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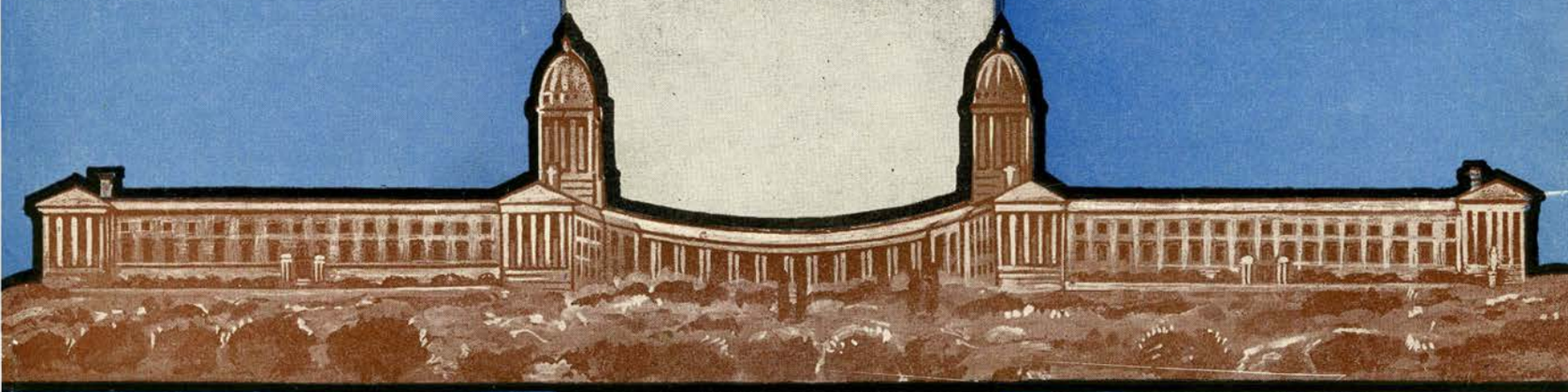
PUBLIC WORKS OF SOUTH AFRICA



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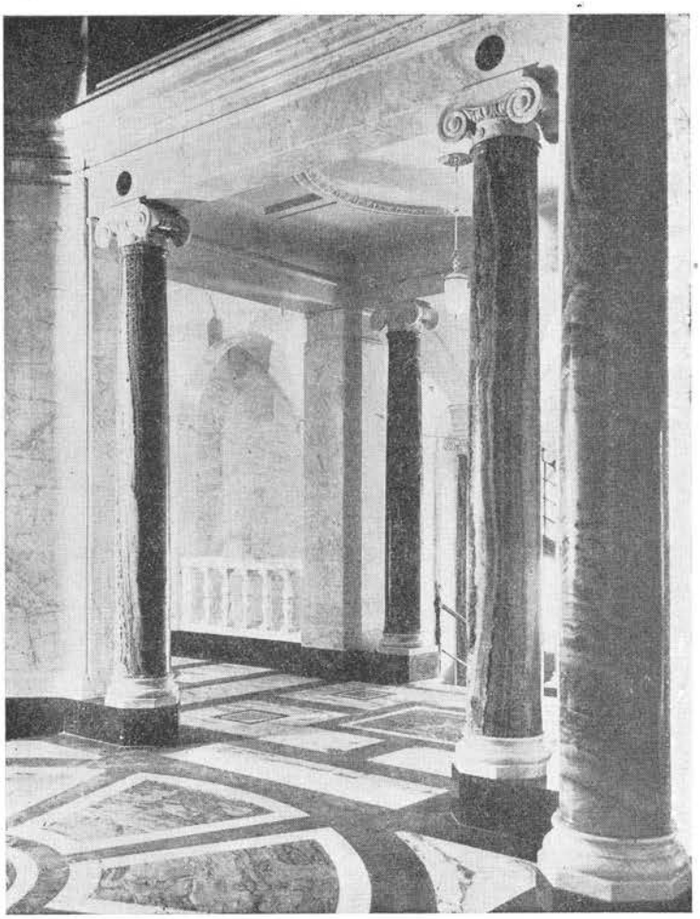

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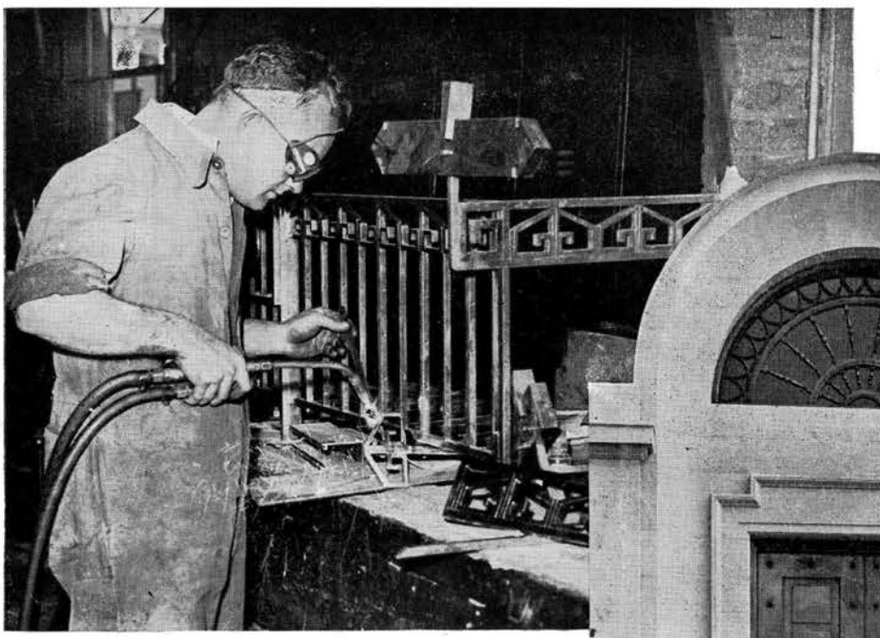

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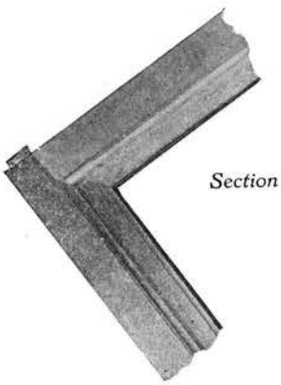

Section of fanlight showing welded angles.

Reproduced by kind permission of Messrs. Herbert Evans & Co.

The above is a reproduction, in miniature of the Full Page Jubilee Announcement of Messrs. Herbert Evans & Co., which appeared in leading newspapers throughout South Africa.

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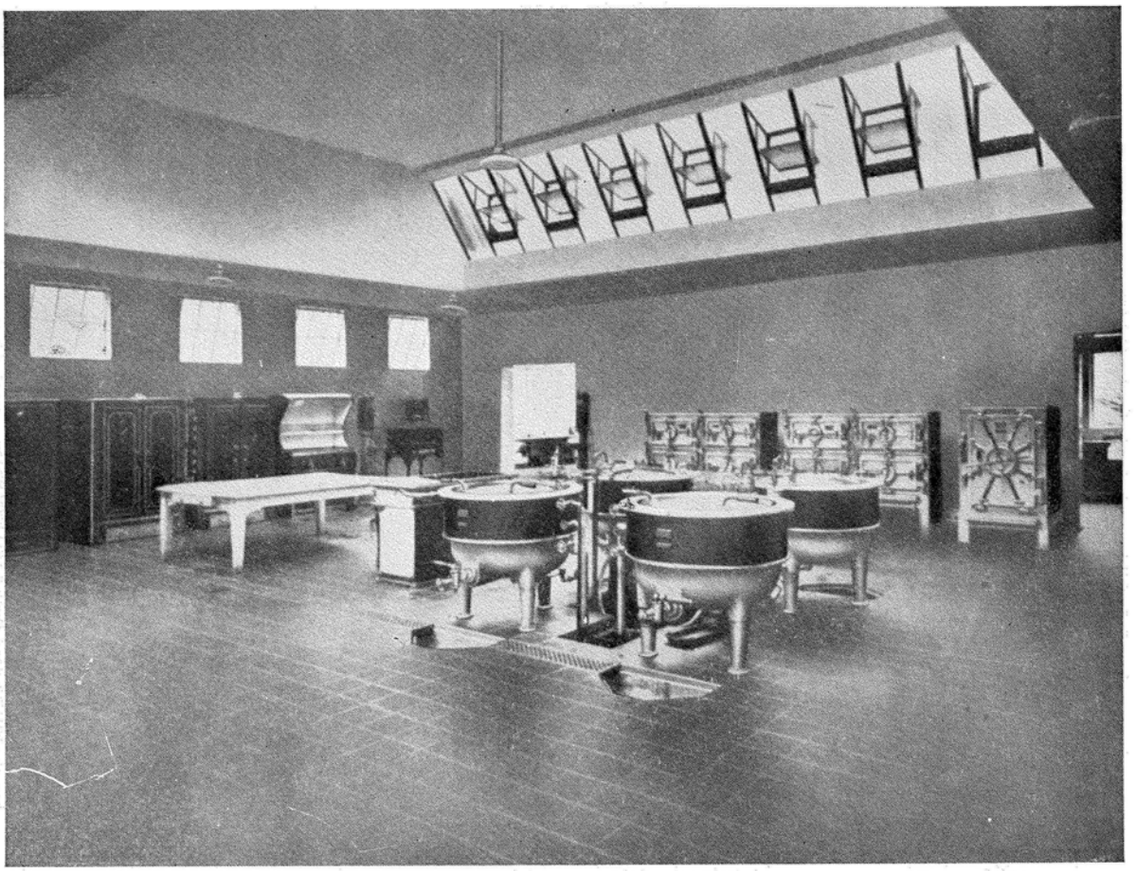

The photograph above shows typical Ashwell & Nesbit equipment recently installed in a modern Kitchen of a large hospital. The apparatus is finished in grey mottled enamel.

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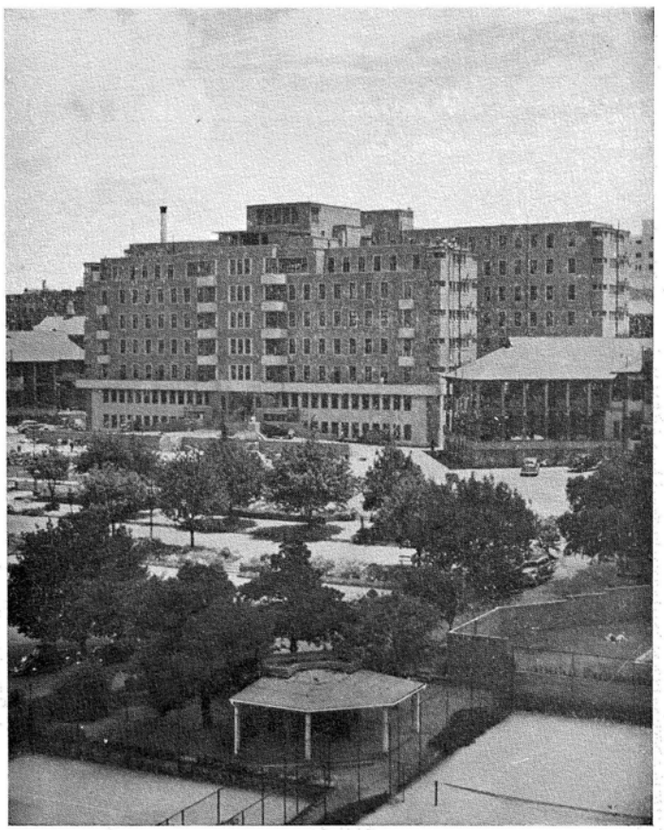

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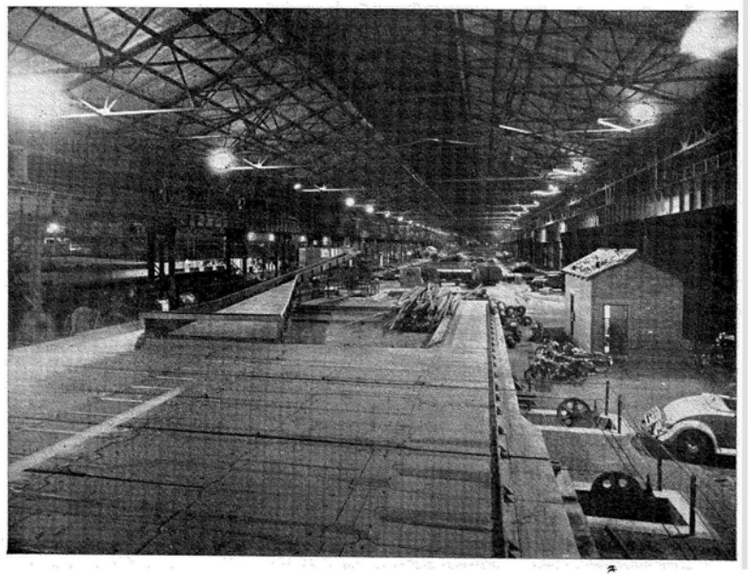
CONTENTS

Interior Light Planning and Design

Some Methods to Obtain Predetermined Results : :

By **E. H. BERRY**, A.M.I.E.E. (S.A.)
(*who is a London Light Expert on tour in the Union*).



AN EXAMPLE OF FACTORY LIGHTING.
An interior view of Iscor Steel Works, Pretoria, showing incandescent lamps set in the roof. For maintenance, the lamps are easily accessible from the gantry crane girders running along each side of the shop.

AS today lighting is a science as well as an art, the modern lighting system must be planned to produce predetermined and specific results, not only in illumination value, but in complete fitness for purpose. The correct spacing of fittings or disposition of sources, the characteristics of the light-controlling media, the material and texture of the internal finish, are all important factors which materially affect the final result and must be considered.

Illumination, too, while regarded usually as a necessary overhead charge, should not always be so regarded. It may be a revenue-producing tool just as much as a machine. In factories, for instance, the speed of production falls as daylight fails; accuracy, too, is affected, and in more than one trade the increase in output by operatives in the "finer" industries is as much as 20 – 25% when correct illumination values have been installed. Looked at another way, five men can produce as much as six men. The initial installation costs more and so does the running expense, but not in the same ratio that the other revenue-producing factors do.

The lumen method of design, basically sound and logical, is the new technique almost universally employed, and enables complex plans to be dealt with in four steps involving two calculations. As the result of intensive and extensive research the many technical considerations which require expert knowledge and experience have been incorporated in charts and tables so that they are automatically allowed for in the design.

Before considering these various factors in detail they should be enumerated as follows:–

(1) The level and type of illumination on the horizontal plane.
(2) The level and type of illumination on the vertical plane.
(3) Freedom from direct glare.
(4) Freedom from reflected glare.
(5) Quality and depth of shadows.
(6) Maintenance.
(7) Favourable appearance.

PROCEDURE IN DESIGN.

THE level of illumination is the obvious starting point. From a table of recommended average values, which are the minimum economic values, it will be found that the usual levels lie between 5 foot-candles and 125 foot-candles for various types of rooms and purposes. These tables must be accepted, for they are the outcome of many thousands of observations, compromises and discussions. An excerpt from these tables is given in this article.

The type of illumination depends on the economics of the job. Quite obviously, the small gain in amenity value would not justify the use of expensive diffusing fittings in a foundry or steel works. Because of the various requirements of type or quality of light, this factor has been subdivided into five classifications:– direct, semi-direct, general, semi-general and indirect. The characteristics of various fittings have been analysed in a simple manner to ascertain the actual distribution of light flux with each.

In the case of direct fittings not less than 90 per cent. of the light is directed downwards. Because of this efficiency, it is mostly used industrially, but is not suitable for, say, an office interior on account of the likelihood of reflected glare from glazed papers or bright metal parts, etc., and the bad psychological effect of a dark ceiling.

In the semi-direct, the most usual type for shops and offices, some 60 to 90 per cent. of the light flux is downwards, the balance being distributed in a solid cone upwards. This permits of a portion to be diffused and reflected with a consequent reduction in shadow intensities.

The general lighting fitting is really necessary because of the high efficiency and high surface bright-

ness of modern light sources. The distribution is similar to that of a bare bulb, but reduces the deleterious glare factor by diminishing the surface brightness to a bearable level such that direct vision of the light source will not desensitise the retina and cause source image persistence. They are usually constructed of a good diffusing glass such as a flashed opal, and are satisfactory for offices, schools, restaurants, shop interiors, etc., on account of their effectiveness in giving bright surroundings and having a pleasing appearance.

The semi-indirect dispose some 60 to 90 per cent. of the light upwards to the ceiling, which then acts as a reflector and diffuser giving illumination with very soft shadows. These suffer from the defect that frequent cleaning is necessary to preserve efficiency, but are largely used for decorative possibilities. A good tip in this country where millions of winged bugs of various kinds commit suicide in these fittings is to cover the top with clear glass. A common fault noticed when these fittings are used is that the ceiling is finished with a glossy surface. This is fatal to good lighting of this type. Excessive spottiness of the distribution is easily noticeable, and images of the interior of the fitting may even be seen. Ceilings must be kept clean and finished a good matt light colour, preferably off-white.

The last is the wholly indirect fitting. At least 90 per cent. of the light is directed upwards to be reflected from the ceiling. It is entirely free from glare. This system tends to suffer from lack of vitality, and perspective values of the interior are lost because of lack of soft shadows. This can be overcome, however, by the use of a little supplementary direct lighting.

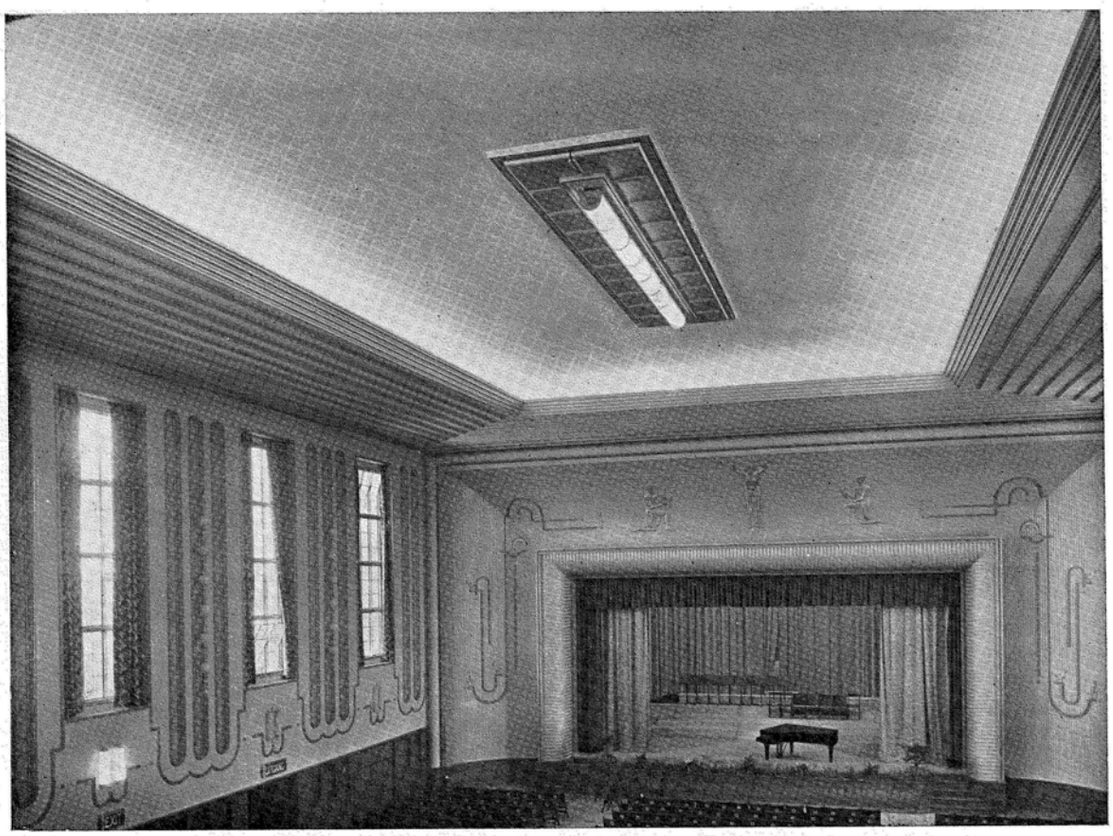
GLARE EFFECTS.

HAVING considered two of the seven factors, direct and reflected glare have to be considered. Glare is defined as an excessive brightness contrast, and causes both ocular discomfort and disability. It is the most frequent and serious fault, and is usually brought about by unshaded or insufficiently shaded sources situated in or near the line of vision.

Too great a contrast between the source and the environment has a similar effect. Glare causes eye, nerve and muscular strain and loss of vision, although the object itself may be brilliantly illuminated. The golden rule is "light on the object — not in the eye." This does not apply to street lighting, where the problem is different. Reflected glare, which is light usually passing upwards into the eye, is particularly harmful, for the eye is partially protected against excessive light from above, but not against that from below. Whatever the plan is, it should be to avoid glare.

The fifth item is quality and depth of shadows. Differences in surface brightness are essential to the appreciation of three dimensional objects, but are of no value for the observation of plane surfaces. Shadows should not be of such a contrast degree as to take on the appearance of objects. In ill-lit works it is amusing, even though disconcerting, to see people stepping carefully over a deep shadow.

Maintenance is in many cases, a most important



A fine example of interior lighting in the Germiston Town Hall. The light feature in the centre of the ceiling provides direct diffused illumination. By offering a certain amount of shadow relief this maintains perspective in combination with the indirect cove lighting round the borders of the ceiling.

matter. It is usual to allow what is termed a depreciation factor of 1·43 to take care of the estimated reduction in light output between cleaning periods. It may, however, mean much more than this. In inaccessible positions the question of the consistency of life, light output and uniformity of the lamps employed may have a considerable bearing upon the maintenance costs.

In one place in London there was a long barrel ceiling. This formed the main lighting feature of the building. Naturally if the lamps began to fail after a short period the ceiling would take on an unpleasant spotty appearance as well as reducing the required light intensity. To relamp this involved the hire of scaffolding for three days at £5 per day. It was therefore necessary to employ the highest — if rather more expensive — grade of lamps with the greatest initial and maintained light output, and likely also to show the least number of failures between relamping periods. To comply with the B.S.S. 161/1937 where lamps have an objective life of 1,000 hours with a mean of 890 it was decided to relamp every 700 hours, which corresponded with a period of some three months' use. All lamps were then removed whether burnt to extinction or not. Those still having a useful life were then used up in accessible positions. The small extra cost of purchasing high-class lamps was well justified by the freedom from early failures and maintenance of lumen-output throughout their useful life. In the mines here and in street lighting the average cost of lamp replacement is some 2s. 9d. per lamp, which means that replacement cost usually exceeds lamp cost. The architect can do much to plan his installation, especially where architectural lighting is employed, to facilitate easy and cheap replacement. Remembering that planning is based upon obtaining and maintaining a known intensity, the question of lamp economics becomes important especially in regard to maintenance. So-called cheap lamps are a fallacy.

In electric lamps, as in most other articles of everyday use, price is a fair indication of quality. Any lamp is useless except as a converter of electric energy into light.

Its quality can therefore be gauged by "How much light can be had for a certain stated amount of electricity," or, alternatively, "How little current must be used to get a stated quantity of light." Briefly, the higher the quality of the lamp, the less current will it consume to provide the required amount of light. The importance of this fact is realised when the total cost of light is analysed. It is made up of two costs: (a) the price of the lamp, (b) the cost of electricity consumed.

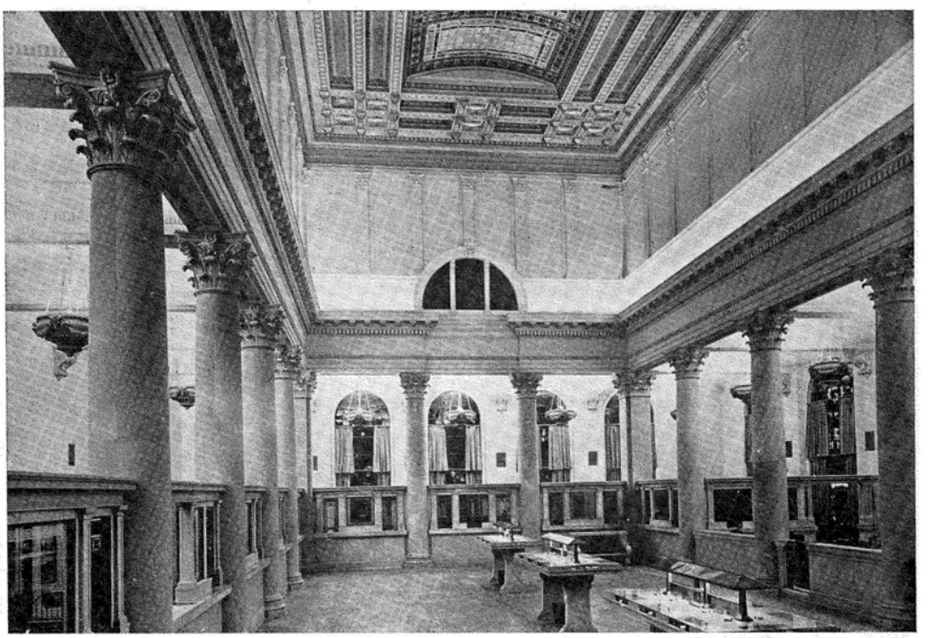
The second cost naturally varies, but on the average a good lamp consumes about 8 times its own cost in the amount of the electricity used. The consumption cost is therefore of greater importance than the cost of the lamp.

An example will make this clear. It will usually be found that with a good lamp costing, say, 10x pence the running cost will be 80x pence, making a total of 90x pence. In a cheap lamp costing half the price, say, 5x pence, the running costs are raised 25 per cent. by inefficiency, that is, 100x pence, making a total of 105x pence. The money saved by purchasing a good quality lamp is 15x pence, or enough to purchase 1½ more good lamps.

The total cost is not the only consideration. As mentioned in the case of the barrel ceiling, uniformity and consistency are also important. The last factor, favourable appearance, is a matter of taste, and may be left to personal discrimination, or decided by the purse and instructions of the client.

DEFINITE PLAN.

HAVING analysed the problems in some detail, a definite plan can now be considered. The first point is to select the intensity of illumination required. Secondly, the best fittings for the job must be chosen; the mounting height has then to be determined as well as the location and number of the points of light. Finally, the size of the lamp required to provide the required intensity of light has to be ascertained.



This interior view of the United States National Bank, Omaha, Nebraska, shows the use of two types of lighting. In the central bay indirect cove lighting is employed, while in the surrounding bays indirect pendant fittings have been used.

The illumination value for any specific requirement may be had by consulting a table of standardised values published by the Illuminating Engineering Society of Great Britain. For the selection of fittings there is a table on the special characteristics of different types of fittings. There are special standardised tables for ascertaining mount-

ing heights, and giving nominal lumen ratings for standard lamps.

In making the calculations the required quantity is the light output of the lamp in lumens to give the required result. Lumens equals the intensity required in foot-candles, multiplied by the area illuminated per fitting in square feet. This amount is multiplied again by the depreciation factor because more light is needed initially to maintain the required value just prior to recleaning. This sum is then divided by some factor less than unity, the factor being called the coefficient of utilization. This coefficient varies with the type of fitting, the proportions of the room expressed as the room index, standardised tables of which may also be had, and the quality and degree of reflection of the texture and colour of the internal surfaces. These become secondary light sources because they are reflecting media of different degrees of absorption and reflection.

The simplicity of this lumen method may be illustrated by an example.

DESIGN FOR A FACTORY.

THE floor plan of the factory space to be lighted is 72 feet by 144 feet. The work carried on in the room is assembly of medium-sized machine parts calling for good horizontal illumination. The supply voltage is 200. The height from the floor to the roof trusses is 12 feet. The roof is open to northern light, and the walls and upper structures are painted a light colour. Only a small amount of material is stored along the walls of the room.

The following is then the procedure:– From the table of illumination values 12 foot-candles is recommended for assembly, medium grade, with a range of 10 – 15. The type of light fitting is determined by consulting the guide to reflecting equipment. The dispersive reflector is selected, the choice being based principally on horizontal illumination and ease of maintenance.

The following is the manner of ascertaining the location of points, mounting heights and number of fittings. The height of the benches, and therefore of work, is 3 feet above the floor. The maximum mounting height of the lamps above the floor is 11 feet, that is, 12 feet to truss, less 1 foot for reflector drop. The maximum height of fittings above the plane of work is therefore 8 feet. Consulting the table giving spacing-mounting heights, an 8 feet mounting height above the plane of work gives a maximum spacing of 12 feet, and, since the section of the room near the walls consists of aisles and storage, 6 feet may be allowed between the last row of fittings and the side walls.

Reference to a plan of the room shows that a 12 feet spacing each way, the outside fittings being 6 feet from the walls, will give a symmetrical lay-out in 24 feet by 36 feet sections. This spacing is therefore adopted. A total of 72 fittings is found to be required for the whole interior.

To obtain the lamp size, first find out the area per fitting, that is the area of the floor space divided by the number of fittings or points in the room. In this example the area is 144 square feet per fitting. The coefficient of utilisation is then found by consulting the room index. This is found to be E, which, on reference to a table giving coefficients of utilisation, is found to represent a value of 0·58 in a location where the ceiling and walls are fairly light.

Taking the depreciation factor of 1·43 the equation now becomes:

$$\text{Lamp lumens required per fitting} = \frac{\text{Foot-candles} \times \text{Area per fitting} \times \text{Depreciation factor}}{\text{Coefficient of Utilization.}}$$

$$= \frac{12 \times 144 \times 1.43}{0.59}$$

$$= 4188.$$

From the table giving the nominal lumen ratings of standard lamps, a 300 watt, 200 volt gasfilled lamp giving 4720 lumens is found most nearly to meet requirements. The actual illumination using this lamp will, of course, be slightly higher than that originally designed for, or

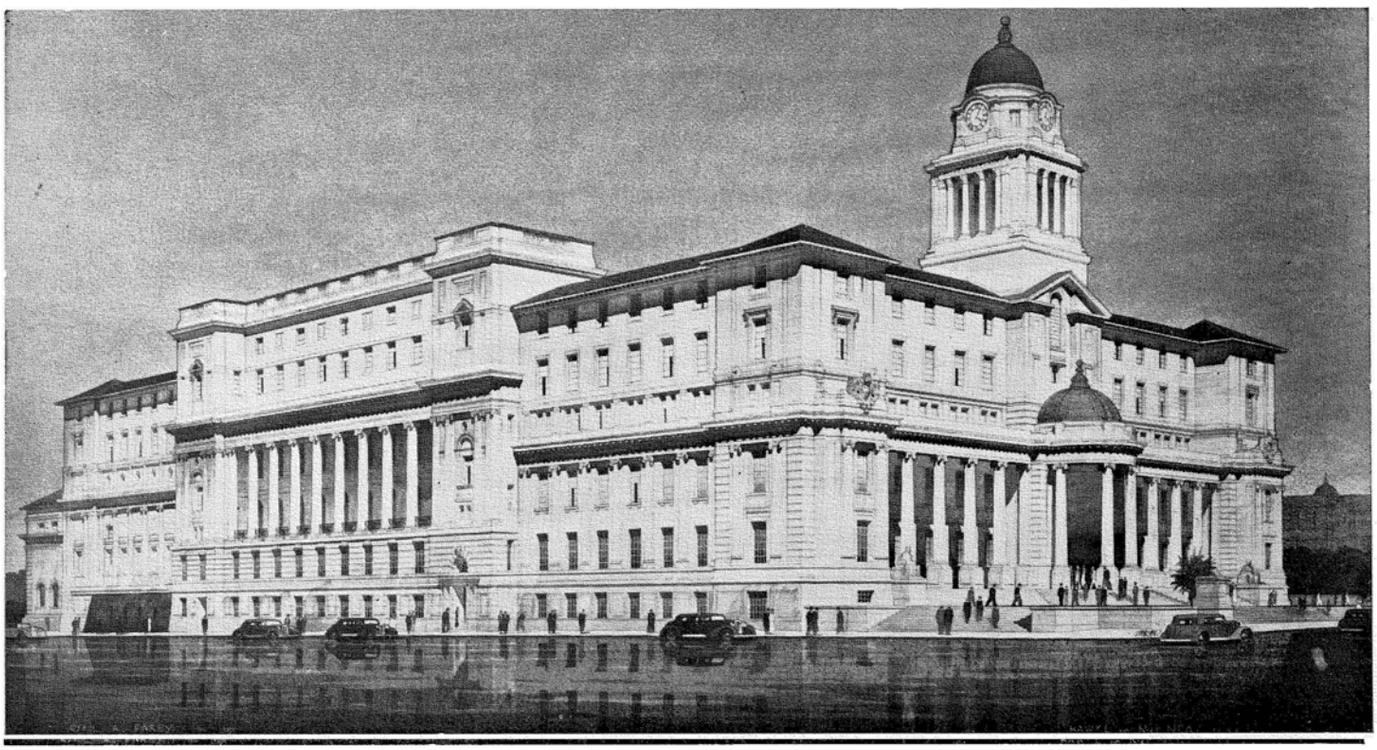
$$\frac{4720 \times 12}{4188}$$

$$= 13.5 \text{ foot-candles.}$$

For any reader who may be interested in this work, a booklet entitled "Illumination Design Data" will be sent free on request by the Editor of PUBLIC WORKS OF SOUTH AFRICA. *All the tables quoted will be found in this booklet.*

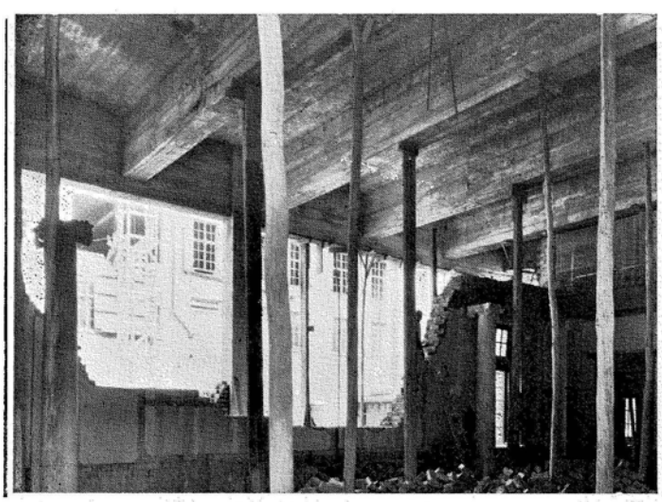
SOME RECOMMENDED VALUES OF ILLUMINATION.

	Average recommended Ft.-candles.	*Range.*
Automobile Show-room	20	15–25
Church	5	4–6
Drawing Office	35	25–50
Garage	8	6–10
Repair Shop	12	10–15
Hospital wards:	3	2–4
Operating Theatre	100	100–800
Minor Surgery	20	15–25
Hotel	8	6–10
Library: General Reading Rooms	8	6–10
On Books	20	15–25
Offices	12	10–15
School: Classrooms	8	6–10
Drawing and Art	20	15–25
Laboratories	12	10–15
Lecture Theatre	8	6–10
Shops: Large Dept. Stores	20	15–25
Medium and small	12	10–15
Display windows	100	upwards.



A PERSPECTIVE OF THE JOHANNESBURG CITY HALL AS IT WILL APPEAR WHEN COMPLETED.

Reproduced from the original painting by Cyril A. Farey, London.



AN INTERIOR VIEW OF THE OLD COUNCIL CHAMBER.

Note the heavy reinforced concrete beams put in to take the weight of the additions on the Rissik Street front off the piers in the Rates Hall.

Johannesburg City Hall Takes On A New Dignity

TWO-STOREY ADDITIONS PROVIDE EXTENDED PUBLIC FACILITIES : : :

By : J.H.

In this article are described the additions to the Johannesburg City Hall and the problems and difficulties that have to be faced.

NEW dignity and beauty is being given to the Johannesburg City Hall which, built in 1912 when the Rand City was by no means the metropolis it is today, has gradually become dwarfed in comparison with the tall structures now surrounding it. Johannesburg lost pride in the building. With the growth of the city also, municipal accommodation became overcrowded, so that on November 12, 1937, a contract was signed for the adding of two storeys to the Municipal offices. The cost of the additions is £202,563. Work was started on November 13, 1937, and it is expected that the work will be completed by the end of April, 1940.

Naturally the additions are executed in the same Renaissance style of architecture as the old part of the building. This, however, still retains the main architectural motifs, such as columns, porticoes and the heavy ornamental cornice. So far as external features are concerned the additions comprise merely a heightening of the façades by two storeys which have received very simple treatment. On the Rissik Street frontage the end motifs of the existing façade are to be extended to the full height of the building with very little repetition of ornamentation. The central feature provided by the existing domed entrance porch is to be strengthened by a projection of the new façade above it. This will be capped by eaves, and will receive more detailed architectural treatment in harmony with the embellishments on the existing building. One of the main embellishments to be included in this projection is a large stained-glass window bearing the arms of the City. The window will be illuminated from the inside by means of diffused electric lights, and will be easily visible from the outside during the daytime. The main feature on this frontage — the tower — is to be raised 33 feet above its existing height to conform to the new elevation of the building.

The effect of the additional two storeys will be to give the building an elevated and dignified appearance. So many tall buildings have been erected in the immediate vicinity of the City Hall within recent years that the latter has become dwarfed in comparison, and certainly not compatible with the civic dignity of Johannesburg.

FACING MATERIAL.

A FLATPAN sandstone facing material is being used for the additions and has been taken from the same quarry as the original sandstone used on the existing building. This stone has proved an excellent building material, and has weathered very well except in one or two places where cement has contacted it. Only lime should be used in connection with sandstone. In some places the old stone has deteriorated slightly by reason of the fact that wooden plugs have been knocked in between the points to facilitate the hanging of festoons of lights on festive occasions. This practice has now been forbidden.

A point of interest regarding the use of this facing stone is that no attempt is to be made to match the colours of the old and new stones. The old stone on the existing building is of a dark tea-stain colour, while the colour of the new stone is almost white. It is thought in some circles that the old stone should be cleaned or sand-blasted in order that it may be whitened. This, however, is not advisable.

The discolouration of the old stone is due to a chemical process by which sandstone forms a hard, weather-proof crust on all exposed surfaces. This crust penetrates into the material to a depth of $\frac{1}{8}$ of an inch. If this crust were to be chipped off to reveal the white stone underneath, the durable and weather-proof qualities of the material would be ruined. It is highly probable, too, that the old sandstone might not now possess the same chemical properties and be incapable, therefore, of forming a new crust. In about five years' time the new sandstone facing on the additions will be approximately of the same colour as that of the old stone.

The plan of the additions conforms to that of the existing building, largely because of the fact that the latter is not a frame construction. It is brick built in the old style and the floors rest on walls 18 inches thick in every case. These rest on foundations of enormous strength. Calculations have proved that the existing structure is capable of withstanding six times the load now being superimposed on it by the new additions. The enormous strength of the building is chiefly attributable to the excellence of the building material and workmanship. No additional strengthening was necessary, except that strong reinforced concrete beams were thrown across the walls, and span the section between the Rissik Street façade and the eastern quadrangle of the building. These beams were put in to prevent any extra weight being thrown on the piers in the Rates Hall. They are 80 feet long and have a section 4 feet 6 inches by 1 foot 6 inches. A gap of about 5 feet separates the beams from the floor of the first additional storey. This space is to be utilised for ducts, pipe lines and electric conduits.

PUBLIC FACILITIES.

THOUGH comprising mostly municipal offices, the additions include several new facilities of importance to the public. In place of the present roof garden an art gallery for exhibition and other purposes is being built. Exhibitions are held at present in the Selborne Hall which is not adapted to such uses. The art gallery will be 100 feet by 30 feet and is to be flanked by two ancillary halls each 30 feet square. All these rooms will be lit artificially in the latest manner. The pictures will be flooded with light and the spectators will stand in the shadow. By this means disturbing reflections will be avoided. The illumination will be achieved by means of electric lights and reflectors concealed in the ceiling.

A large modernly equipped kitchen is also being built so that the largest possible gatherings in the City Hall can be catered for. Attached to the kitchen is a large refrigerated store room. Lifts take the food from the kitchen to all floors. Two liquor bars are included among the additions. They are to be fitted with the latest equipment and refrigerators.

Another important addition is that of a staff refreshment room situated on the top floor. The roof of this refreshment room is being fitted out in the form of a roof garden and recreation ground. A large kitchen is attached to this room. Better accommodation, too, is to be given to the Music Director whose new suite will be on the south-west corner of the building overlooking the Library Square. This suite will be reached by a separate lift.

Considerable improvements are being made to the Council chamber, which is being enlarged. The old domed ceiling has been scrapped and the outer wall facing an inner court is to be pushed out for a distance of 11 feet 6 inches. Adequate Press accommodation is being provided by the installation of two ranges of Press pews. There will also be an extra seating for 10 additional councillors, making 41 in all. These 10 extra benches are to be made locally to match the existing fine oak benches.

Special attention is being given to the acoustics of the council chamber, the walls of which are to be finished in oak panelling up to a height of 9 feet. Above this panelling masonry size acoustic tiles will be used.

Off the council chamber a room 45 feet by 30 feet has been provided for use by the mayor as a luncheon parlour so that the mayor may entertain his guests to luncheon in the City Hall instead of taking them to a club or hotel.

INTERIOR HEATING.

AN interesting new principle is to be used in the warming of the council chamber, large committee room and mayor's luncheon parlour. This principle differs from that usually adopted for the heating of interiors in this country, that is, heating by convection. The system to be installed in the Johannesburg City Hall is based on the principle of radiation.

Heating will be achieved by low temperature electric radiating warming panels in the ceiling. The temperature of these concealed panels will be approximately 120 degrees Fahrenheit. With this system the air in the room is not employed as a medium for the transmission of heat from the panels by convection. The heating medium is the rays emitted by the warming panels. These rays are absorbed by the floor, the furniture, the walls and the bodies of people in the room, and converted into heat. The effect is accumulative, for the warmed interior in its turn acts as a radiator, so that innumerable surfaces are radiating heat, and the room throughout is kept at a comfortable temperature.

The advantage of this system over hot water and steam radiators is that there is no need to rely on the transmission of heat by convection through the air. A continuous supply of fresh air can therefore be allowed to circulate through the room without unduly reducing the temperature. The heating from hot water or steam radiators, which act mainly on the principle of convection, would be lost if the windows were thrown open on a cold day. A further advantage to be found in the use of these electric radiating warming panels is that they compensate for the loss of body heat irrespective of air temperature.

It is possible also to maintain an even degree of temperature in all parts of the room by the use of thermostats which control the radiating energy of various sections of the heating panels.

The heating elements in the panels will comprise low temperature, indestructable wires of a nickel-copper alloy wound on a suitable base. These elements will be equally spaced, covered with four layers of insulating fabric and glued between two boards fixed to the ceiling. The top board will form a foundation for the heating panels and the lower board, the undersurface of which will be visible to the occupants of the room, will serve as the radiating surface. The offices and other sections of the building are to be heated by means of the ordinary steam radiators.

Air conditioning is being provided for public offices such as the rates hall, some of the basement offices and the council chamber. The latter will be air con-

ditioned by means of a separate plant. Other improvements include the liberal use of an asbestos spray for acoustically treating the ceilings of rooms in which a great deal of noise is to be expected.

Another improvement will be the inclusion in the basement under the Harrison Street frontage of public conveniences to replace the present unsightly ones near the Cenotaph. Entrances to these conveniences will be off President and Market Streets. The old conveniences will be removed and the site utilised for a garden or a lawn. The City Hall itself is being investigated at present for the improvement of acoustics and air conditioning as well as a remodelling of the organ. Extra seating and lighting is also likely to be provided. At the time of writing this article, however, nothing definite had been decided upon in this connection.

RAISING THE TOWER.

FROM a constructional point of view, the main difficulty to be met is the raising of the tower on the Rissik Street front to a height of 33 feet above its present level. It was first the intention of the authorities to adopt a suggestion which would have introduced a novel, and if anything, spectacular engineering feat into this country. The suggestion was to raise the tower as it stands to its new height on lifting jacks, thereafter to build the necessary superstructure under it. Briefly, the method of accomplishing this was to be as follows:

The idea was to place two layers of strong steel girders across the section of the tower, the girders being inserted through holes cut in the walls. It was the intention to place a set of 32 hydraulic jacks on the lower set of girders and tighten these up against the upper section before sawing through the walls of the tower. Operating simultaneously the jacks would have lifted the tower weighing 1,000 tons by stages. At the end of each stage a built-up steel structure would have been inserted to rest the tower and lift the jacks. When the lifting stages were completed the tower would have been supported at its new height on a steel web structure round which the retaining walls would have been built.

This procedure, however, was abandoned owing to various factors, including insurance. It has now been decided to demolish the dome and tower, stone by stone, marking each stone so that the whole may be rebuilt at its new height when the two additional storeys have been added. The work of demolition has already begun, but it is not certain yet how long these alterations will take.

In conclusion, a word should be said about the roofing tiles. These formerly were glazed green handmade tiles from Spain. As the Spanish village where these tiles were made is no longer in existence they will be replaced by bluish brindle tiles made in Pretoria. This is the only change that has been made in the treatment of the building.

The additions were designed by Messrs. Hawke, McKinlay & Sayce, Architects, Johannesburg, the original architects being Messrs. Hawke & McKinlay, Cape Town.

Problems in Planning:

A New School on a Difficult Site

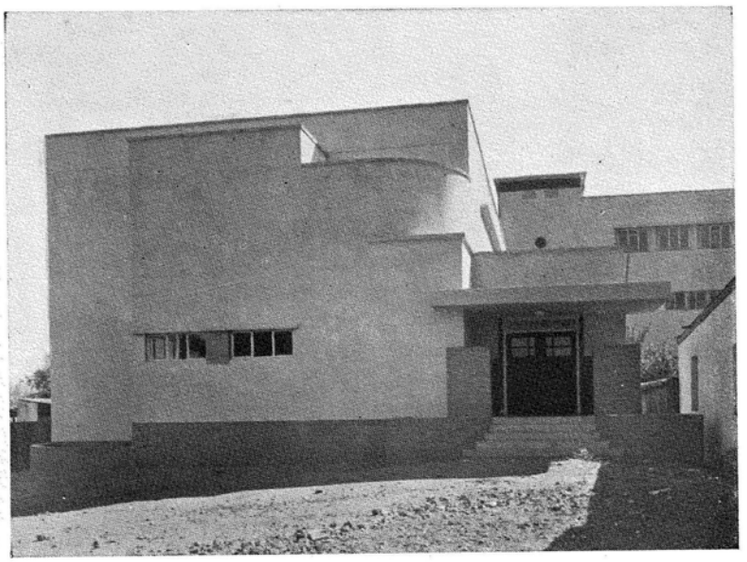
PRETORIA'S NEW :: "EENDRACHTSKOOL"

[CONTRIBUTED]

"EENDRACHTSKOOL," PRETORIA.

THE new Eendracht School, Pretoria, which has been carried out for the Transvaal Provincial Administration by Mr. V. S. Rees-Poole, is probably one of the more interesting of recent school buildings in Pretoria. It replaces the old school, which was built towards the end of the last century. This old building had become so inadequate for modern requirements and had fallen into such a deplorable state of disrepair, that the only solution to the problem was to rebuild.

The recreation ground available on the original site was inadequate for the new and larger building. To overcome this defect, the site was extended by acquiring properties to the west and north. Unfortunately, the property on the south boundary could not be acquired, so that, although the site had been increased to about three times its original area, it still presented some unusual planning problems, which were not simplified by having to retain the existing building until the new one was completed.



"EENDRACHTSKOOL," PRETORIA.

The new school accommodates 450 pupils, and twelve classrooms and a laboratory were required. Furthermore, it was to be a Domestic Science and a Manual Training Centre; these requirements, together with the necessary staff-rooms, store-rooms, cloak-room and lavatory accommodation, and the assembly hall, complete the scheme.

The problem would not have been simple, even with a straightforward site of an equal area, but with the difficulties already described the solution presented overcomes all the disadvantages and provides the necessary accommodation in a most convenient and interesting form.

The ground and first floor provide the necessary number of class-rooms. The principal's office, staff-rooms and cloak-rooms, with lavatory accommodation and store-rooms, are situated in the centre, between the two class-room blocks. The staff and parents' entrance leads into a lobby off which these rooms open. Boys and girls have separate entrances at different parts of the building; the stairs are next to the entrances, with cloak and lavatory accommodation. Cloak-room and lavatory accommodation is provided on both the ground and first ffoors.

The assembly hall is situated at the west end of the building, and occupies what otherwise would have been a very awkward portion of the site. It has an entrance directly from the street, opening from a porch into a closed loggia which runs the entire length of the hall and links up to the corridor of the class-room block. The hall contains a cinema projection room and a spacious stage.

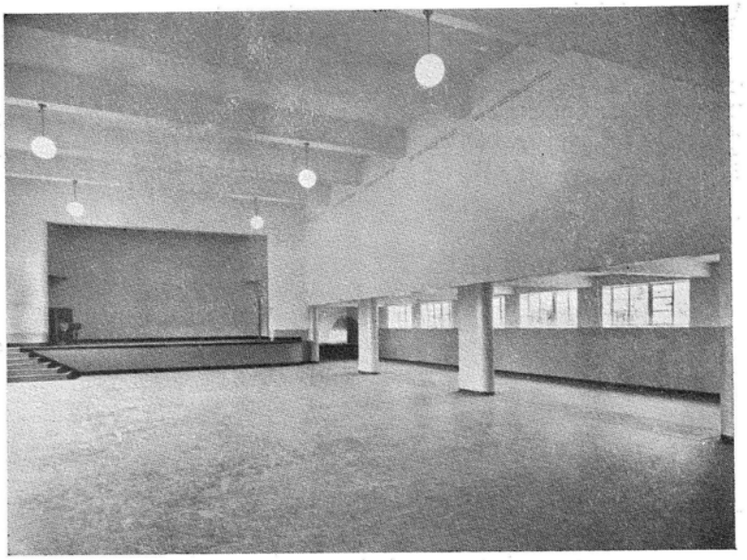
On the second floor the Manual Training Centre, the laboratory and the Domestic Science Centre have been placed. The boys' entrance and stair gives access to the Manual Training Centre, and the girls' to the Domestic Science portion of the second floor. The laboratory is situated between these two departments.

The staff-rooms and all the class-rooms have a northern aspect, with a closed and well-lighted corridor on the south. The second-floor rooms occupy the whole breadth of the building; and the Domestic Science room opens out on to a large terrace on the east. The assembly hall runs from north to south, with a row of windows on the east and west; thus it is provided with a pleasant amount of morning light.

The building is a concrete-framed structure with brick panel in-filling. Owing to its extreme length, the frame has been divided into three separate portions, with expansion joints. It is centrally heated by a boiler in the basement at the back of the assembly hall. All soil, waste and rainwater pipes are concealed in ducts or pipe areas.

Externally, the building is faced up to ground-floor window-sill level with dark red bricks; above this plinth plaster is used, limewashed a pleasant buff colour. The window-frames are painted white; and the entrance doors are of teak in white-painted frames. Internally, the dadoes are painted a light colour, and the walls and ceilings are colour-washed, and each class-room has its own particular colour scheme. Generally, the floors are covered with brown battleship lino. Large built-in cupboards are provided in the principal's and staff-rooms. A recess at the back of each class-room is fitted with low built-in cupboards.

Work on the lay-out of the grounds will be undertaken in the near future, and the two foundation stones from the old buildings will be placed in the garden to form part of a "commemoration monument."

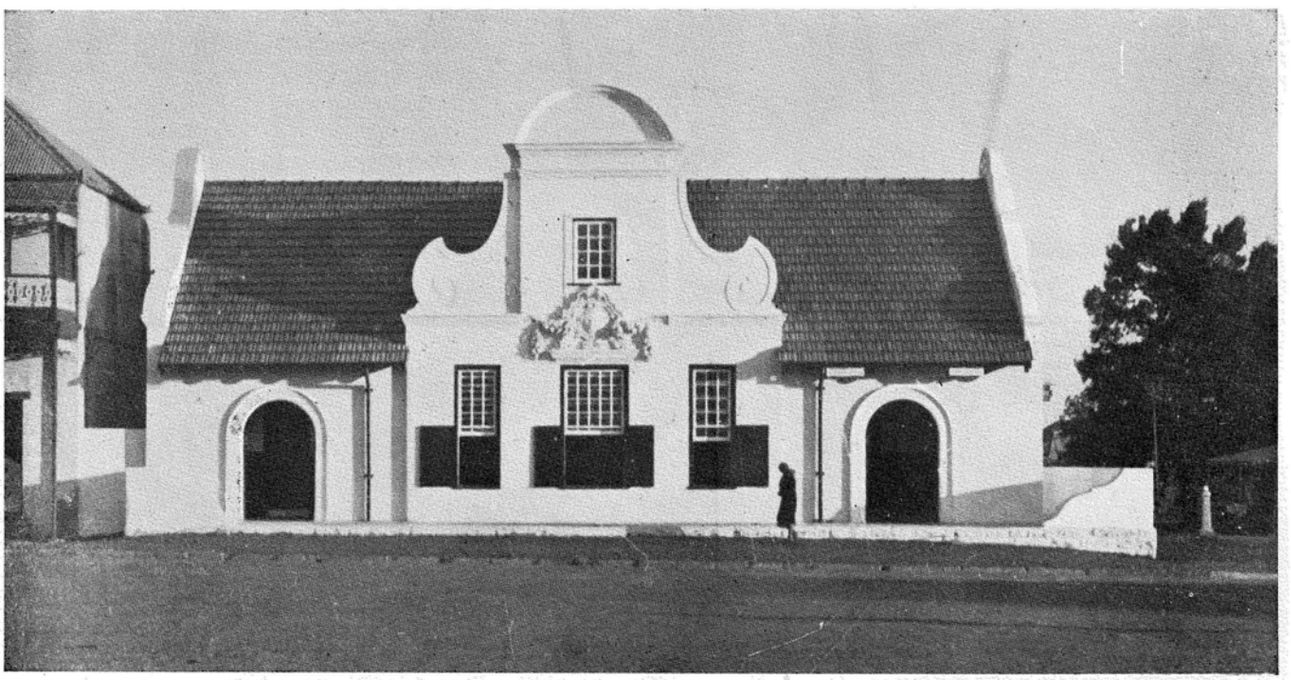


THE ASSEMBLY HALL.

Another Example of

CAPE DUTCH ARCHITECTURE

IN WINBURG'S NEW PUBLIC OFFICES



WINBURG POST OFFICE.

WHEN the new Public Offices were recently completed at Winburg, the old building was taken over by the Postal authorities, and replanned and refaced by the Public Works Department to form the completed new Post Office block, of which the above illustration shews the front elevation to Church Square.

The Cape Dutch style has been used as harmonizing pleasantly and simply with the general character of our Provincial towns, and the building takes its sure place amongst those that go to build up the South African national character work.

Divided into two parts, the first contract was carried out by Messrs. D. Watson & Son, at a cost of £1,949, and comprised the building of the exchange, battery room, women's rest-room, workshop and garage, lavatory block, etc. The second portion — practically the whole of the alterations and additions to the main block — was carried out by Messrs. W. H. Gresty, whose contract price was £2,830 11s. 5d. The buildings, fronting to Church Square, Victoria Street and Albert Street, were completed in June, 1938.

The second contract consisted of gutting practically the whole of the existing building. With the exception of portions of the outside walls, very little remained.

The remodelling consisted generally of the addition of four new gables, a new roof of Marseiles red tiles, new doors, windows and fittings throughout in teak. The external finish of the building is whitewashed plaster, with oiled teak joinery.

Internally, there is a large counter space 41 feet long, with adequate European and non-European public spaces, a private box lobby 27 feet by 17 feet, the circulation branch behind the counter is 29 feet by 24 feet, with Postmaster's room and store leading off.

On two sides of the building has been placed the open "voorstoep."

One might safely say that the old building has received a new birth in the spirit — as well as in the letter(s)!

TURNER NEWHAM.

IMPERIAL AIRWAYS' NEW FLYING BOAT HANGAR . . . . at Durban

By J.H.

THE new Imperial Airways flying boat hangar now almost completed at Durban has the distinction of being the largest structure in the Union for the housing of a single machine. Situated at the Bay-head near the Congella Power Station, the hangar is part of the £90,000 scheme for the creation of an Imperial Airways flying-boat base in Durban Bay. The hangar will be used as a repair and overhaul depôt. Up to the present repairs and overhauls have been done out on the open Bay.

The hangar is removed a short distance from an 8 feet deep basin now in the course of excavation, the approach from the basin to the hangar being up a concrete-covered ramp. The flying-boats, which are fitted with retractable wheels, will taxi up this ramp to an apron strip in front of the hangar under their own power. The structure was designed for Imperial Airways by the South African Railways and Harbours and fabrication and erection were carried out by a South African firm.

Structurally the hangar has many interesting features. It is an all-steel construction, the trusses of which have a span of 177 feet. The apex of the building is 75 feet high and the depth 100 feet. There is ample room therefore for the accommodation of the flying-boats being used on the Durban – Southampton route.

The site on which the hangar was built dictated to a large extent the design chosen. Engineers and architects acquainted with the Durban Bay-head will appreciate that the soil in that vicinity is a combination of sandy clay and alluvial deposits not very far above the water level. The floor of the hangar is actually 12·5 feet above L.W.O.S.T. Allowance for a possible uneven settlement had therefore to be made, so that the type of structure chosen was a three-pinned frame. This construction allows of uneven settlement without setting up stresses and strains in the building.

The hangar consists of five trusses girded together, the leg of each truss being bolted down to a pyramid-shaped concrete slab foundation, and resting on a rocker-plate. Each truss comprises two structural units secured at the top by a pin. The frames are spaced at 25-feet centres. A lattice structure was adopted in contradistinction to the solid web structure, as there was some urgency for the completion of the job and structural sections obtainable within the Union had consequently to be used. The depth of the inclined trusses is 8 feet and the legs taper from a point at the base to 11 feet wide at the haunches. The height of the eaves is 49 feet.

A word about the foundations will be of interest. As already stated the foundations consist of pyramid-shaped concrete slabs for each leg. These are set at 5·5 feet above L.W.O.S.T., which is about one foot below ordinary high water level. The maximum toe-pressure allowed for each slab is one ton per square inch. For each stanchion the size of the slab is 14 by 7 feet with vertical ribs 18 inches thick. The slabs taper upwards to a length of 3 feet and a width of 2 feet 6 inches. These slabs are capped by a specially designed stool embedded into the concrete. By pre-determining the exact position for each leg, these stools greatly facilitated erection. The legs of the structure are bolted down independently to the concrete structure by bolts which pass through the stools. These bolts are of $1\frac{3}{8}$-inch diameter, there being two to each intermediate truss and four for each of the corners, in order to take an uplift of approximately 50 tons. The hangar was designed for dead loading and a horizontal wind load of 30 lb. to the square inch. Its total weight is about 251 tons.

The roof covering of the hangar is of corrugated protected metal and the side sheeting is in corrugated steel of 20 B.G. specially treated. The whole is painted an aluminium colour. On the one side a 25-foot lean-to has been provided as a workshop and store room.

One of the notable features of the structure is the doors. These are placed at the sea end and comprise six sliding doors each 40 feet 6 inches high and 30 feet wide. When fully opened a clearance 40 feet high and 154 feet wide is provided. Each door weighs approximately 7 tons and is supported on two bogeys, each comprising two double-flanged wheels in tandem running on rails embedded in the concrete floor. On each door one bogey is geared to a handle enabling the doors to be easily operated by hand. Horizontal roller guides are provided at the top of the doors, so that, in the event of any slight distortion of the building through uneven settlement, the free movement of the doors will not be impeded. All the wheels and rollers on the doors are on ball-bearings, and the doors roll back in front of trestles outside the hangar.

The erection of the trusses presented no difficulty. The trusses were assembled on the site and lifted into position by means of four specially designed masts, two 100 feet high and two 70 feet high. The two legs of each truss were lifted into position by means of the 70-foot derricks. When in position the top pin was inserted and the truss held in position while the next truss was erected. The two were then girdered together, the girders being hoisted by means of the 100-foot masts. The first two trusses were therefore self-supporting, enabling the masts to be moved back for the erection of the remaining three trusses.

Operations began on the hangar last January and the building is now completed almost to the last detail. Its cost is in the neighbourhood of £20,000.

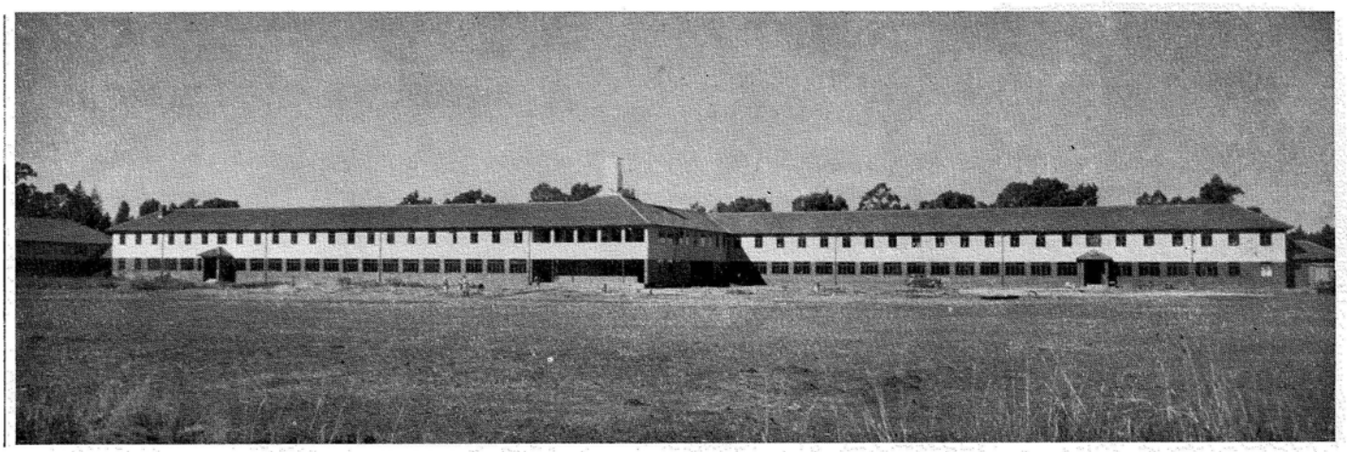
Bloemfontein's Police Headquarters

Police Offices, C.I.D., Charge Office, and Barracks in a Self-Contained Unit

★

Right-angled Break in 520-ft. Building provides interesting division between Offices and Barracks

[CONTRIBUTED.]



IN the middle of 1937, a new and spacious Police Barracks, costing approximately £47,000, was completed in Bloemfontein, by Messrs. Engel & Ruyter, of Pretoria. The foundation contract had been executed by Messrs. van Boom in 1935.

The plans for this scheme were prepared by the architectural staff of the Public Works Department.

An extensive site was chosen on the corner of Park Road and First Avenue. King's Park lies to the north across First Avenue, while Victoria Park is to the east, and the main approach from the centre of the town is from the south. A sewer, not to be built upon, runs diagonally across the site. These were the main factors to be borne in mind when siting the buildings, which were grouped to the south of the site, with the main entrance gate at the south-western corner of the grounds.

In front of the buildings and to the north of the sewer a sports arena has been planned, which, together with the parks, gives an open and spacious appearance to the buildings.

The programme called for the provision of Police Offices and Barracks. Both are placed in one double-storey building 520 feet long, with a right-angled break in the middle.

This break, accentuated by a clock turret, is of great importance in the scheme; it forms a natural division between the Barracks and the Offices. In it are located the main entrances and staircases, and through it passes the carriageway to the yard behind.

To the right of the carriageway, and nearer the town, the offices are located, to the left the more privately situated Barracks.

The offices accommodate the District Commandant and his staff, the Criminal Investigation Department, and also the Charge Office with all the necessary adjuncts.

The Barracks consist of, on the ground floor, a canteen, two recreation rooms, an officers' and a men's mess, which are adjacent and can be thrown into one when the occasion demands, and the kitchen accommodation; while the first floor provides 48 single bedrooms for the men, with the necessary ablution rooms. Each bedroom has a built-in wardrobe, and is comfortably fitted up.

A secondary staircase leads directly from the men's quarters to a well-equipped gymnasium, a hall 34ft. x 76ft. long, and to a swimming bath.

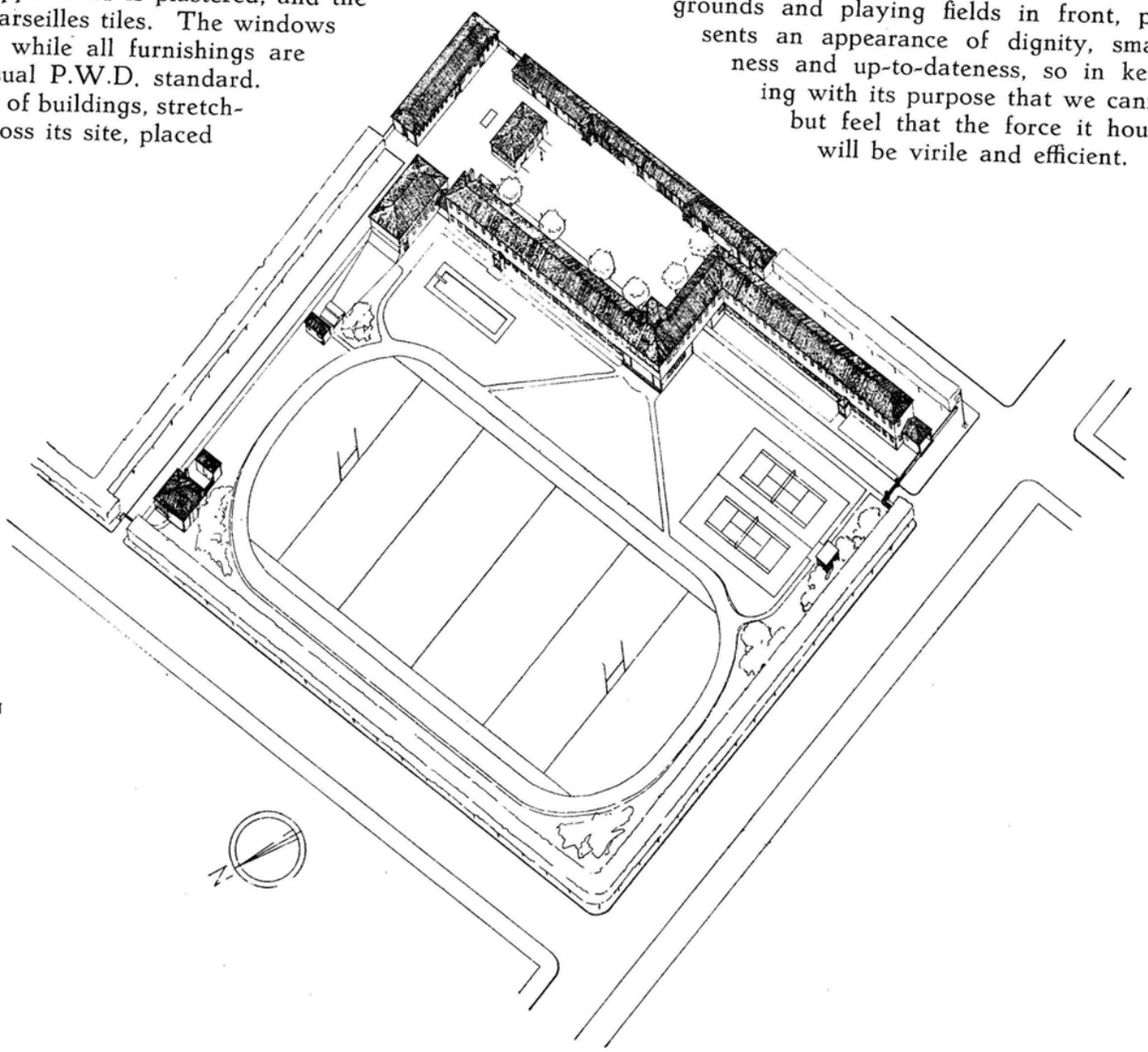
Behind the quarters are situated the cells, and also garage accommodation for officers' and for Police cars. A site was allocated for stables, but these have not been provided, in accordance with the new Police policy of mechanizing the force, and in time this site will be used for the housing of further mechanical transport.

A comfortable little cottage has been provided on the extreme north-eastern corner of the site, for the Police Gaoler. These are the only married quarters in this scheme.

The elevation is pleasing in its contrast of red and

white. The lower floor is built in facing bricks, the upper floor is plastered, and the roof is of Marseilles tiles. The windows are of steel, while all furnishings are up to the usual P.W.D. standard.

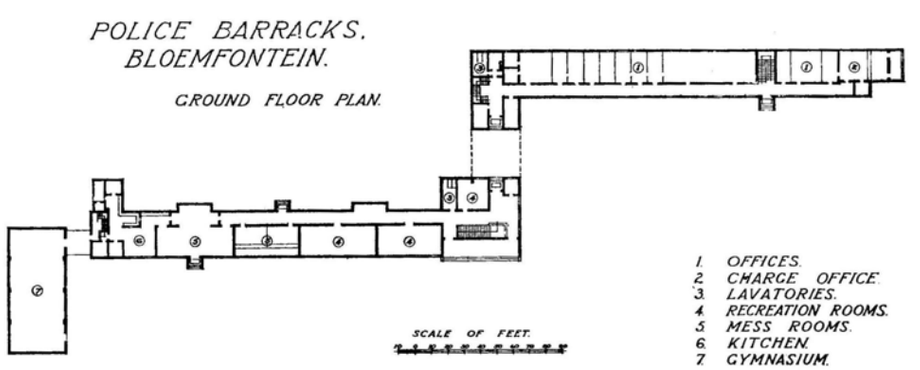
This block of buildings, stretching right across its site, placed far back from the street, with well laid out grounds and playing fields in front, presents an appearance of dignity, smartness and up-to-dateness, so in keeping with its purpose that we cannot but feel that the force it houses will be virile and efficient.

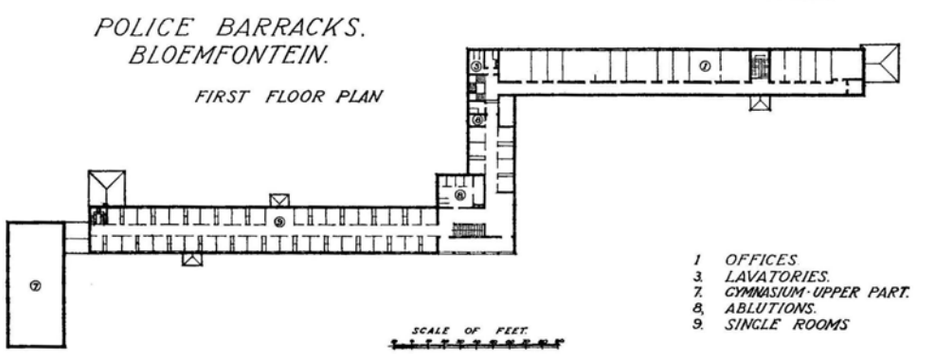


BLOEMFONTEIN

POLICE

BARRACKS.





£140,000 Development in Johannesburg's Municipal Transport Service

Contributed

MODERN REPAIR DEPOT FOR MAINTENANCE OF 500 VEHICLES

AN important improvement to the Johannesburg Municipal transport services is to be found in the new tramway workshops now nearing completion at Newtown. Included in the scheme, the total cost of which is £140,000, is a handsome three-storey office block for tramway officials. The office block was completed towards the end of last year. While the workshop or shed is structurally complete a large amount of work has still to be done regarding the installation of traverser gear, machinery, wiring, etc. The structure is in accordance with the latest transport development, and provision has been made in both workshops and offices for expansion likely to take place during the next 15 or 20 years. The office block includes recreation and catering facilities for the entire staff — administrative, running and artisan.

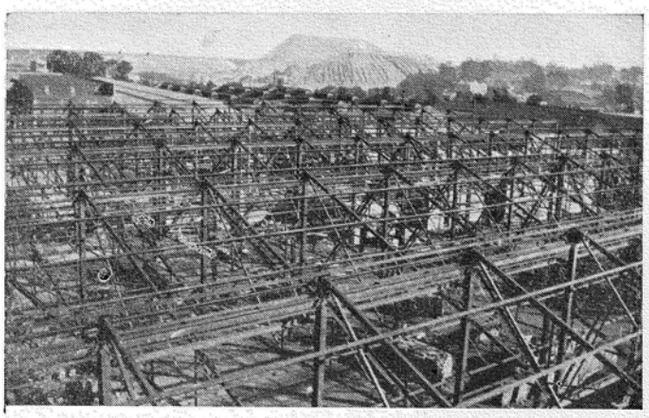
The shed is a large structure 465 feet long. In plan it represents the side of a truncated wedge 230 feet wide at the east end and 175 feet wide at the other. The end walls are at right angles to the north wall, the south wall converging. The walls are brick built in a reinforced concrete frame, and are faced on the outside with 24-inch square concrete tiles painted cream. A predominant feature of the walls is the provision of continuous windows ranging between 8 feet 6 inches and 17 feet high and divided into sections, one of which is 186 feet long. The windows are on the outside of the concrete supporting columns, which, therefore, do not interrupt their continuity. They are built in frames divided into 8-feet squares by 6 by 3-inch steel channels. Further illumination is provided by the glazing of the vertical sections of the all-steel saw-tooth roof, the trusses of which are 30 feet long, and the span 90 feet. By this means 50 foot-candles of illumination are obtained during the day. Actually the window space is approximately 35 per cent. of the floor area, that is, about 25 per cent. above that required by ordinance.

LAY-OUT OF SHED.

THE shop is divided into large bays or departments. Starting at the east end, the first bay has been designed for the examination and repair of trolleybuses. This bay is 230 feet wide and 90 feet deep and has 15 examination pits set at an angle facing the entrance. These pits are faced with white glazed tiles and fitted with special recessed electric lights and a connection for leading away exhaust fumes on occasions when motor buses are being examined. The floor of these pits is on the same level as the floor of the adjacent machine bay to facilitate the removal of heavy parts to the latter department. The floor of the machine bay in which will be installed modern machine-shop equipment, is actually 5 feet lower than that of the trolley-bus bay.

The machine bay, also 90 feet deep, is followed by a body-building bay, 200 feet wide and 165 feet deep. In this bay are seven tram tracks 100 feet long set over pits running parallel with the width of the building. The trams will be run on to these pits from a single entrance by means of a traverser electrically operated. The tracks on the traverser connect up also with tracks on an elevator to be used for lifting tramcar bodies off the chassis. This department has been equipped with a 10-ton crane and a 2-ton crane of the overhead gantry type. Both cranes have independent supports.

The fourth bay is partitioned off from the shed by means of a brick wall surmounted by large glass windows. In this bay the painting and enamelling of bodies is to be done. There are two tram tracks in this bay, both served by the traverser. The entrance through which the traverser runs is fitted with electrically operated metal roll shutter 38 feet high by 18 feet wide. This shutter rolls right down to the bottom of the traverser pit. This sealing-off of the painting department is to ensure efficient air-conditioning, so necessary in an area where poisonous fumes from



ROOF OF NEW TRAMWAY WORKSHOPS DURING CONSTRUCTION.

paint and enamel exist. The painting bay is followed by an open bay used as a blacksmith shop.

Additional accommodation in the shops has been provided by the building of two galleries in the body-building bay for incidental offices, conveniences and store-rooms. A certain portion of the machine bay has been partitioned off for stores as well. All the entrances to the shed are 15 by 22 feet, and are fitted with electrically operated roll shutters.

OFFICE BLOCK.

THOUGH not comprising a very large building, the office block is interesting for its lay-out and some of the accessories provided for the staffs. These accessories include a swimming bath and solarium on the roof.

The block faces east and consists of a brick-faced building of reinforced concrete frame construction, containing three storeys and a basement. The front façade has a length of 240 feet, the depth of the building is 40 feet, and, constructionally, is part of the workshop behind it, being separated from this by only a light bay. A light brown brick has been used throughout.

The façade is dominated by horizontal lines set by continuous windows on all floors, the supporting columns taking the form of mullions. This design has probably been influenced by the fact that the offices consist of long rooms running almost the entire length of each wing. These long rooms are partitioned off by brick walls 3 feet high surmounted by framed glass up to the ceiling. The windows outside are painted red and their surrounds cream — the official colours of the tramway department.

The horizontal lines of the façade are relieved by a strong central motif consisting of a projection 42 feet wide and 3 feet deep, rising to a height of 60 feet, that is, 15 feet above the rest of the building. This includes a small fourth floor.

In this central projection is the main entrance to the building. The entrance doors, handsome teak pieces divided into small glass panels, are gained by a short flight of steps up into a stepped recess forming a shadow frame, not only for the door, but for a large window above it. This window is 12 feet wide and 20 feet high, rising to the roof slab. It is divided into squares and actually forms a glass wall for the vestibules in front of the lift well on both floors.

The offices extend along both wings and have access from a corridor running along the back of the block. This corridor is illuminated by large windows opening into the light bay between the office block and the east wall of the shed. The corridors lead off the vestibules, on each side of which are strong-rooms with 4-inch concrete walls. Men's and women's conveniences are situated behind the lift well.

INTERIOR TREATMENT.

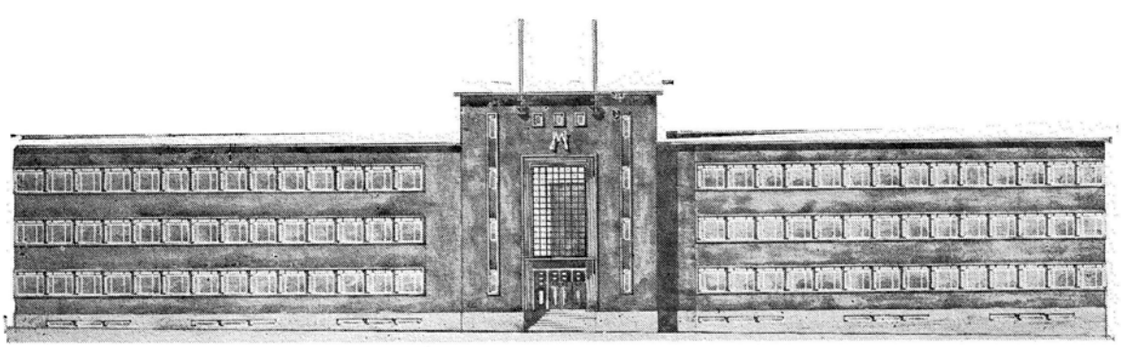
SIMPLE interior treatment on modern lines is the keynote of the design. The board room and general manager's office, however, have more lavish embellishment. These rooms are flush-panelled with Australian silky oak, which has a rich, polished and restful appearance. The building is air-conditioned throughout with supply and return ducts; and the illumination provided is of the indirect diffused type.

The basement contains large rooms set aside for private lockers, the cash-receiving department, a recreation room, kitchen and an equipment department for the personnel.

In the fourth floor is housed the lift machinery and air-conditioning equipment. On the roof is the swimming bath and solarium. The bath is 17 by 25 feet with a depth of 4 feet 6 inches. An interesting innovation has been included in this connection, in that the water of the swimming bath is circulated as a cooling medium for the air-conditioning plant immediately beneath it. The water, returning from the air-conditioning plant, is ejected into the swimming bath in a warm shower or spray at one end, serving the dual purpose of warming the water and slightly aerating it.

As has been mentioned before, the new offices and shed have been designed to accommodate expansion for the next 15 to 20 years. It is the policy of the Johannesburg City Council, however, to gradually replace the tramcars with trolley and motor buses, so that the provision made in the shed for tramcars will be equally suitable for the other types of vehicles. The traverser has been designed to take road vehicles as well as tramcars.

When completed in a few months' time the workshop will represent the main repair depôt for about 500 municipal vehicles. The present bus, trolley-bus and tramcar depôts will be maintained for parking and maintenance.



THE FRONT FAÇADE OF THE NEW TRAMWAY OFFICE BLOCK.

BENONI WEST JUNIOR SCHOOL

A Pleasing Example of the Quad-Type School Plan

IT is with pleasure that we are able this month to publish a short account of the Benoni West Junior School, which has been designed for the Provincial Administration by Mr. J. Lockwood Hall.

The school has been planned about two quadrangles, and is symmetrical, owing to its position in relation to the existing Benoni West Primary School, the sites of which are back to back.

In plan the lay-out of the school is in the form of a rectangle providing two quadrangles each 41 feet 7½ inches by 53 feet. The quadrangles are surrounded by a roofed verandah 7 feet 9 inches wide, and separated from each other by two central classrooms 25 feet wide.

BENONI WEST JUNIOR SCHOOL.

It was not expedient to provide an assembly hall, and so the architect has separated the two central class-rooms with folding doors, which, when opened, allow these two rooms to be used for this purpose.

Two of the noticeable advantages of the Quad-type school plan are, firstly, the ease of administration, and secondly, the avoidance of long and uninteresting corridors.

There are ten classrooms, each fitted with lockers for the children, blackboards just above the floor level to enable the children to draw on them with ease, and lots of pinning space.

These classroms, each of which are 22 by 25 feet approximately, are arranged along the back and front of the quadrangles in groups of six and four respectively. In all classrooms good cross-ventilation and illumination are provided. The sides of the rectangle project into well-planned and spacious sections comprising cloakrooms, wash rooms, urinals and separately enclosed lavatories in a novel corridor arrangement. One section is reserved for boys and the other for girls and lead off the respective quadrangles behind brick wall screens. There are two entrances to each of these facilities. Each of these entrances leads straight through a wash room on either side to an exit door opening into a wall-enclosed area housing bicycle stands. Two additional entrances are provided to each quadrangle at the ends of the verandahs. These doors open out on to small entrance porches approached by a flight of six steps.

The exterior is of light brown iron spot facing bricks, with the windows and ironwork painted ivory. The interior ironwork and the doors and windows are painted blue. The lockers in classrooms are painted veld green with black tops, edges and handles.

The floors of the classrooms are solid, covered with battleship lino and black grano borders, and the interior window sills are slate.

The main entrance, centrally situated in the front façade, is through double steel glass panelled doors opening into a corridor 7 feet 6 inches wide. Off this corridor, which leads straight on to the verandah of the quadrangles, are the administrative apartments comprising the principal's office, the staff room, a stock room and a store room.

Central heating is provided throughout, each room being warmed by means of rayrad panels 4 by 3 feet, set flush in the walls.

Simplicity is the key-note of the front façade, which consists of a plain brick frontage rising from a small splayed brick plinth and capped by bricks placed on edge. Full expression is therefore given to the windows, which provide a horizontal note in that they are contained in long sections of five windows of the

hopper type. The exterior sills are of bricks placed on edge. Above each window is a series of small ventilation panels. On each side of the main entrance are smaller windows above a projection of the façade rising to the window sills. This serves as a flower-pot base.

The roof is a well-vented corrugated iron lean-to around the quadrangles, hidden from the exterior with parapet walls.

All storm water is carried from the quadrangles by means of covered concrete channels, so that there is no possibility of the children tripping on them.

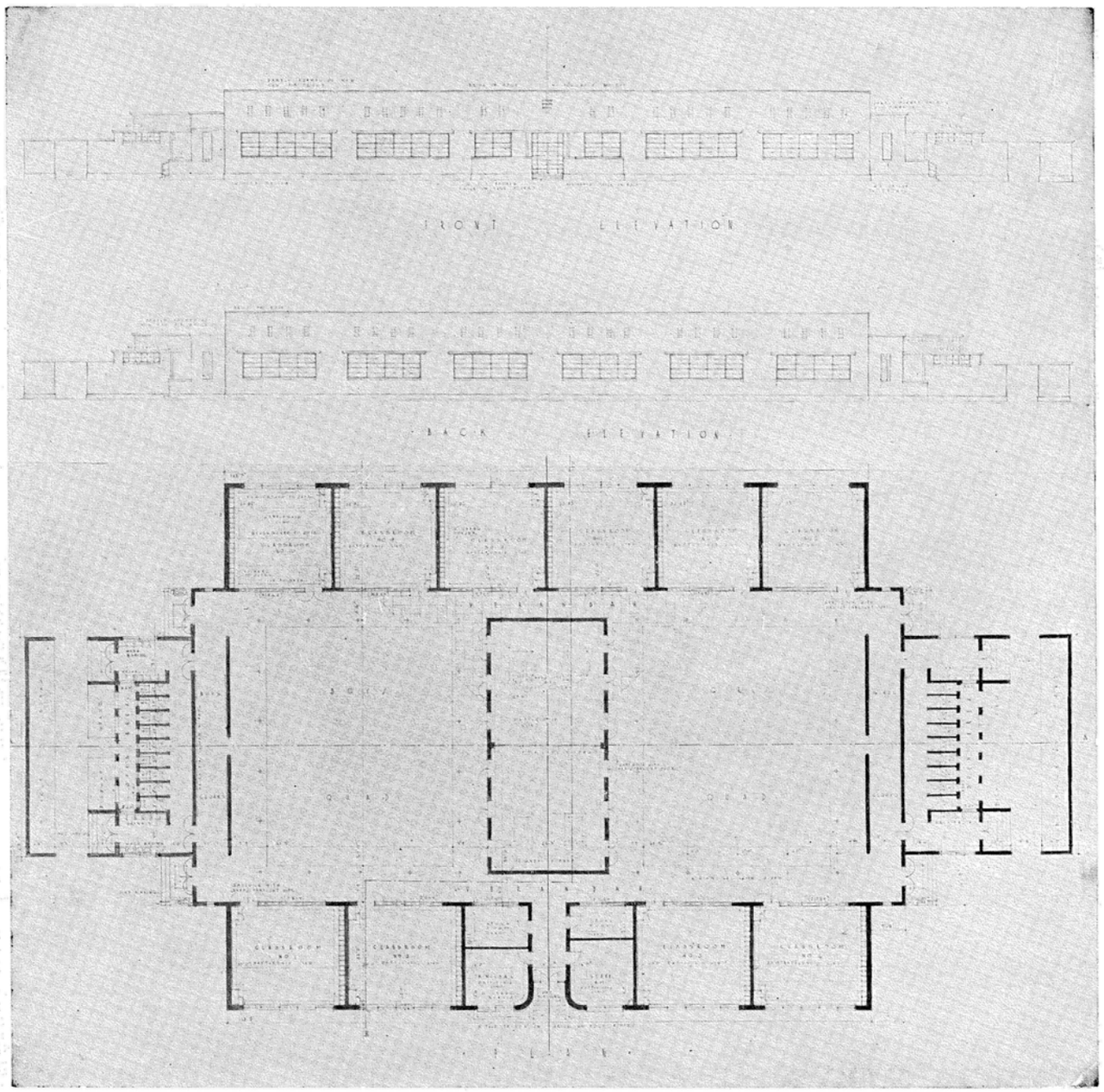
The building, which is costing £12,977 11s. 10d., has been well thought out and planned, and provides a new and pleasing school for the youngsters of Benoni West.

An interesting comment on the planning of the Benoni West Junior School is provided by Dr. C. C. P. Anning, Medical Officer of Health, Benoni.

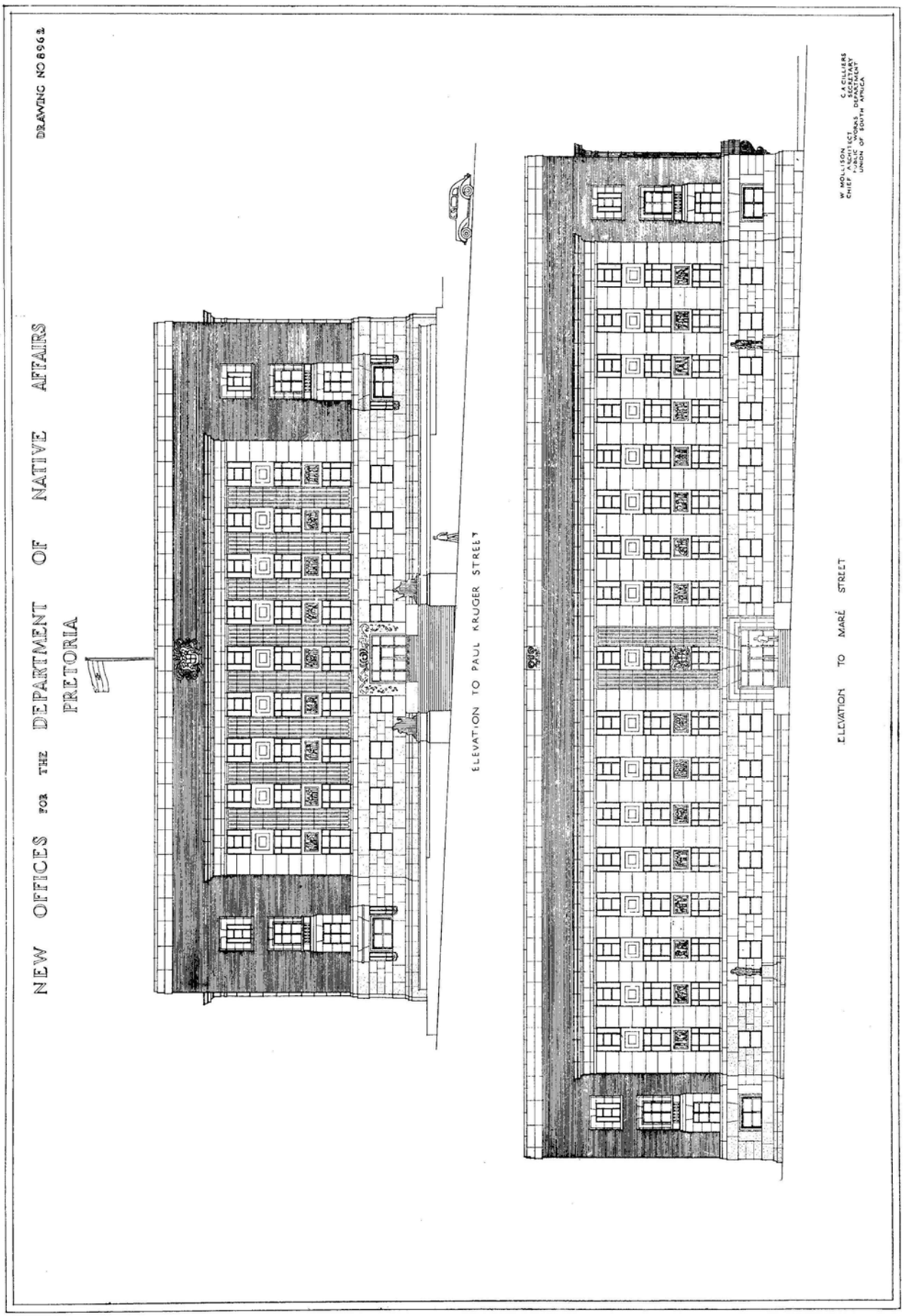
"The Benoni West Junior School," states Dr. Anning, "provides an excellent example of a modern school built primarily as a place in which health can be created as well as knowledge gained.

"Public health is concerned with increasing the 'happiness rate' as well as decreasing the death rate. Happiness means health. Thank goodness that today we have begun to build schools in which general diffused light can and does shine, in which cleanliness and carefulness can be fully achieved and in which, in fact, buoyant health can be developed.

"The motto of the Benoni Town Council health department is 'Through education to health.' In the Benoni West Junior School education and health will march hand in hand."



PLAN AND ELEVATIONS: BENONI WEST JUNIOR SCHOOL.



Old Pretoria Landmark will yield place to well-conceived new building that will well contribute to the reconstruction of Paul Kruger Street: : :

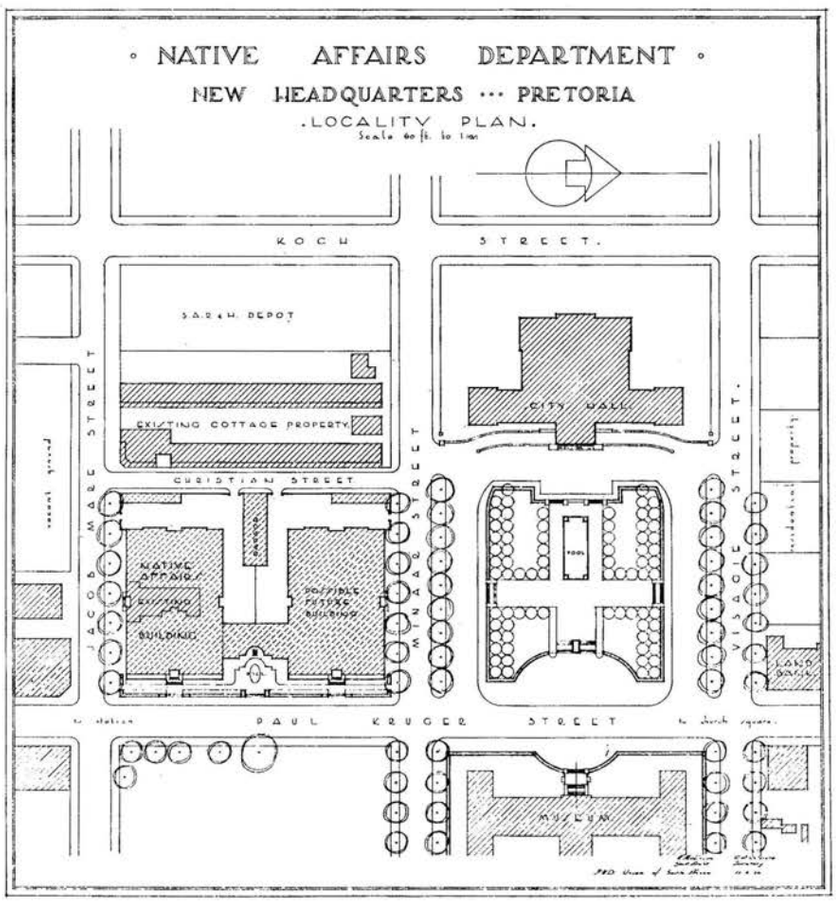
NEW HEADQUARTERS BUILDING FOR THE UNION NATIVE AFFAIRS DEPARTMENT - - - -

★

[Contributed]

A FAMILIAR old landmark in Pretoria is to go when the construction of the new Native Affairs Offices is begun, namely Z.A.S.M. House, in Paul Kruger Street. This old and unsightly building, now used as offices, will be demolished, and in its place will rise a new and imposing building to meet the ever-increasing needs of the Department.

The locality plan shows the position of the new building, with one front facing Paul Kruger Street, and a possible future building on the remainder of the site, the two buildings being connected by a link, recessed to give an ornamental lay-out, which might be used for a memorial. As the new building will form one of a group of important buildings facing Paul Kruger Street, its relation is shown to the City Hall, with its garden foreground, and to the Transvaal Museum, which is intended to be completed with two projecting wings as shown.



The ground-floor plan shows the extent of the projected new building. The portion shown with solid-lined walls is in course of construction, while that portion still to be built is shown with hatched walls.

The plan is designed with a repeated unit bay, to allow for subdivision into offices as required.

A Native Appeal Court and a large registry are provided on the ground floor, in addition to a board-room, the usual offices, lavatory blocks and light courts; while on the first floor will be an assembly hall and a library.

There will also be provided a Natives' yard, with male and female shelters and lavatories, and cycle sheds. The service yard will give access to the garages and store. There are to be two entrances with staircases and lifts, one in Paul Kruger Street, and one, already constructed, in Jacob Maré Street.

Externally, the ground floor is to be faced with granite from Brits. This durable, warm-coloured and attractively textured material is used to harmonize with a beautiful light red sandstone from Waterpoort quarry, in the Transvaal, which forms the plain and fluted pilasters above. The stonework is surrounded by a ground of red brick, terminating in a coping of Waterpoort stone.

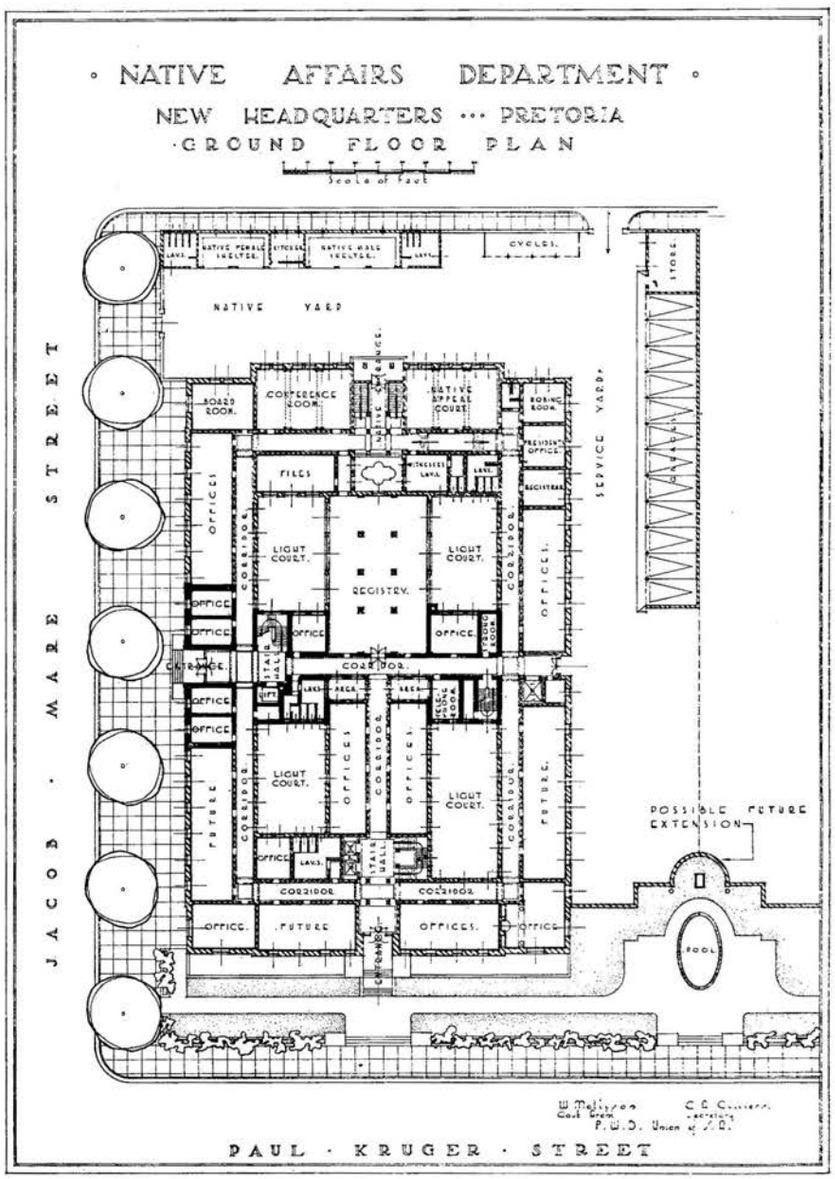
The main entrance, from Paul Kruger Street, is to

have a surround of carved floral blade and scrollwork. Above will be a series of sculptured panels, at first-floor level, of Native life, or other subjects relevant to the building, separated by fluted pilasters; and above the main cornice will be the Union Coat of Arms.

In the front to Jacob Maré Street the same treatment is being continued, but with plain instead of fluted pilasters. The Coat of Arms is placed between two fluted pilasters at the centre of the row of sculptured panels executed by Mr. Alfred R. Martin, of Johannesburg, and which depict: "Fencing," "Music and Song," "Warriors and Potters," and "Kraal Life." Two further panels in the main entrance depict: "The Slinger," and "Bayete!" High above the coping is a central ornament of carved proteas.

It is proposed to place two large bases for groups of statuary in front of the building in Paul Kruger Street, which will increase the monumental character of this street, and two smaller bases in Jacob Maré Street for portrait statues.

The walls of the entrance vestibule, staircase and staircase halls are to be faced with travertine from Port St. Johns, Natal; and the vestibule is also to be paved with this material. The halls, main stair and ground floor corridors are to be paved with rubber, and the corridors of the upper floors with linoleum. The floors of the offices are to be of wood block.



SOCIAL REHABILITATION APPLIED TO UNION HOUSING SCHEMES

OCTAVIA HILL FLATS.

Successful Experiment at Octavia Hill Estate

[CONTRIBUTED.]

ONE of the most interesting schemes undertaken for the housing of the distressed poor is to be seen in the Octavia Hill Flats, situated at Fordsburg, Johannesburg. Built and run by a Government-aided non-profit-earning company, these flats represent an unusual and promising experiment in social welfare, for this experiment is rapidly proving that with sympathetic guidance and assistance the social rehabilitation of poverty-stricken families is highly practicable and easily achieved.

The Octavia Hill Flats consist of self-contained units of eight blocks comprising 126 flats in all. These are made up of 30 single-room flats, 30 three-room flats (two bedrooms and a dining-room, besides a separate kitchen, bathroom and lavatory), and 36 four-room flats. The blocks are uniform in that they comprise either all single-room flats, three-room flats or four-room flats. There are 30, 15 and 12 flats respectively to each block. Free electric light and hot water are provided throughout, the tenants having to pay only for stove gas on the shilling-in-the-slot principle.

The scheme was started in 1936, and two blocks were completed in January, 1937, to provide accommodation for 30 families in three-room flats. In the same year a start was made on six additional blocks, which were completed in January, 1938. The architecture of the old and new blocks is substantially the same, a slight improvement in the facing bricks of the balconies being made in the latter.

In each case the blocks are straightforward three-storey brick constructions. The length of the façade is 136 feet 7 inches, with horizontal features provided by continuous brick balconies running along the entire length of each floor. An upward motif is provided at each end of the façade by a projection of about 14 feet. In each projection is an enclosed staircase and various store-rooms. The roof is of galvanised corrugated iron.

SPACIOUS INTERIORS.

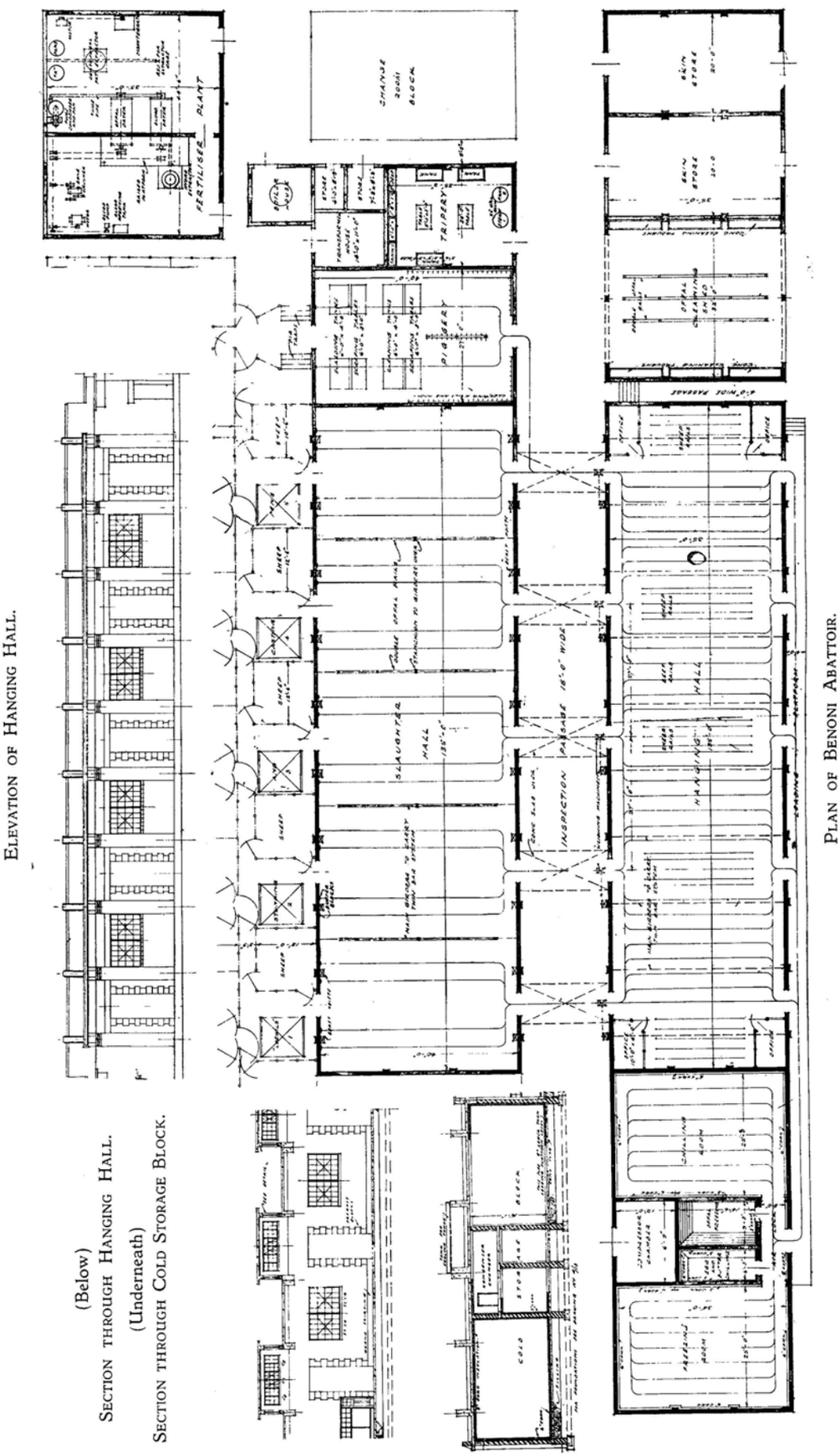
The interior of the flats are spacious and well laid out. In each case entrance to the flat is direct through the living room off the common balcony or verandah. The living rooms are 15 feet 6 inches by 13 feet. From the living rooms doors lead off to the bedrooms, each of which has a standard size of 15 feet by 10 feet. The kitchens are 10 by 12 feet and the bathrooms are by no means inconveniently small. The floors and ceilings are concrete, the latter being plasteerd and distempered to the colour of the walls. Moulded concrete takes the place of wood for picture rails as a prevention against the harbouring of vermin. The doors leading to the various rooms are very plain. A ventilation grille is provided above each instead of the usual fanlights. While the electric fittings are plain and strong, each living room has a handsome built-in gas radiator. Steel ceilings were used for the top floor. A distance of 8 feet 6 inches separates the floor from the ceiling. The steel windows are spacious, and each flat is equipped with several stout, built-in cupboards.

The eight blocks are laid out in large grounds which provide sufficient room for playing fields and lawned spaces.

To make the community as self-contained as possible, a large community hall has been included in the office block, which stands some distance apart from the flats. In this hall various demonstrations, lectures and concerts are held under the guidance of welfare workers for the benefit of the tenants.

This hall is approximately 50 feet long and 30 feet wide, complete with a recessed stage. Instead of side walls, steel supporting columns have been used, the spaces in between being closed by steel-framed glass from floor to ceiling. Inside the hall private lockers have been provided as well as a small library supplied by the Johannesburg Public Library. This hall has been found sufficient for the needs of a community comprising about 500 persons, of whom 220 are children of all ages.

It is interesting to note that although the initial expense of the scheme was £76,000, the flats are being let out at the following rentals: £1 a month for four-room flats, 15s. a month for three-room flats and 10s. a month for single-room flats.



ELEVATION OF HANGING HALL.

(Below)
SECTION THROUGH HANGING HALL.
(Underneath)
SECTION THROUGH COLD STORAGE BLOCK.

PLAN OF BENONI ABATTOIR.

REEF TOWN ABATTOIR UP TO WORLD STANDARDS

Modern Plant at Benoni Sets New Note In Cold Storage

BENONI possesses an abattoir which is not only one of the most up-to-date by comparison with world standards, but is the fourth largest in the Union of South Africa. This abattoir serves most of the Eastern Reef. The Benoni abattoir is a unit of the Municipal Health Department under the control of the Medical Officer of Health, Dr. C. C. P. Anning.

Benoni's first abattoir was opened in 1913, so that from this date the production of meat was carried out under better conditions than hitherto. It was not until January, 1935, however, that definite laws controlling inspection were laid down by local authorities or by the Government. The regulations framed under the Public Health Act No. 36 of 1919, were then formulated and a definite system of inspection laid down.

By 1922 the requirements of the rapidly expanding East Rand taxed the available space of the existing abattoirs to their limit. New abattoirs were required and the existing plant was then started. Benoni's first establishment lacked many of the essentials, in that there was an absence of storage facilities and hygienic methods of dealing with waste and condemned meats.

ABATTOIR PLANNING.

ONE of the foremost essentials in abattoir design is simplicity conducive to ease of handling cattle and carcases. The design must be such that the abattoir may be worked to capacity without the danger of congestion, for in a business of this nature if there is any congestion cleanliness and hygiene will suffer. It must be remembered that an abattoir has many departments. The cleaned carcases must be in a different department to that dealing with the offal and entrails. The by-products department for the manufacture of blood and meat meal must be removed as far away from the slaughtering and hanging departments as possible. Another essential for abattoirs is humane killing. The Benoni abattoir may be said to fulfil all these requirements.

The design of abattoirs vary according to whether a greater number of oxen or sheep is to be killed. The killing of oxen requires more space and equipment than the killing of sheep. At the Benoni abattoir about 60 per cent. of the killings are of oxen and 40 per cent. of sheep. In the Cape, however, only 20 per cent. of the killings are of oxen and 80 per cent. of sheep.

As will be seen in the reproduced plan, the Benoni abattoir consists mainly of two large rectangular halls 135 feet long running parallel to each other and separated by an 18-foot wide open-air inspection passage. Each hall is divided into five bays, each bay being provided with a north and south doorway. The doorways in each bay are on the same axis as those of its relative opposite bay in the other hall.

The north hall is the slaughter hall which is 40 feet wide and 18 feet 1½ inches high. The walls are brick, cement-plastered inside, the lower portion of the interior walls being faced in salt-glazed brick. The ceiling is a concrete slab with roof lights. Both ceiling and plastered walls are enamelled white. There is a concrete floor and grano skirting. The floor has a slight slope towards the inspection passage and is provided with draining or blood channels. In this hall the slaughtering and dressing take place. A killing pen is situated at each of the five north doorways, these pens being connected by runways to the lairage.

The south or hanging hall is of similar design. It is 35 feet wide and the interior walls are plastered from floor to ceiling and enamelled white. The south doorways of this hall lead out on to a loading platform protected by a concrete slab canopy. This hall is extended in both east and west directions. On the west are the chilling and freezing departments, and on the east the offal cleaning department and skin stores. All exteriors are brick and the entrance doors have pre-cast concrete block surrounds.

FREEZING PLANT.

THE freezing and chilling plants are of interest. These embody an interesting innovation in that the freezing medium is pre-cooled dry air circulated through the rooms via ducts led into the rooms immediately under the ceiling. This system prevents any deposition of moisture on the meat and its subsequent freezing into icicles and also avoids the necessity for defrosting. Ice on meat not only spoils the quality of the meat, but forms an insulating case or surface which prevents the

cold from penetrating into the interior of the carcasses. Bone taint is likely to result. In the freezing chambers of the Benoni abattoir this cannot happen as any moisture that may be in the air is condensed in special chambers or condensers before it is circulated through the freezing and chilling rooms. The cold air in the rooms is drawn off to the compressors to be recirculated. The temperature in the chilling room is between 38 and 40°F. That in the freezing room is 14°F.

The chilling and freezing rooms are each 25 by 34 feet, entrance to each being through an air lock compartment. The rooms are situated on either side of two smaller chambers. One of these, 9 by 14 feet 6 inches, is used for the freezing of offal, and the other, 6 by 14 feet 6 inches, for butter and eggs. Behind these two smaller chambers is situated the air compressor department containing two independent electrically driven air compressors of 30-ton refrigeration capacity. Both units are thermostatically controlled.

The walls of the freezing and chilling chambers are covered with a 6-inch cork insulation, the ceiling being insulated with 8-inch material. In the two smaller freezing chambers 3-inch insulating material is used. The height of both rooms is 16 feet, the roof being a concrete slab. The condenser equipment is situated above the two smaller chambers.

OTHER DEPARTMENTS.

To the east of the slaughter halls are the piggery and tripery departments. The former is housed in a room 27 feet wide, containing scraper tables and cleaning and scalding tanks. The tripery is 20 feet wide. Adjacent to these is the transformer house and stores.

A word should be said about the lairage. This consists of a series of fenced-off pens divided into five section each containing six pens. These pens lead off an assembly pen which has entrance from a siding platform.

Each pen is provided with watering facilities and cattle may be accommodated for three days. All the pens have 7 foot 6 inch fences, and from each pen a runway is provided leading direct to the stunning pens. These latter are of the "Jameson" type and may be used both for Christian aid Kosher or Indian killing. An interesting point in regard to the pen fences is that the Government requires 7 foot 6 inch fences to be erected around all quarantine sections. But as it is difficult to separate quarantine from clean cattle it was decided to place all cattle dealt with at the Benoni abattoir under quarantine rules.

Some interesting time statistics in regard to the adaptability of the Jameson stunning pens for Kosher killing have been taken. It was found that the time to drive an ox into the pen, fasten it for Kosher killing, tip it, cut and bleed it and pull it in to the hall was 4 minutes. A floor of 14 oxen were driven in, shot, tipped, pulled in and bled in 22 minutes. The pens are roofed in so that the cattle should not become overheated by exposure to the sun and so increase the possibility of the meat becoming tainted.

The fertilizer plant is housed in a building some distance away from the slaughter hall. It consists of a single room 44 feet 6 inches by 35 feet divided into two compartments where blood and meat meal are manufactured and fat produced.

These by-products are manufactured in two steam-jacketted driers, so that no steam or water comes into contact with the material being processed. All moisture is extracted by the heat produced in the jackets, and the mass is continually stirred up by beaters rotating on a shaft running through each drier. After from five to six hours blood is reduced to a powder which is cooled off, ground and bagged for sale. The meat, offal, etc., is taken from the drier and placed in a turbine fat extractor, after which it is ground and ready for sale. A soda solution is used to clarify the fat, which is then sold to soap factories. During the year 1936-37, 70 tons of blood meal, 75 tons of meat meal and 16 tons of fat were produced and sold.

The entire abattoir is adequately equipped with a patent twin-bar overhead rail system. This consists of two parallel steel rails from which is suspended a hook on two rollers. The advantage of this system is its simplicity, for there is not the slightest possibility of the rollers becoming jammed in the points and so impeding work. The rails run from the slaughter hall through to the hanging hall, which is equipped with two sets for each of the five bays. From the hanging hall a set of rails run on to the loading platform and thence along to the chilling and freezing chambers. In both slaughter and hanging halls hoists are provided for lifting carcasses.

QUANTITIES.

A FEW figures relating to quantities dealt with by an abattoir of this size will be of interest.

During the year 1936-37, a total of 86,666 animals were slaughtered. This total comprises 30,954 oxen, 54,177 sheep, 409 calves and 1,126 pigs. This slaughtering represented an income of £5,992. The by-products department produced a total of 119,950 lb. blood meal; 152,550 lb. meat meal and 32,250 lb. fat. The wholesale value of the meat which passed through the abattoir during the same year was £330,000, including oxen, £210,000; sheep, £50,000; pigs, £1,500; imported meat, £17,500; hides and skins, £36,000, and offal, £15,000.

All slaughtering at the Benoni abattoir is done by men employed by the various butchers. There are no private slaughter poles in Benoni and all meat for sale in Benoni must be slaughtered at the abattoir. If it is slaughtered at some other approved abattoir, the meat must be brought in for inspection and stamping.

EXPANSION.

AN important point in the design of any abattoir is the provision for expansion. The abattoir must be laid out in such a way that expansion will not interfere with the simplicity of the design or tend to confuse the clean and unclean departments, as they are termed.

The designers of the Benoni abattoirs have paid attention to this.

By consulting the plan it will be seen that there is ample room for any extension of the slaughter hall to the west, as there is also for cold storage and chilling. In the event of any appreciable enlargement of the abattoirs there will be no necessity to interfere with the lay-out by providing extra piggeries, triperies and offal-cleaning departments as the present size of these departments is sufficient to accommodate considerable future expansion. At present the Benoni abattoirs are dealing with 130 oxen and 250 sheep carcases daily.

HYGIENE.

NEEDLESS to say every provision for hygiene has been made at the Benoni abattoirs. The lay-out or planning conducive to this has already been discussed. A few further points remain. The floors of the building are of granite concrete smooth surfaces and provided with the necessary facilities for swilling. The abattoir is connected with the sewerage and in the offal-cleaning department there is a large conical-shaped offal sewage sump fitted with a plug operated by means of a chain and pulley. With the present system of working at the abattoir, approximately half an hour before work stops all floors, channels and the sump have been swilled so that nothing is left to stagnate or putrefy.

But one small problem remains. This is in regard to the sewage. The sewage from the abattoir has a high acid content and, further, contains indissoluble particles of undigested grass, which has a tendency to interfere with the working of the sewage system of the town. It is understood, however, that attention is being given to a different method of disposing of this undigested grass.

Tenders Invited

THE following are particulars of the more important tenders which have been invited, up to the time of going to press, by Government Departments and Provincial Administrations. In each case the date by which tenders must be submitted and the office to which application should be made, are given :–

BUILDINGS AND ALTERATIONS, ETC.

Additions to Sastri College, Durban (P.W.D. tender 250): Secretary for Public Works, Pretoria (room 531, 'phone 5477); District Representative, P.W.D., Pietermaritzburg; and Inspector of Works, P.W.D., Durban. **1st June.**

Additions and alterations to Egerton School, Ladysmith, Natal (P.W.D. tender 251): Secretary for Public Works, Pretoria (Room 531, 'phone 5477); and District Representative, P.W.D., Pietermaritzburg. **1st June.**

Assembly Hall, erection of, for Kakamas High School: Messrs. Louw & Louw, architects, Sanlam Building, Cape Town, and 130, Main Street, Paarl. **2nd June.**

Additions to school, Wartburg, Natal: P.W.D., Pretoria and Pietermaritzburg. **7th June.**

Additions to Eshowe School, Natal: P.W.D., Durban. **1st June.**

CHEMICALS, LABORATORY EQUIPMENT, ETC.

Chemicals and apparatus for Western Province Fruit Research Station (tender S.O. 314): Union Tender and Supplies Board, 271 Visagie Street (P.O. Box 371, 'phone 3121), Pretoria. **1st June.**

Dip testers for Onderstepoort Laboratory (supply of: tender S.O. 323): Particulars obtainable as above. **8th June.**

Glass flasks and beakers for Onderstepoort Laboratory (supply of: tender S.O. 322): Particulars obtainable as above. **8th June.**

Glass slides for Onderstepoort Laboratory (supply of: tender S.O. 320): Particulars obtainable as above. **8th June.**

Hypodermic syringes and spares for Onderstepoort Laboratory (supply of: tender S.O. 319): Particulars as above. **8th June.**

ELECTRICAL EQUIPMENT.

100 k.v.a. alternator and automatic voltage regulator (Irrigation tender 4): Controller of Stores, Irrig. Department, P.O. Box 277, Pretoria; Circle Engineers at Cape Town (P.O. Box 23), Port Elizabeth (P.O. Box 3020), and Durban (P.O. Box 1018). **1st June.**

Crude-oil engine lighting plant and battery for Swartfontein Labour Colony, near Nelspruit (supply and delivery: P.W.D. tender 233): Secretary for Public Works, Pretoria (Room 531, 'phone 5477). **8th June.**

Electric conduit tubing, galvanised steel (supply of: P.W.D. tender S. 7): Secretary for Public Works, Pretoria (Room 548, 'phone 3504). **8th June.**

Electric lamps, supply of, for 1939–40 (P.W.D. tender S. 6): Particulars obtainable as in preceding item. **8th June.**

Electrical plant for State Alluvial Diggings, Alexander Bay (supply of: tender S.O. 326): Union Tender and Supplies Board, 271 Visagie Street (P.O. Box 371, 'phone 3121), Pretoria. **8th June.**

Dimming apparatus and switchboard, lighting fittings, floodlights, spotlights, footlights and battens, and fluorescent discharge tubes for new Recreation Hall, Voortrekkerhoogte (supply

and delivery: P.W.D. tender 240): Secretary for Public Works, Pretoria (Room 531, 'phone 5477). **15th June.**

Supply of woodwork: stillage for battery racks for Pretoria Automatic Telephone Exchange (P.O. tender 745): District Stores Superintendents, Johannesburg, Cape Town, Port Elizabeth, East London, Durban, and Bloemfontein; Divisional Controller, P.O. Pietermaritzburg; Controller of P.O. Stores, Room 77, G.P.O. Annexe, Pretoria. **8th June.**

Electric lighting fittings for South African National Art Gallery, Cape Town (supply and delivery: tender P.W.D. 246): Secretary for Public Works, Pretoria (Room 531, 'phone 5477), and District Representative, P.W.D., Cape Town. **22nd June.**

Radio receiving apparatus (Transvaal Provincial tender 109/1939): Superintendent of Stores, P.O. Box 857, Pretoria. **7th June.**

ROADS AND ROAD-MAKING EQUIPMENT.

Electrically driven mechanical shovel for State Alluvial Diggings, Alexander Bay (supply of: tender S.O. 317): Union Tender and Supplies Board, 271 Visagie Street (P.O. Box 371, 'phone 3121), Pretoria. **8th June.**

Approhimately 1,213,800 gallons bitumen (Transvaal Provincial tender 107/1939): Superintendent of Stores, P.O. Box 857, Pretoria. **1st June.**

Mechanical plant: Provincial Roads Engineer, P.O. Box 417, Pietermaritzburg. **7th June.**

SURGICAL AND HOSPITAL EQUIPMENT.

Electric bed-passenger lift for Maternity Ward Block, Grey's Hospital, Pietermaritzburg (supply, delivery and erection: P.W.D. tender 253): Secretary for Public Works, Pretoria (Room 531, 'phone 5477), and District Representative, P.W.D., Pietermaritzburg. **21st June.**

WATER SUPPLY AND IRRIGATION EQUIPMENT.

150,000-gal. water tower and alterations and additions to reticulation at Grey's Hospital, Pietermaritzburg (P.W.D. tender 252): Secretary for Public Works, Pretoria (Room 531, 'phone 5477); and District Representative, P.W.D., Pietermaritzburg. **1st June.**

MISCELLANEOUS.

Petrol or paraffin engine (supply of: P.O. tender 742): District Stores Superintendents, Johannesburg, Cape Town, Port Elizabeth, East London, Durban and Bloemfontein; Divisional Controller, P.O., Pietermaritzburg; Controller of P.O. Stores, Room 77, G.P.O. Annexe, Pretoria. **15th June.**

Assize equipment for Department of Commerce and Industries, Pretoria (tender S.O. 315): Union Tender and Supplies

Stone-crusher for Mental Hospital, Pretoria (supply of: tender S.O. 321): Union Tender and Supplies Board, 271 Visagie Street (P.O. Box 371, 'phone 3121), Pretoria. **8th June.**

Belt-driven lathe for Mental Hospital, Queenstown (supply and delivery: P.W.D. tender 235): Secretary for Public Works, Pretoria (Room 531, 'phone 5477), and District Representative, P.W.D., Port Elizabeth. **15th June.**

Structural steelwork, etc, for S.A.R., Salt River (S.A.R. tender 2168) and Pretoria (S.A.R. tender 2169): Railway Stores Superintendents at Salt River, Uitenhage, East London, Durban, Bloemfontein, Pretoria, and Chief Stores Superintendent, Room 46, S.A.R. & H. Headquarters, Johannesburg. **10th July** and **17th July,** respectively.

School bedsteads: Provincial Accountant, P.O. Box 373, Pietermaritzburg. **7th June.**
Board, 271 Visagie Street (P.O. Box 371, 'phone 3121), Pretoria. **1st June.**

Engine-driven winch (P.O. tender 743): District Stores Superintendents, Johannesburg, Cape Town, Port Elizabeth, East London, Durban, Bloemfontein; Divisional Controller, P.O., Pietermaritzburg; Controller of P.O. Stores, Room 77, G.P.O. Annexe, Pretoria. **22nd June.**

Structural steelwork, etc., coal bunker, Railways Administration, Germiston (S.A.R. tender 2161): Railway Stores Superintendents Salt River, Uitenhage, East London, Durban, Bloemfontein, Pretoria, and Chief Stores Superintendent, Room 46, S.A.R. & H. Headquarters, Johannesburg. **3rd July.**

5-ton steel travelling crane for Durban Harbour (S.A.R. tender 2164): Particulars obtainable as above. **10th July.**

Tenders Accepted

THE following are particulars of some of the contracts which have been awarded. The name of the successful tenderer is given in each case, and, wherever practicable, the contract price :–

BUILDINGS AND ALTERATIONS, ETC.

Hangar, with offices, etc., at Young's Field Aerodrome (P.W.D. tender 201): L. A. Steens, Pinelands. £15,376.

Automatic Telephone Exchange, Boksburg (tender P.W.D. 204): F. C. Holton, Krugersdorp. £4,722.

Hangar, offices, garages and workshops at Waterkloof Air Station (tender P.W.D. 225): Pretoria Steel Construction Co., (Pty.) Ltd., Pretoria. £13,665.

Alterations and additions to Automatic Telephone Exchange, Parkview (tender P.W.D. 202): J. W. Petersen & Co., Krugersdorp. £545.

Thatching of roof of dairy, Stellenbosch-Elsenburg College of Agriculture (tender P.W.D. 196): G. C. van Ster, Eersterivier. £163 4s.

Additions to Glenwood Park School (Natal): E. A. Borland. £484.

Additions to Umgeni Indian School, Durban: A. Hanson. £491.

CENTRAL HEATING.

Central heating installation at Benoni Post Office and Automatic Telephone Exchange (tender P.W.D. 191): A. E. Barker, Johannesburg. £343.

ELECTRICAL EQUIPMENT.

Automatic Telephone Exchange, Orange Grove — alterations and additions (P.W.D. tender 174): R. Beardworth & Son (Pty.), Ltd., Johannesburg. £1,950.

Low-tension cable for Recreation Hall, Voortrekkerhoogte (tender P.W.D. 177): A.E.G. Engineering Co. (S.A.) (Pty.), Ltd., Johannesburg.

Generators, magneto, motor-driven (tender P.O. 723): Rogers-Jenkins & Co. (Pty.), Ltd., Johannesburg.

Inter-office communication system for Department of Justice (tender P.O. 698): Siemens Bros. & Co. (British), Ltd., Johannesburg. £72 10s., f.o.r. Johannesburg.

LABORATORY EQUIPMENT, ETC.

Hypodermic syringes, spare glass barrels, etc., for Onderstepoort Laboratory: Argonauts (S.A.), Ltd., Johannesburg.

Zeiss microscopes (8) for Onderstepoort Laboratory (tender S.O. 232): B. Owen-Jones, Ltd., Johannesburg. £41 6s. each (delivered).

ROADS AND ROAD-MAKING EQUIPMENT.

Road-grader (tender S.O. 257): Thos. Barlow & Sons (S.A.), Ltd., Johannesburg. £80 5s. 3d., f.o.r. Johannesburg.

Surface rater (Transvaal Provincial tender 11/1939): A. Keller, Johannesburg.

Rotary screens (Transvaal Provincial tender 12/1939): Couzin & Attwood (Pty.), Ltd., Johannesburg.

Bitumen emulsion (Transvaal Provincial tender 13/1939): Colas (S.A.), Ltd.

SURGICAL AND HOSPITAL EQUIPMENT.

Chest condenser plant, fluoroscope, and intensifying screens for Nelspoort Sanatorium (tender S.O. 211): S.A. Dental and Surgical Manufacturing Co., Cape Town.

WATER SUPPLY AND IRRIGATION EQUIPMENT.

Windmill, tank, and tankstand at Groblershoop Police Station (P.W.D. tender 182): G. North & Son., Ltd., East London. £189 9s.

Reservoir shuttering, 5 sets (tender S.O. 228): Woolf Engineering Co. (Pty.), Ltd., Bloemfontein. £225, f.o.r. Bloemfontein.

Windmill for Motiton Police Station (tender P.W.D. 183): Malcomess, Ltd., Johannesburg. £65 7s. 9d.

Boring for water, Government Institutions, Vereeniging (tender I.D. 346): Gearings, Ltd., Johannesburg.

Boring for water on Crown Lands (tender I.D. 318): M. J. Fourie & Co., Delareyville.

Boring for water at Provincial Road Camps, Potchefstroom (tender I.D. 302): H. W. Olivier, Potchefstroom.

Manilla drilling cable (48,000 ft.)— tender I.D. 315: Victor Kent (Tvl.), (Pty.), Ltd., Johannesburg. 9½d. per foot, f.o.r. Jacobs.

Boring for water at new Hostel, Piet Retief (tender I.D. 329): Gearings, Ltd., Johannesburg.

Boring for water, Middledrift (tender S.O. 268): Gearings, Ltd., Johannesburg.

MISCELLANEOUS.

Concrete pipes and collars, etc., for Young's Field Aerodrome (tender S.O. 284): Hume Pipe Co. (S.A.), Ltd., Germiston.

Spring roller blinds for S.A. National Art Gallery, Cape Town (tender P.W.D. 192): Walter Donald (Pty.), Ltd., Cape Town. £640.

Beeswax (4,000 lb.) for Department of Posts and Telegraphs (tender P.O. 715): H. C. D. de Wit, Pretoria. £162 10s., f.o.b. Rotterdam.

Luggage-barrows (12, tubular steel V-shaped) for Department of Posts and Telegraphs (tender P.O. 731): F. A. Poole (Pty.), Ltd., Pretoria. £178 10s.

Trolleys (25) for Vaal-Hartz Settlement (tender S.O. 266): F. A. Poole (Pty.), Ltd., Pretoria. £30 each.

Mealie-threshing machine (tender S.O. 266): Malcomess, Ltd., Johannesburg. £70 6s.

Tractors (6) (tender S.O. 208): Thos. Barlow & Sons (S.A.), Ltd., Johannesburg. £773 5s., f.o.b. New York.

(a) Ironing and finishing machine, (b) swivel gladiron, (c) steaming-table (tender P.W.D. 161): (a) Griffin Engineering Co., Ltd., Johannesburg: £477. (b) Bell's Asbestos & Engineering (Afr.), Ltd., Johannesburg: £149. (c) Patlansky Bros & Schauder, Port Elizabeth: £34 18s. 11d.

Wall clocks (500) (tender P.W.D. S. 4): Goodman Bros., Johannesburg. £2 7s. each, f.o.b. London.

Castings (tender I.D. 313): (a) 7 tons phosphor-bronze: Rowe-Jewell & Co., Ltd., Johannesburg. (b) 25 tons grey iron, 35 tons semi-steel, 2 tons special grey iron: Perfection Piston Manufacturing Co. (Pty.), Ltd., Johannesburg.

Cable-hauling trailers — 2 (tender P.O. 727): Dowson & Dobson, Ltd., Johannesburg. £278, f.o.b. Rotterdam.

Pillar posting boxes (tender P.O. 730): (a) Oval: Hume Pipe Co. (S.A.), Ltd., Germiston; (b) round: Salt River Cement Works (Pty.), Ltd., Cape Town.

Wire screening, for State Alluvial Diggings (tender S.O. 244): Victor Kent (Tvl.) (Pty.), Ltd., Johannesburg; and Wm. Bain & Co. (S.A.), Ltd., Johannesburg.

Lucerne power-press for Olyvenhout Settlement (tender S.O. 279): Dunell Ebden & Co. (Pty.), Ltd., Port Elizabeth. £198 10s., f.o.r. Port Elizabeth.

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