compensation to be paid to each owner who is injuriously affected under the scheme.

(h) The appreciation to be paid to the authority by each owner who derives a benefit under the scheme.

After the authority has prepared plans illustrating the existing position and the proposed redistribution scheme, notice must be served on the owners of land concerned stating how their land is affected by the scheme. Public notice must also be given, and interested persons are thus given an opportunity to lodge objections . . .

Payment for "Betterment"

Among other things, the Act provides that a redistribution scheme shall make provision for the amount of compensation to be paid by the redistribution authority to each owner of land in the scheme area who is injuriously affected under the redistribution scheme, and conversely for the amount of appreciation to be paid to the authority by each owner of land who derives a benefit under the redistribution scheme, "appreciation" being the amount by which the value of land granted under such a scheme exceeds the value of the land in place of which such land was granted. The inclusion in the Act of provision for the payment of "appreciation" is of particular interest when it is remembered that the Government has up to the present resisted all attempts by local authorities to secure the inclusion in our town planning legislation of provisions for the payment of "betterment."

Professor W. G. Holford, the eminent British town planning authority, recently informed the Transvaal Town and Country Planning Association that no attempt had been made in South Africa to recover any of the values created through giving certain rights, such as business rights, to the land owner. These values, he declared, were values which the community had created, and South Africa would have to find some way around the compensation and betterment problem. At present those who have their present rights restricted were compensated, but nothing whatsoever was collected for the betterment of property as a result of the community's activities. These remarks apply with equal force to Southern Rhodesia.

(Continued from bottom of next column.)

building station to study the behaviour of aluminium alloys, and other non-ferrous metals, in buildings.

It is of interest, therefore, to all concerned in building in South Africa, to learn that arrangements have now been concluded for Stewarts and Lloyds of South Africa, Ltd., to act as sole agents for I.C.I., Metals Division. All the latest technical information will now be available in this country to architects, engineers, builders and users of wrought non-ferrous metals.

TECHNICAL NOTES

NEW TUBE WORKS

THE recent opening by Sir Godfrey Huggins, Prime Minister of Southern Rhodesia, of Stewarts and Lloyds' new steel tube plant at Que-Que, was a big step forward for industry in the colony. Initial production at the new factory, which draws its raw material from the adjacent Rhodesian Iron and Steel Corporation steelworks, will consist of standard screwed and socketed tubes, both black and galvanised. Already the plant has a capacity of 8,000 short tons of tubes per year, in all sizes from three inches to a quarter inch nominal bore. Additional equipment, now in course of completion, will enable the manufacture of various tubulars and specials necessary to make a full range of products for Rhodesian industry. As demand grows further plant, machinery and offices can be erected on the 210-acre site.

Interior view of the Que-Que tubo-works.

LIGHTING

With the establishment of a subsidiary organisation of the well-known firm of British Thomson-Houston in Johannesburg, those concerned with industrial, commercial and street lighting will be able to get better service than before. Already the products of this firm, such as turbo-alternators, switchgear, transformers, rectifiers, motor and control gear, lamps and lighting equipment, are well known to electrical engineers in Southern Africa, as elsewhere. But the establishment of a local branch will enable the lighting advisory services to be greatly extended. At the same time Messrs. Thos. Barlow & Sons (Natal), Ltd., still remain as agents for the "garden" province.

NON-FERROUS METALS

The Metals Division of Imperial Chemical Industries is the largest manufacturer of wrought non-ferrous metal products. Plates, strip, circles, tubes, rods, wire and welding rods in brass, copper, nickel silver, aluminium and alloys of all these metals are manufactured in their mills. The company has also erected at Witton, near Birmingham, an experimental

OVERSEAS NOTES AND NEWS

Britain

THE Bowland Forest Tunnel, which forms the ten mile centre portion of the water supply aqueduct from Haweswater to Manchester was recently rescribed, by Mr. C. F. Grundy, M.I.E.C., to the Institution of Civil Engineers in London.

The aqueduct in tunnel is of circular section, 8 ft. 6 in. in diameter, with a concrete lining varying in thickness from 14 ins. to 18 ins. The section for tunnel driving is horse-shoe shaped, about 11 ft. by 11ft., with an 8 ft. wide floor. The major quantities of work involved are as follows :—

Excavation in tunnel	250,000 cub. yds.
Concrete lining	140,000 cub. yds.

The indications are that 7½ miles of tunnel will be driven through a mixture of carboniferous shales and millstone grits requiring temporary support. The remainder will be in hard limestone.

Highways, Bridges and Aerodromes.

At Pitlochry, the combined dam and power station is the lowest stage of the Tummel-Garry project of the North of Scotland Hydro-Electric Board.

The dam is of the gravity type, 510 ft. in length between the cut-off walls and 60 ft. in height from foundation level to the spillway crest. Two spillway sections, each 90 ft. long, separated by a central control tower and flanked by control towers on each bank, have an extreme width of 93 ft., measured from the upstream face to the tip of the spillway bucket.

The estimated quantities for the major items of work are as follows :—

Excavation of loose material overlying rock	110,000 cub. yd.
Rock excavation	37,000 cub. yd.
Concrete of all grades	62,000 cub. yd.
Shuttering to exposed faces only	42,000 sq. yd.

Road access to the site is obtained via an existing public road on the right-hand bank and by an extension across the old recreation ground to the left-hand bank. In addition, a temporary suspension footbridge of 250 ft. span has been erected immediately upstream of the dam to facilitate the movement of labour and to support the power and lighting leads to the plant.

Spoil tips are located on both banks of the River Tummel upstream of the dam, but about 16,000 cub. yd. of material has been transported by lorry to form the approaches to the new Aldour bridge, under construction about ½ mile downstream.

Highways, Bridges and Aerodromes.

British Guiana

The ten year development plan, recently approved by the Secretary of State for the Colonies, includes the provision of hospital, school, housing, agricultural irrigation, water and industrial projects at an estimated cost of £6,500,000. Nearly half this sum is being allocated under the Colonial Development and Welfare Act by the British Government.

Unfortunately the engineering staff of the Public Works Department has been 50 per cent. under strength for well over a year and it is virtually impossible to fill the vacancies at the salaries at present on offer.

Highways, Bridges and Aerodromes.

Canada

The first all-aluminium highway bridge on the American continent is to be built at Arvida, Quebec.

The main span is a fixed 290 ft. arch with a 47½ ft. rise and with five 20 ft. continuous girder approach spans at each end. Total length between back walls of the abutments is 504 ft.

The box girder arch ribs are 23 ft. centres, and are braced with latticed girders, forming a K-system of bracing. All posts, over the arch as well as the approaches, are on the same centres as the arch ribs and are spaced 20 ft. longitudinally. Of box construction, they are not braced in either direction, except for posts at the skewbacks.

The floor system consists of two lines of longitudinal girders, continuous from end to end and supported by the posts, and of floorbeams of the same depth as the girders and framing them at panel points and at midspan. The floorbeams are thus spaced 10 ft., and carry a sidewalk bracket at each end.

The roadway is 24 ft. between curbs and is of 8 in. poured-in-place continuous concrete slab, reinforced in two directions. There is no crown on the roadway and the bituminous wearing surface is 2½ in. thick throughout.

There are two 4 ft. sidewalks, of pre-cast concrete construction. The units are 5 ft. long, the slab thickness varying from 6½ in. at the outer edge and 5½ in. near the curb. The curb was made only 6 in. high to allow the opening of car doors, but in the interests of safety, the aluminium handrailing was designed for greater lateral forces than is usual.

It consists of vertical square bars between two longitudinal 4 in. channels, and of extruded semi-elliptical section for the top rail, with posts at every floorbeam. A grooved, channel-shaped extruded fascia will conceal the edges of the sidewalks and will add to the clean cut appearance of the structure.

The bridge deck is sloping down from the south end, the grade being 1.034 per cent. over the south approach, and 4.125 per cent. over the north approach, with a joining vertical curve over the arch span. Finger-plate type expansion joints are provided in the roadway at both ends of the bridge, with drainage troughs underneath.

Highways, Bridges and Aerodromes.

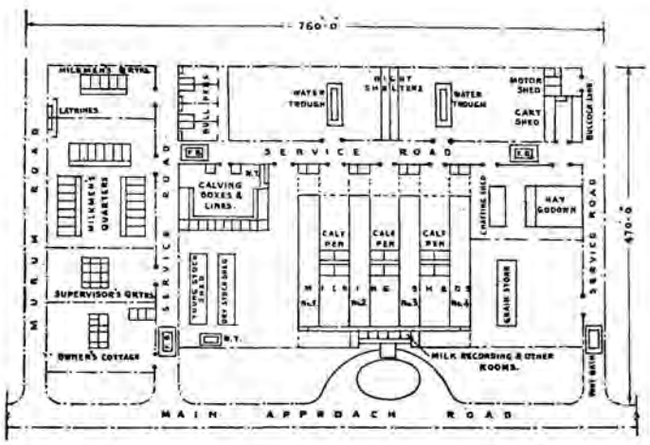
India

The inauguration of the new kiln at the Kynne Works of the Associated Cement Companies, Ltd., in the Central Provinces, at the end of last year, has increased production by a million tons per annum. The present capacity is 3,550,000 per year, or nearly 1,000 tons per day.

Indian Cement Journal.

To provide clean milk "for the masses" in Bombay, the Indian Government has recently opened a milk colony at Goregaon. When completed this project will have used up to 25,000 tons of cement. Until now over 50,000 milk cattle have been housed in congested residential parts of Bombay, in unclean, insanitary stables with no land available for grazing and exercise. Each of the standard farm units, in the new Government milk colony, can accommodate 300 milch cattle in four milking sheds. Separate calving boxes and calf pens are provided. The scheme allows for quarters for manager, supervisor and milkmen close at hand. Grain, hay and dry stock are stored in separate sheds. At both entrance and exit a footbath for the cattle is provided.

Indian Cement Journal.



Plan showing layout of a standard farm unit at the Indian Government Milk Colony at Goregaon.

INDUSTRIAL CENSUS

The figures for the year 1946-47 have just been released. They show, as we might expect, a continued advance in the number of factories, in employment and in output. As compared with the previous year the number of manufacturing establishments increased by 528, accounting for a rise in the value of land, buildings, machinery, plant and tools to the extent of over £17 million. Numbers of European employees were 13,000 greater while a further 19,000 Non-Europeans were at work. The gross value of the output, at £446 million, was £68 million more than the year before.

In the stone and clay industries there were 596 establishments, employing nearly 4,800 Europeans and almost 35,000 Non-Europeans. The metals industry engaged over 40,000 Europeans and close on 60,000 other races, in 1,467 establishments. There are 464 factories making furniture and employing nearly 14,000 people of "all races." Of these 4,769 were Europeans. The building and contracting business was the fourth largest, judged by the number of firms engaged. Together with more than 14,700 Europeans there were 40,000 Non-Europeans employed in the 1,184 establishments engaged upon this class of work.

While the general factory figures do give a comparison for the previous two years only, those for individual industries give us relative data for previous years. It is a pity that, as has been admitted by the Minister for Economic Affairs, the Department of Census and Statistics is not more adequately staffed. We might then get more complete figures and also some diagrammatic comparisons with previous years, which would make the data not only more meaningful but also considerably easier to digest. Further, as the Chamber of Industries has pointed out, some up-to-date figures would be infinitely more valuable. Those now issued are anything up to **three years old.**

If a country's economic development is to be studied and shaped to best advantage there must be, as in a business, up-to-date statistics. More historical recapitulations are of little value. There is seldom much worth copying from Socialist British economy but the Government there did, at least three years ago, institute a system of monthly economic statistics issued right up-to-date. Given adequate staff and facilities such a system could be followed in South Africa with considerable advantage.

PUBLICATIONS RECEIVED

British Public Utility Services by D. N. Chester, published for the British Council by Longmans, Green & Co. 32 pp. One shilling.

This is a well illustrated and well written little book. But Mr. Chester suffers from all the difficulties incumbent upon authors who write for official propaganda purposes. However, as an Official Fellow of Nuffield College, Oxford, and Editor of the Journal of Public Administration, as well as the author of two books on Road Passenger Transport and Nationalised Industries, he is obviously an authority on the subject.

In five chapters, apart from the Introduction, we are given instances of development, ownership and operation, forms of public control, problems and current controversies and the future. In the space at his command, Mr. Chester has certainly been objective.

First Report of the Committee on Industrial Productivity published by His Majesty's Stationery Office. 31 pp. 6d.

The Committee, which is presided over by Sir Henry Tizard, was appointed in December, 1947, "to advise the Lord President of the Council and the Chancellor of the Exchequer on the form and scale of research effort in the natural and social sciences which would best assist an early increase in industrial productivity and further to advise on the manner in which the results of such research can best be applied."

This report, obviously not conclusive, describes the *modus operandi* adopted by the Committee and an outline of its researches in the fields of technology and operational research; imports substitution; human factors, as well as technical information.

Annual Report of the Department of Social Welfare, 1947. Published by the Government Printer, Pretoria. 45 pp. 5s.

This report leads off with a chapter on Administration, in which there is a good deal of forthright comment. The Secretary for Social Welfare, Mr. G. A. C. Kuschke, says: "Bad and unsuitable office accommodation is not merely

uneconomical but, from a humane point of view, inadmissible, and the authorities should be urged to give much more attention to the question of suitable office accommodation for civil servants . . . The Department's head office is in Pretoria, the administrative capital of the Union, but it is here where the accommodation of the State's enormous and ever-expanding administrative machinery is conspicuously inadequate and even unsuitable . . . The Administrative machinery of this Department lies scattered over no less than four separate buildings in the city."

Among the subjects dealt with in the eight succeeding chapters are social centres, childrens' institutions, commercial restaurants, soup kitchens, workers' hostels and residential clubs, homes for the aged and infirm and regional planning. In the comparatively short section devoted to this last subject the following sage comment appears: "If it is decided in advance to develop a centre systematically, according to a definite plan or programme, particularly when a new industrial centre is laid out, **it will never be necessary one day to wait or wish for an earthquake to remove the hovels and slums."**

Colour Code for Workshops and Factories, published by the South African Bureau of Standards. 26 pp. in English and Afrikaans. Price 7s. 6d.

The scope of this code is to provide better and more pleasant working conditions, thus improving morale, reducing accidents and encouraging recruitment; to provide better visual conditions, greater safety and higher standards of hygiene and systematic maintenance. The application of the code lies in colour identification for machinery, surroundings and piping systems.

The colour printing, by the Cape Times, shows practical adaptation of the suggestions made in the code for each of three main fields of application listed above.

Code of Practice relating to Colour Marking and Identification of Medical Gas Cylinders and Anaesthetic Apparatus. Published by the South African Bureau of Standards. 22 pp. and enclosure. 5s.

Specification for Yellow and Orange Chrome Pigments. Published by the S.A. Bureau of Standards. 43 pp. English and Afrikaans. 5s.

Ascot Town Plan Summaries

Sixty-five of the leading cities and towns of Great Britain have now been covered by these excellent official and unofficial planning reports. Some twenty-five summaries have now been gathered in to a bound folder and issued through the U.K. Information Office. Well printed and profusely illustrated on good paper they provide excellent "case" instruction and study in town planning problems.

MIGRATION

The May figures, published for press release on 15th July, show some interesting comparisons. While immigrants, during the month of May itself, totalled 1,351, emigrants leaving South Africa, numbered 902, leaving a net gain to the country of only 449 people.

For the period January to May, 1949, while 7,539 arrived, 3,502 left — a net gain of 4,037. During the same five months of last year immigrants, at 14,839, were nearly double this year's figure. At the same time emigrants, at 3,025, were nearly five hundred fewer. Those remaining in 1948, numbering 11,814, were 2¾ times as many as during the corresponding period of this year.

ABSTRACT OF GOVERNMENT REGULATIONS

Industrial Conciliation Act 1937 — Agreement relating to the Building Industry, East London.

Extraordinary Gazette No. 4186, dated 17th June, 1949.

This agreement was entered into between the East London Master Builders' Association, on the one hand, and the Amalgamated Society of Woodworkers and the Building Workers' Industrial Union of South Africa, on the other. The agreement covers wages, cost of living allowances, the prohibition of piece work, hours of work, overtime, etc. To a certain extent it covers apprentices and learners, as well as the fully qualified men, for whom it is intended. The agreement does not apply to persons engaged on farm buildings or repairs, if the dwelling houses concerned cost less than £1,000, or if the other buildings affected are exclusively used for farming purposes.

Industrial Conciliation Act 1937 — Agreement relating to the Iron, Steel, Engineering and Metallurgical Industry for the Union of South Africa.

Extraordinary Gazette No. 4188, dated 17th June, 1949.

This agreement was entered into between the Cape Engineers' and Founders' Association; East London Engineers' and Founders' Employers' Association; Light Metal Products Association of South Africa; Natal Engineers and Founders' Federation; and the Port Elizabeth Engineers' Association, on the one hand, and the Amalgamated Engineering Union and the Ironmoulders' Society of South Africa, on the other.

The scope of the agreement is restricted to the metal window, door, fly-screen, wire drawing, weaving, forming and the foundry sections of the industries concerned. Wages, learnership periods and the premium bonus system are covered in the schedule.

Aliwal North Municipality — Building Regulations.
Cape of Good Hope Provincial Gazette No. 2421, dated 17th June, 1949.

These are too long to summarise here but repeal previous regulations dated January, 1925, with subsequent amendments. Those contemplating designing or building in this municipal area are advised to procure a copy of the Gazette mentioned above.

Impendhle Health Committee — Regulations.
Natal Provincial Gazette No. 2231 dated 9th June, 1949.

The second chapter of these regulations deals with building. The same advice needs to be followed as in the case of Aliwal North, above. There is a special sub-section covering overcrowding.

Amendment of Regulations made under Section *two* of the Housing (Emergency Powers) Act 1945.

This amendment has the effect of preventing a person, who has bought a house by means of a loan from the National Housing Commission or from a local authority, from selling the house, within five years of purchase, without first offering to the Commission and/or the local authority concerned. The amendment also makes provision for the price to be paid.

LIBRARY ACCESSIONS

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

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

Publications not in constant use by the departments of the C.S.I.R. may be borrowed through the post. **Enquirers should quote the number at the left-hand side of each item (e.g., 35/21)** and address their letters to: Library and Information Division, South African Council for Scientific and Industrial Research, P.O. Box 395, Pretoria. Telephone: 3-1261 (Ext. 42).

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

CONCRETE.

34/56 ILLINOIS. University. Engineering experiment station.
. . . A brief history of lime, cement, concrete, and reinforced concrete, by Jasper O. Draffin . . . Urbana, University of Illinois, 1943. (Bulletin vol. 40, no. 45, June 29, 1943; Engineering experiment station, reprint series no. 27).
47 p. tables, diagrs.
Reprinted form Journal of the Western society of Engineers, vol. 48, March, 1943.
(In National Building Research Institute.)
Pam. 666.9(091)

34/57 ILLINOIS. University. Engineering experiment station.
. . . The thermal conductivity and diffusivity of concrete, by A. P. Carman . . . and R. A. Nelson. Urbana, University of Illinois, 1921. (Bulletin vol. 18, no. 34, April 25, 1921; Engineering experiment station, bulletin no. 122).
39 p. illus., tables, diagrs.
Pam. 536.21 : 691.32

CONCRETE. Cellular.

34/58 BRITISH intelligence objectives sub-committee.
Cellular concretes and some other insulating building materials in Germany; G. E. Bessey . . . London, H.M. Stationery office, [1946?] (BIOS final report no. 1352, item no. 22).
28 p. photos. Mimeographed.
"This report deals primarily with an investigation of developments in the various processes of manufacture of cellular concretes in Germany, and with their use. It includes the Porenbeton (hydrogen peroxide) process, the Microporite and Iporite processes, and experimental developments similar to the Swedish "Siporex" aluminium powder process. Factories near Munich and Hamburg, and laboratories near Munich and Frankfurt were inspected and details of the processes were taken, and a number of buildings in which these materials had been used were examined.
Two works making peat insulating slabs and one making fibre insulating board were examined. Developments in regard to insulating building materials generally were discussed with a . . . German authority on the subject."
(Copy also in Commerce and Industries.)
Pam. 661.24/.25(43)

CONNECTION ANGLES.

34/59 ILLINOIS. University. Engineering experiment station.
. . . Fatigue tests of connection angles, by Wilbur M. Wilson and John V. Coombe. Urbana, University of Illinois, 1939. (Bulletin vol. 37, no. 6, October 3, 1939; Engineering experiment station, bulletin series no. 317).
24 p. tables, diagrs.
"The fatigue tests in this paper were . . . planned to determine the magnitude of the deflection to which the outstanding leg of a deflection angle can be subjected a large number of times without failure of either the angle or the rivets."
(In National Building Research Institute.)
Pam. 624.21.078.1 : 625.1] : 620.178.3

COPPER SHEETS.

34/60 ILLINOIS. University. Engineering experiment station.
. . . Investigation of the strength of riveted joints in copper sheets . . . Wilbur M. Wilson . . . and Ahmet Munci Ozelsel . . . Urbana, University of Illinois, 1946. (Bulletin vol 43, no. 33, January 22, 1946; Engineering experiment station, bulletin series no. 360).
84 p. illus., tables, diagrs.
(In National Building Research Institute).
Pam. 624.078.1 : 669.3] : 620.17

ELECTRICAL networks

34/71 ILLINOIS. University. Engineering experiment station.
. . . Solution of electrical networks by successive approximations, by Laurence L. Smith. Urbana, University of Illinois, 1937. (Bulletin vol. 35, no. 27, November 30, 1937; Engineering experiment station, bulletin no. 299).
40 p. tables, diagrs.
(In National Building Research Institute).
Pam. 621.316.11

ELECTRICITY.

34/72 BRUHAT, G.
. . . Électricité: cinquième édition revue et corrigée . . . Paris, Masson et Cie, 1947.
viii, 762 p. diagrs.
537

ELECTRONIC INSTRUMENTS.

34/73 UNITED States. Office of scientific research and development. National defence research committee.
Electronic instruments; edited by Ivan A. Greenwood . . . J. Vance Holdam . . . and Duncan Machrae . . . New York, McGraw-Hill book company, inc., 1948. (Massachusetts institute of technology, radiation laboratory series no. 21).
xvii, 72 p. illus., tables, diagrs.
(Copy also in Telecommunications Research Laboratory.)
621.389

ENGINEERING.

34/74 GRANT, Eugene L.
Principles of engineering economy: revised edition. New York, Ronald press co., (1947).
xix, 431 p. tables, diagrs.
62.003

34.75 INSTITUTION of Civil Engineers, London.
The civil engineer in war: a symposium of papers on wartime engineering problems . . . London, Institution of Civil Engineers, 1948.
3 vols. illus., tables, diagrs. (some folding).
Contents: Vol. 1: Airfields, roads, railways and bridges; vol. 2: Docks and harbours; Vol. 3: Properties of materials, structures, hydraulics, tunnelling, and surveying.
624/628 : 623

ENGINEERING OPTICS.

34/76 HABELL, K. J. and Arthur Cox.
Engineering optics: the principles of optical methods in engineering measurement . . . London, Sir Isaac Pitman and Sons, Ltd., 1948.
xix, 411 p. illus., tables, diagrs.
535.8 : 68

FEED WATER.

34/77 JACKSON, Percy G.
Boiler feed water: a concise handbook of water for boiler feeding purposes: its effects, treatment and analysis . . . third edition, revised and enlarged . . . London, Charles Griffin and Co., Ltd., 1935.
xi, 166 p. photos., tables, diagrs.
621.187.1

NEW PROJECTS

Barkly East : Hydro-electric scheme. Estimated cost, £32,250.

Bellville : Pavilion, to be built by the municipality, at the Bellville sports grounds. Estimated cost, £25,000. A gymnasium to be built at the sports centre.

Bergville, Natal : Installation of a complete new water supply scheme, fully metered. £9,000.
Extension of and improvement of present sanitary removal system and the establishment of a refuse removal system. £3,500.
Establishment of new abattoir facilities, the erection of public latrines and the improvement of the present dipping tank arrangements and facilities. £5,500.
The construction of public streets, footpaths, kerbing and channelling and stormwater drainage. £8,000.
The construction and/or purchase of new town offices. £3,000.
Town planning. £500.
The laying-out and establishment of public parks. £500.

Bloemfontein : At Tempe Quarry : Workshop and store. £1,000.
Clinic. Estimated cost, £1,125.
Four-flatted houses. Estimated cost, £12,650.

Bredasdorp : Erection of a Magistrate's residence.

Brits : Erection of new teachers' quarters at Brits Agricultural School.

Cape Town : New reservoir to be built at Wemmershoek.
Consideration is being given to the inclusion of a big, modern theatre in the Cape Town foreshore scheme.
Three new hospitals, the combined cost of which will be about £2,000,000. One hospital will be for non-Europeans at Athlone and will cost about £800,000.

Deal : The opening of a second ward at Deal Hospital, for tuberculotics and the purchase of necessary equipment. Estimated cost, £2,152 15s. 3d.

Durban : New Municipal offices.

Ermelo : New sewerage scheme. Estimated cost, £80,000.

George : New 1,000,000-gallon service reservoir. Estimated cost, £30,000.

Goodwood : Building of a central Fire Station and purchasing of more equipment. Estimated cost, £12,700.

Johannesburg : Extensions to the Municipal Power Station at Orlando. Estimated cost, £8,133,000.
Plan for a five-storey car park to cost about £180,000 and to accommodate 600 cars — 120 on each floor.
Conversion of the old beerhall at City Deep Compound into a communal restaurant for Native workers. Estimated cost, £6,020.

Mossel Bay : Electricity extensions to cost £105,000 and the first portion of a big water scheme, £228,400.

Parys : Enlargement of the present swimming bath and alterations to its drainage system.
Proposal for a free library.
New sewerage scheme. Estimated cost, £2,000.
New sanitary depot and huts for Natives in the sanitary department. Estimated cost, £1,000.
Additions and alterations to abattoir. Estimated cost, £3,000.
Additions, renovations and alterations to Town Hall. Estimated cost, £7,000.
Electricity extensions. Estimated cost, £5,000.

Pretoria : Erection of shop and post office at Gezina.

Simonstown : Erection of a 40,000,000-gallon reservoir. The dam will be built on the municipal water area at Brooklands. Estimated cost, £46,000.

Stellenbosch : Scheme for providing houses for the aged. Proposed site is at Krom River. Estimated cost, £15,000.
Plan for economic quarters for non-Europeans, consisting of five blocks, with four houses for couples in each block, to be built for £800 each and let at £4 a month.
Preparation of a similar scheme for Europeans.

Strand : Non-European housing scheme. Estimated cost, £200,000.
Building of bathing-cubicles, dressing-rooms and shower-baths at Melkbaai Beach. Estimated cost, £6,000.

Uitenhage : Erection of a recreation hall for Natives in the Kabah Location.

Upington : Rest rooms, a control tower and offices at the aerodrome and a scheme for the building of 20 houses before March, 1950.

Walmer : Supply of electricity to Schoenmakersdorp. Estimated cost, £3,500.
New office block for municipal employees and alterations to the Town Hall. Estimated cost, £29,000.

Worcester : Water augmentation scheme, including canalization of the Hex River and the enlargement of the Hospital dam.
Other capital works include sewerage, waterworks, streets, stormwater drainage, sport ground, public health, plant and equipment, fire brigade, office mechanisation and electricity extensions. Under these headings are included the building of Riebeeck Street railway bridge and a social welfare centre for Coloureds.
The estimated cost of all these items is £1,000,000.

Wilgehof (Bloemfontein) : Housing scheme, National Housing Commission. Estimated cost, £114,650.

Houses built at Odstock, near Salisbury, Wiltshire, from traditional materials, showing the high standards maintained in British housing schemes.

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 CONDITIONING AND REFRIGERATION PLANT, ETC.:

Paarl: Supply, delivery and erection of air-conditioning plant, New Carrier Repeater Station, Paarl, for Public Works Department, Pretoria. Tender No. P.W.D. 246. Address tenders to Chairman, Union Tender and Supplies Board, Box 371, Pretoria. Due, 15/9/49.

BUILDING, ETC.:

Idutywa, C.P.: New gaol and gaoler's quarters, Idutywa, C.P., for the Public Works Department, Pretoria. Tender No. P.W.D. 247. Address tenders to Chairman, Union Tender and Supplies Board, Box 371, Pretoria. Due, 22/9/49.

Rustenburg: The erection and completion of a new water tank and pump house, garages and fencing at the new Commercial High School, Rustenburg. Architects: Gerard Moerdyk and Watson, 126, Sanlam Buildings, Andries Street, Pretoria.

S.A. Railways: Structural steel works. Tender No. D. 680. S.A.R. Tender Board. 715, P.F.A.C. Building, 15, De Villiers Street, Johannesburg. Due, 13/10/49.

ELECTRICAL EQUIPMENT, ETC.:

Bulawayo Municipality: Switch gear cables, transformers, commutator grinding machine, styrene extrusion press, winches, dyanometers, loose current transformers, recording ammeter, lamps, meters, overhead line materials and equipment and zeolite. Contract No. E. 58⅞1949. City Electrical Engineer, Bulawayo. Due, 28/9/49.

Cape Town Municipality: Switch and socket outlet units. Specification 1574/1949. City Electrical Engineer, Cape Town. Due, 5/9/49.

Durban Municipality: Oil circuit breakers. Contract E. 2214. Electricity Department, Durban. Due, 14/10/49.

Port Shepstone Municipality: Two only 200 k.v.a. transformers. Town Clerk and Treasurer, Port Shepstone. Due, 5/10/49.

Pretoria West Municipality: 6,000 ft. of 0.6 square inch core area, single-core 11 k.v. paper-insulated, lead-covered and served cable. Specification 341. Controller of Stores and Buyer, Pretoria West. Due, 26/9/49.

Umtali Municipality: Metering equipment. Contract No. E.3/1949; Oil-testing set. Contract No. E.4/1949; E.H.T. Voltage tester. Contract No. E.5/1949; Meter-testing equipment. Contract E.6/1949; Steel tubular poles. Contract No. E.7/1949; Electric siren. Contract No. E.11/1949; L.T. cable and boxes. Contract No. E.12/1949; E.H.T. cable and boxes. Contract No. E.13/1949; E.H.T. switchgear. Contract No. E.14/1949. Town Electrical Engineer, P.O. Box 121, Umtali. Due, 12/10/49.

Upington Municipality: Electricity extensions. Contract 2, 1949: One 625 K.W. Turbo alternator, condensing and cooling water plant, etc.; Contract 3, 1949: Two Boiler units capacity of each 20,000 lb. per hour. Economisers, feed water pumps, chimney, and induced draught plant, etc. Notice No. 20/1949. Consulting Engineer: Mr. H. M. S. Muller, P.O. Box 17, Upington. (Two sets of plans and specifications on deposit of £3-3-0 — additional copies at £1-1-0 per set). Due, 24/10/49.

S.A. Railways: Supply, delivery, erection and testing of electric elevators. Contract No. C. 635. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, De Villiers Street, Johannesburg. Due, 20/10/49.

Electric cable, etc. Contract No. C.645. S.A.R. Tender Board, 715, P.F.A.C. Building, 15 De Villiers Street, Johannesburg. Due, 15/9/49.

ENGINEERING EQUIPMENT, ETC.:

Cape Town Municipality: 21″ Steel Pipes and Specials. Form of tender A.50/49. City Engineer, Cape Town. Due, 19/9/49.

Bulawayo: Supply and installation: One electric overhead travelling crane crab, single hook. One overhead travelling crane bridge with operator's cab complete. Commercial Manager, Rhodesian Iron and Steel Commission, P.O. Box 554, Bulawayo.

Rand Water Board. Additional water supply (1949) scheme: Supply, delivery, erection and commissioning of three electric-motor-driven centrifugal pump sets at Zuikerbosch pumping station (intake pumps). Contract 727. Chief Engineer, 3, Fraser Street, Johannesburg. Due, 15/11/49. (Deposit of £3-0-0—extra copies of documents at £1-0-0 each.)

Rand Water Board: Additional water supply (1949) scheme: Supply, delivery and erection and commissioning of three main electric-motor-driven centrifugal pump sets at Zuikerbosch pumping station. Contract 728. Chief Engineer, 3, Fraser Street, Johannesburg. Due, 1/11/49. (Deposit of £3-0-0 — extra copies at £1-0-0 each.)

TELEPHONE AND TELEGRAPH EQUIPMENT, ETC.:

S.A. Railways: Telephone Cable. Contract No. C.554. S.A.R. Tender Board, 715, P.F.A.C. Building, 15 De Villiers Street, Johannesburg. Due, 20/10/49.

WATER SUPPLY AND IRRIGATION EQUIPMENT:

Cape Town Municipality: Supply and delivery of water meters and stop cocks. Contract No. 6/1949. Consulting Engineers: Ninham Shand, 806, Groote Kerk Building, Cape Town. Due, 21/9/49. (Two copies of documents on deposit of £2-2-0).

Port Shepstone Municipality: One only 8 h.p. water boiler. Town Clerk and Treasurer, Port Shepstone. Due, 5/10/49.

MISCELLANEOUS:

Steel Wool: Contract No. E.743. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, De Villiers Street, Johannesburg. Chief Stores Superintendent, 702, Park Chambers, Rissik Street, Johannesburg. Due, 27/9/49.

Automatic Couplers: Contract No. B.608. S.A.R. Tender Board, 715, P.F.A.C. Building, 15, De Villiers Street, Johannesburg. Due, 6/10/49.

TENDERS ACCEPTED

AIR CONDITIONING AND CENTRAL HEATING :

Supply, delivery and erection of new air conditioning plant, additions to automatic telephone exchange to Auckland Park, Johannesburg. Tender No. 24/1/1097. P.W.D./198. Fulmark Engineering Co., Pty.), Ltd., Johannesburg. £3,076.

Supply, delivery and erection of central heating installation, automatic exchange additions to Auckland Park, Johannesburg. Tender No. 24/1/1097. P.W.D.199. £552. Butler and Herbert Engineering (Pty.), Ltd., Johannesburg.

Supply, delivery and erection of new air conditioning plant, automatic exchange extension to Durban North. Tender No. 24/1/689. P.W.D./200. Airco Engineering, Ltd., Durban. £3,045 15s.

Supply, delivery and erection of central heating installation in the office block for various Government Departments, Umtata. Tender No. 24/1/910. P.W.D./206. Butler and Herbert Engineering (Pty.), Ltd., Johannesburg. £1,525.

Supply, delivery and installation of air conditioning plant and auxiliary equipment for the Reference Library, Johannesburg. Contract No. 459. Carrier Africa (Pty.), Ltd. £6,994.

BUILDING AND ALTERATIONS, ETC. :

Additional accommodation for Bessemer road factory of S.A. Mint for Department of Public Works. Tender No. 24/1/723. P.W.D./190. G. Newlands (Pty.), Ltd., Pretoria. £2,882.

Magistrate's Residency, Bredasdorp, for Department of Public Works. Tender 24/1/1884. P.W.D./191. T. C. Wiersma, Kuilsrivier. £4,790.

New shower dressing-room, garage, stainless steel sink, wash-basin and stove : repairs and renovations at Housecraft school, Riebeek West, for Department of Public Works. Tender 24/1/1087. P.W.D./202. T. C. Wiersma, Kuilsrivier. £1,723 3s.

Orkney English Medium Primary School, Klerksdorp : new school. Contractors : H. D. Abery (Pty.), Ltd. £31,499.

Vanderbijl Park Second Primary School : new school. Contractors : S. J. Labuschagne (Pty.), Ltd. £30,000.

Selection Park School : additions and alterations. Messrs. F. D. Wybregt and Co. (Pty.), Ltd., Pretoria. £6,328.

Toitskraal Primary School : school and teachers' quarters. Messrs. Van Heerden and Johnson (Pty.), Ltd., Pretoria. £21,598 11s. 3d.

Potchefstroom Gymnasium High School : new girls' hostel. Messrs. Van Heerden and Johnson (Pty.), Ltd., Pretoria. £47,178 16s. 6d.

Dormitory block for 60 pupils and staff and new workshop at Technical and High School, Middelburg (Tvl.) Tender No. 24/1/1358. P.W.D./193. B.G.B. Construction Co. (Pty.), Ltd., Nelspruit. £26,541.

New offices for Immigration staff, Mafeking. Tender No. 24/1/1/261. P.W.D./197. F. Stokker and N. Bolweg, Pretoria. £2,720 14s. 6d.

COOKING EQUIPMENT, ETC.:

Eight three-plate electric stoves for Department of Public Works. Tender No. 24/1/1508. P.W.D./S. 325. Ballantine, Ltd., Pretoria. £23 10s. each.

Kitchen stove for the South African Police. Tender No. 19/1/33. S.A.P. 444. A. Schrauder and Sons (Pty.), Ltd., Port Elizabeth. £11 19s.

Two slow combustion stoves for the South African Police. Tender No. 19/1/33. S.A.P. 444. Ballantyne, Ltd., Pretoria. £6 each.

Electric stove to the Western Province Fruit Research Station, Stellenbosch. Tender No. 25/1/838. S.O. 3303. S.A. General Electric Co., Ltd., Cape Town. £84 10s. Also, additional pressure cooker. £5 2s.

One hundred and ninety-two weldless steel tubular electric lighting poles for Department of Public Works. Tender No. 24/1/744. P.W.D./S.259. Stewarts and Lloyds of S.A., Ltd., Pretoria. £7 8s. 6d. each.

One hundred and forty-four tubular galvanised steel electric lighting poles for Department of Public Works. Tender No. 24/1/744. P.W.D./S. 259. Stewarts and Lloyds of S.A., Ltd., Pretoria. £12 18s. each.

Eight twenty-gallon electric hot water cylinders for Department of Public Works. Tender No. 24/1/1508. P.W.D./S. 325. Sadi Water Heaters (Pty.), Ltd., Johannesburg. £27 7s. 6d.

Electric lamps for Johannesburg Municipality. Tender No. 431. Bartle and Co., John Hess., British General Electric Co., Ltd., Hubert Davies and Co., Ltd., Illuminating Engineers (S.A.), Ltd., Johnson and Phillips (S.A.), (Pty.), Ltd., Metropolitan Vickers (S.A.), (Pty.), Ltd., Reunert and Lenz, Ltd., Siemens Bros and Co. (British), Ltd., The S.A. General Electric Co., Ltd.

Electrical equipment required for the Glen Agricultural College. Tender No. 24/1./1181. P.W.D./S. 327. Hubert Davies and Co., Johannesburg. Bartle and Co., Johannesburg. British General Electric Co., Ltd., Johannesburg. Samuel Osborn (S.A.), Ltd., Johannesburg. National Engineering (Pty.), Ltd., Johannesburg. Stewarts and Lloyds of S.A., Ltd., Bloemfontein. Siemens Bros. and Co., Ltd., Johannesburg.

Three hydraulically operated scrapers to the Division of Soil Conservation and Extension, Pretoria. Tender No. 25/1/1769. S.O. 331/49. Landsborough Findlay (S.A.), Ltd., Johannesburg. £550 each.

Six alidades to the Department of Forestry, Pretoria. Tender No. 25/1/1170. S.O. 3314. The Griffin Engineering Co., Ltd., Johannesburg. £65 each.

Welded steel fabric for floors of biological filters at disposal works, for the Municipality of Benoni. Baldwins (S.A.), Ltd. £3,081 18s. 11d.

Stormwater drainage: Umgeni Road, Durban. Tender No. B.1649. Messrs. Ray Norris (Pty.), Ltd. £9,512 7s. 6d.

Metal spun, light-weight, cast iron pipes, for the Electricity Committee, Durban Municipality. Tender No. P.303. Messrs. Stewarts and Lloyds of South Africa, Ltd. £4,208 6s. 8d.

LABORATORY AND HOSPITAL EQUIPMENT:

Chemicals and apparatus to the Stellenbosch-Elsenburg College of Agriculture, Stellenbosch. Tender No. 25/1/914. S.O. 2827. Macdonald Adams and Co., Johannesburg.

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