# SOUTH AFRICAN ARCHITECTURAL RECORD


OLIVETTI SHOP :: NATIVE HOUSING :: CRADOCK HEIGHTS
SCULPTURE BY SHAPSHAK

MAY 1952

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# SOUTH AFRICAN ARCHITECTURAL RECORD

*JOURNAL OF THE INSTITUTE OF SOUTH AFRICAN ARCHITECTS; THE CAPE, NATAL, ORANGE FREE STATE AND TRANSVAAL PROVINCIAL INSTITUTES AND THE CHAPTER OF SOUTH AFRICAN QUANTITY SURVEYORS*

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VOLUME 37

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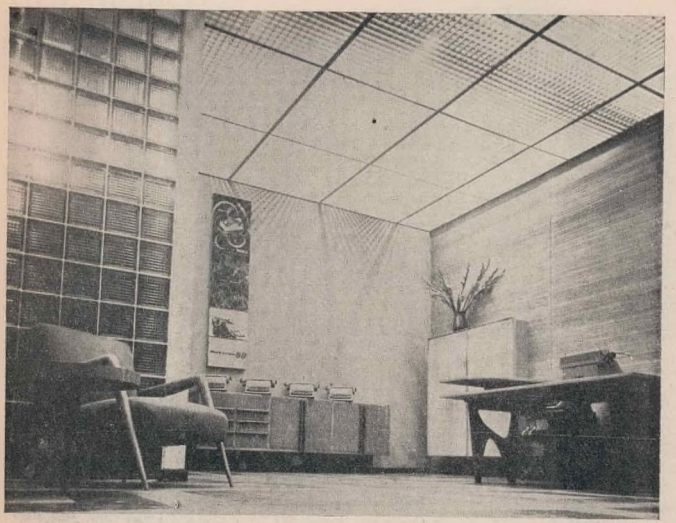
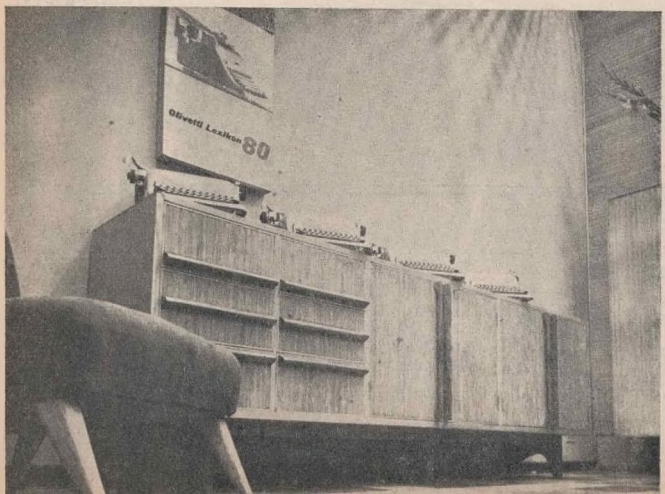





PHOTOS BY D. A. BRIDGE

ARCHITECTS

KENNEDY ● FURNER ●

IRVINE-SMITH ● JOUBERT

This shop, together with a suite of offices on the first floor constitutes the head office of Messrs. Olivetti Africa Ltd., a firm handling office machines and similar equipment.

Their experience has shown that very few of their machines are sold over the counter. Instead most of their business is done by travellers, phone orders or tenders, and for this reason the conventional shop with counter and shelves was not required.

The shop really serves as a display area and ante-room to the offices at the rear and on the first floor.

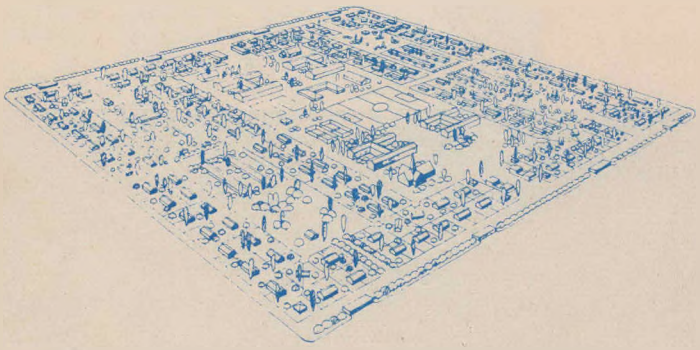
The west wall is covered in combed plywood, bleached and stained to light oak. The colours generally used are grey, royal blue and white and the furniture, also designed by the Architects, is in bleached oak and mahogany.

The shopfitting was by Messrs. Fredk. Sage, the furniture was manufactured by Dalmada of Springs, and the ceiling was supplied and fitted by Messrs. Fluorescent Sales (Pty.), Ltd.

# NATIVE HOUSING

A. J. CUTTEN • TOWN PLANNING CONSULTANT

**A Lecture given at Kelvin House, Johannesburg, under the auspices of the Transvaal Provincial Institute of Architects.**



AERIAL VIEW OF NATIVE DORMITORY SUBURB

*(1) THE PARALLEL CASE OF THE ENGLISH WORKER*

In evaluating the problems of housing the Native labourer who has to-day collected in such large numbers in and around the cities and larger towns of South Africa, it is useful and advantageous to examine how similar problems have been tackled and met in other countries of the world. Living in a young country, as we do, we are inclined to think that our problems are peculiar to ourselves, and I am afraid in the fashion quite typical of modern youth we are either scornful of, or do not take the trouble to investigate how the older and more experienced countries fared under similar conditions.

I propose therefore as a preliminary to our discussion this evening to outline briefly the housing difficulties and situations that occurred during and after the Industrial Revolution in England. You will remember that beginning in the eighteenth century, England, by a series of inventions rapidly improved her techniques of textile manufacture and of coal mining, iron mining and smelting, until she assumed world superiority in these directions, while the harnessing of steam power for stationary and locomotive engines, and later for ships, enabled her industry and commerce to advance by leaps and bounds, to produce enormous profits for the newly established capitalists.

The promise of regular work and the lure of a cash wage in the factories brought the peasant flocking into the towns in his thousands, and almost overnight housing conditions sprang up that are almost incredible in their sordidness.

At first and for some time the only accommodation procurable was in the discarded mansions of the newly rich hastily converted into lodging houses, so that a house originally built for one family finally housed a family in each room. On this basis as many as sixteen people of both sexes might be sleeping

in one room, and from three to eight in one bed. In addition many of the inner rooms had no direct access to the fresh air or sunlight, water was not laid on, and sanitation was by means of privies in the cellars, and rubbish was disposed of by being thrown into the street. Under these circumstances the degradation to which these people sunk may well be imagined. Lice, rats, fleas and flies abounded, as did also their consequential ills of scarlet fever, typhus, smallpox, bubonic plague and other diseases. Adult and infant mortality figures soared while immorality and crime were rampant.

According to some writers never at any other time in English history did the housing conditions of the common people sink to such depths, and the misery these people suffered could not have been any less than that suffered by thousands of Natives in our locations and Native townships to-day.

And even the first houses built by the factory owners for the workers were little better. Constructed back to back, two rooms out of four still had no light of ventilation and the smallness of the rooms still made overcrowding unavoidable. Municipal services scarcely existed so that a town having open drains down the middle of the streets was indeed fortunate, and while amongst the glut of invention and scientific advance that marked the times many improvements were made to building techniques — for instance, iron piping was manufactured, and with it the original water borne sewerage was developed; gas light, and the gas stove were introduced, and the bath tub was perfected so that it could be filled by turning on a tap and emptied by pulling a plug — yet none of these improvements found their way into the houses of the workers.

Naturally, many public spirited and sympathetic people realised the evils of these conditions and various attempts were made to improve them. In 1842 the "Metropolitan Association for Improving the Dwellings of the Industrial Poor" was founded, and encouraged by Prince Albert, held an Exposition on working class houses at the great Industrial Exhibition in the Crystal Palace in 1851. One of the best entries comprised a two-storey building with four flats of 500 sq. feet. Each had a living room of 150 square feet, and three bedrooms, one of 150 square feet, and two of 50 square feet. Water was laid on and a water closet was provided flushed from a cistern, while all rooms had at least one external wall.

Unfortunately, however, the new devices of water supply, gas lighting and sanitation added so considerably to the cost of the houses that it was found that an economic rent was beyond the means of the real working class, and this type of house soon became occupied by a better class of person for whom they were not intended. To bring the rental within the means of the worker, something had to be sacrificed and eventually workers' quarters became standardised as tenements in six-storey buildings, terribly crowded and still with insufficient lighting and ventilation.

In other words, the reason why the worker then could not obtain proper standards of health and comfortable living was the same as it is to-day. The provision of really adequate amenities and services was more than the worker could afford, and the problem of the house builders became how to produce the best possible results whilst giving the absolute minimum of amenity.

It will also be noticed that then, just as now in this country, the solution of paying the worker a wage that would enable him to live in a house with adequate standards of sanitation and comfort seemed to receive little consideration from the employers whose main problem seemed to be just how little need the worker be paid, and just what was the minimum with which he need be provided in the way of housing, open spaces, schools, sports fields, etc. (You will remember that in the initial stages even the children were employed in the factories, so little thought indeed was given to schools.)

Such a state of affairs, obviously, could not last for ever. Gradually the worker gathered strength to resist, and conditions were improved by the eventual uniting of the worker into his Trade Unions with their persistent demand for better conditions, higher pay and shorter hours. While up to 1824 it was illegal for workers to hold meetings to discuss their conditions, and many punishments were meted out for this offence, yet, in 1871, the Trades Union received Governmental recognition, and in sheer self-protection against the deadly strikes and lock-outs, the upper classes at last began to concern themselves with the housing of the working classes. It is also interesting to note that with certain notable exceptions, the assistance that was eventually provided took the shape of subsidies out of public taxes rather than the adequate increase in wages mentioned earlier. Laws were passed forcing Municipalities to improve their services and certain amenities such as Poor Houses and Schools were provided by the State.

And this system has persisted till the present day — In England, in Belgium, in Holland, in Denmark, France and Germany the same procedure is followed, and the poorer classes are subsidised from the taxes of the rich. Only America does not follow the pattern of direct subsidy, but nevertheless does so indirectly, as housing corporations are assisted by being given cheap land, and then enjoy tax and rating exemptions. But in Europe anyway it is generally accepted that the subsidising of the housing of the labourer and poorer classes is the responsibility of the Municipality and the State.

And that is the parallel picture for those of us who have eyes to see, and for those of us who have the intelligence to grasp its lessons. To my mind, the significant points are as follows :—

1. The peasant is attracted to the Towns by the cash pay of industry.
2. The industrialist pays an absolute minimum wage and does little or nothing about housing his workers.
3. The uniting of the workers into Unions eventually forces the hands of the capitalists who, working through the

State and the Local Authority, arrange that subsidies are provided to enable the worker to be housed.

Such is the pattern followed by the rest of the world. If we in South Africa can avoid this pattern, we will indeed be extremely clever. Lewis Mumford says "Without doubt . . . a unit that consists of workers without the middle class and rich groups that exist in a big city, is unable to support even the elementary civic equipment of roads, sewers, fire departments, police service and schools. At present, it is only by remaining in metropolitan areas where the taxes derived from the well-to-do districts can be partly applied to the working class quarters, that the worker can obtain even a modicum of the facilities for a good life."

And yet, of course, we in this country are still trying to make one unit (of workers) self-sufficient by means of the Native Revenue Account. If we succeed we will be the first to do so — if we fail, I suggest we court chaos and disaster.

In turn, the workers of England, Germany and France rebelled against the oppression of the factory owners, and only after much bitter fighting and shedding of blood were their rights recognised. And this was among masters and workers of the same race and colour. If such a step becomes inevitable in this country where masters and servants are of different colour you can well imagine how much more bitter and severe will be that fighting and that blood-shed.

I suggest, however, that such a step is *not* inevitable, and that with wisdom and foresight we may avoid this stage by benefitting from the experience of Europe, and planning wisely and providing well for the housing of the native workers of this country.

(II) *SITING THE LOCATION.*

It is unfortunate that usually the siting of a native location is so circumscribed — generally by surrounding European development — that the planner has little or no choice regarding the site. In Johannesburg for example, you will remember that as a result of a small pox outbreak in the City, the first location, Pimville, was established some ten miles out on the Potchefstroom Road, and it has always been assumed that from then on, all new Native Townships must be placed in the adjoining areas.

For practical purposes, however, it is common knowledge that a native location situated 8 to 12 miles away from the City and not on any main railway line is inconvenient and expensive both in money and in man-travelling hours. Furthermore the concept that natives living in Orlando and working in the East of the City should have to traverse the entire breadth of the business area to arrive at their place of work borders on the ludicrous. So far as the Northern areas are concerned the fortuitous position of Alexandra does help considerably those individuals working on that side of the City, but the fact that, in order to live as close as possible to their place of work, 82,000 people are forced to cramp together on some 900 acres (90 per gross acre, amounting to 15 persons or three families per one eighth acre stand) is a most significant pointer in our planning investigation.

These conditions however are now a "fait accompli," but it is interesting to consider what other steps might have been taken had we been entrusted with the planning of the Golden City in its early stages, and yet had the prescience to know to what proportions it would later develop.

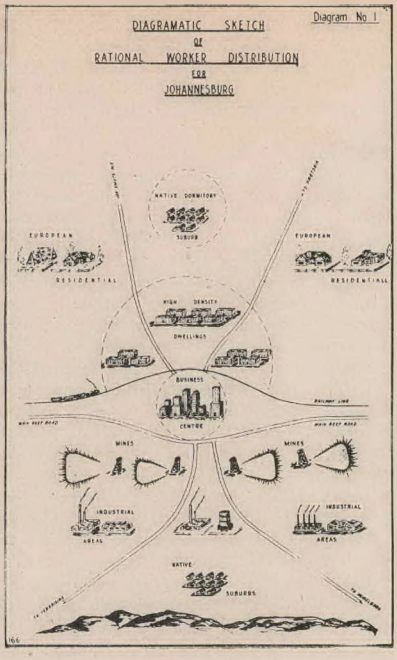
To approach this problem fairly we must admit two things. First, the native being a low wage earner should be as close as possible to his place of work, and in proportion to his earning capacity the white man should be further removed. Secondly, for Commerce and Industry to obtain the best service from its employees it is necessary for employees to be adequately housed with proper amenities and conveniences. I wonder whether it is generally known that the average length of employment of a native in a Commercial or Industrial job in Johannesburg is between 11 and 12 months. How can we possibly therefore expect efficiency or skill from them? Only by enabling the worker to live with his family under proper social conditions, can a stable industrial working class be built up that will acquire the training, skill and efficiency that we look for in vain to-day.

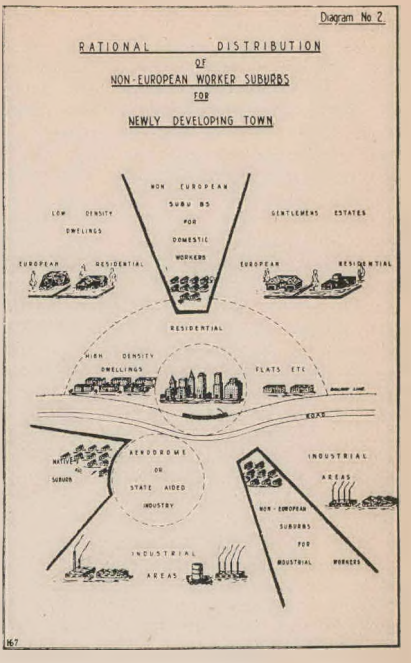
In other words, our plan should provide for a Native Dormitory Suburb on exactly the same lines as a European Suburb. The dictates of economics, and differences in habits, mode of living, and original low degree of civilisation may reduce the standards somewhat, but nevertheless the aim must be the same.

Le Corbusier has long advocated the "Linear City," and the Johannesburg topography fits very easily into this conception. The Rand, the gold reef and the railway all run East-West with the Mines immediately to the South of the road and rail traffic routes. The Northern areas are the most desirable from a residential point of view and here should be sited — with the lower income groups nearer to the railway — the European population. South of the Mine Zone, with which is combined the Industrial Zone, would then be located the Native Suburbs.

In terms of the suburbs as we know them to-day, this means that the Natives would occupy Rosettenville, Turffontein, Regents Park area. Further North would be Industrial areas, say Booysens, Ophirton, Village Main, Selby, Prospect. The City centre, of course, would remain in the same position, and Vrededorp, Berea, Doornfontein would be "Flat Land" accommodating the miner and artisan class, with the more well-to-do families to the further North much as they are to-day. An additional Native suburb for domestic servants is, however, necessary in amongst this latter zone, and would probably be well sited unobtrusively on the tributary valleys of the Klein Jukskei River, say at Craighall or Illovo and Sandhurst.

However, this is now no longer possible in Johannesburg, yet new towns are elsewhere being planned to-day without sufficient thought of the future development of their Native townships. Instead of setting aside (as is so usually done) one




particular area for Natives, I suggest that at least two, if not three, of such areas should be so earmarked. These would be wedge-shaped zones radiating from the centre of the town and evenly distributed around it.

For example, let us consider a town springing up around a new mine, a national aerodrome, or perhaps a State-aided industry. First the line of demarcation should be decided between the residential and the industrial areas — and industrial areas there must be or no town can survive, let alone expand. The industrial area will also be segment shaped — radiating from the business centre which will generally be near the railway station — at least in the early stages of development. On either side of this industrial area and immediately adjacent to it should be the non-European area. Any development of this industrial area will then carry the non-European area with it, as both grow in proportion away from the centre, and yet remain adjacent. On the other side of the railway in the area which is reserved for residential purposes only, at a distance from the centre of about five or six miles, should be sited another native area to serve as a dormitory suburb for domestic servants. This too, will radiate outwards and in growth keep pace with the expansion of the residential areas.

On this system every native worker, either industrial or domestic, will be enabled to go home to his family and his friends every evening, should he or she so wish, and I suggest that in the not very distant future, this is the only basis on which we will be able to persuade the Native to work in our houses and gardens.

I also suggest that those townships being developed in the Free State, which are being built with Native rooms of 70 or 80 Square Feet in the back yards of the European dwellings are, in their short-sightedness, courting trouble and racial dissention in the future. I suggest a more realistic solution is as I have indicated above, with Native Dormitory suburbs within reasonable walking distance of the European houses as well as the industrial areas. This means the provision of at least two location sites whose nearest boundaries are not

more than five miles apart. In 50 years time I am convinced that it is only under such conditions that we Europeans will have any domestic servants at all. On the other hand I am also convinced that if we do plan wisely, and on these lines, we will not only improve tremendously the conditions among the non-Europeans, but in doing so improve greatly the relations between the races, and the sum content of happiness, harmony and prosperity in South Africa.

(III) *THE DESIGN OF THE TOWNSHIP.*

The first problem that confronts the planner of a Native Township to-day is that of finance. Facing a similar situation as that which confronted the builder of houses for the 19th century workers of England, the question arises of how to achieve the utmost possible amenity at the smallest possible cost. One solution that early presented itself to those 19th century builders holds good with even greater force to-day. And that is that the frontage of building plots must be kept to a minimum — for in direct proportion to this frontage does the cost of service mains down the street increase. Gas mains, water mains, electric cable or wire, sewers and storm water drains, kerbing and guttering, road surfacing — all cost money and every foot saved in this direction is so much saved on the overall cost of the house. With this thought in mind, the English Architects decided upon 30' as the suitable minimum frontage, but with our improved standards and our demand for the maximum of sunshine in this country I suggest that 40' for all normal purposes is an adequate and suitable frontage. Originally the Department of Native Affairs laid down 60' x 80' as a standard native plot, but in recent years the frontage distance has been decreased to 50' x 45', and in some cases even 40' is now being accepted. With the combined cost of essential services to-day amounting to almost £3 per foot it will be appreciated that in a scheme involving thousands of houses this reduction of every possible foot of frontage becomes most important. In the 60,000 houses required in Johannesburg, a 40' plot instead of 45' would mean a saving of £900,000.

So far as the depth of plot is concerned, from examination of many native locations and squatter camps, I am convinced that 40' x 60' is the absolute minimum area of land on which a human family can conveniently and comfortably live. While I originally inclined to a plot of 40' by 80' as an ideal size, I am now persuaded by various Medical Officers of Health and Location Managers that this length of plot serves no other purpose than to encourage the creation of sheds and other building accretions in the back yard, and for my present design I have adopted 40' x 70' as the standard plot size.

The next consideration is density. Even townships with small plots can be wasteful in other directions, and others with a high density may only manage this by sacrificing the adequacy of provision of amenities such as schools, playing fields, etc. Thus in planning a township it is essential to have some objective in view so far as the ultimate density of population is concerned, as well as the distribution and quantity of the essential amenities.

For comparative purposes it is interesting to note that Orlando East was laid out with plots of 50' x 62' (3,100 Sq. Ft.), and produced a gross density of 6 houses per acre. But this was only achieved by omitting school sites, providing only about 5 acres of Park, two sports grounds of 8 and 10 acres, and two or three children's playgrounds of one acre each, for a population of about 45,000 people.

Klipspruit Township (a large portion of which was used for Moroka, the controlled squatter's camp) was designed and laid out in the ground with plots of 50' x 100' served with ample social facilities. This however produced an overall density of only 3.1 houses per acre, which is truly luxurious planning but I contend is an extravagance that neither we nor the native can afford. I say we from the point of view that suitable available land for location purposes is limited, and I say the Native because he is the one under our present system anyway who has to pay for the services.

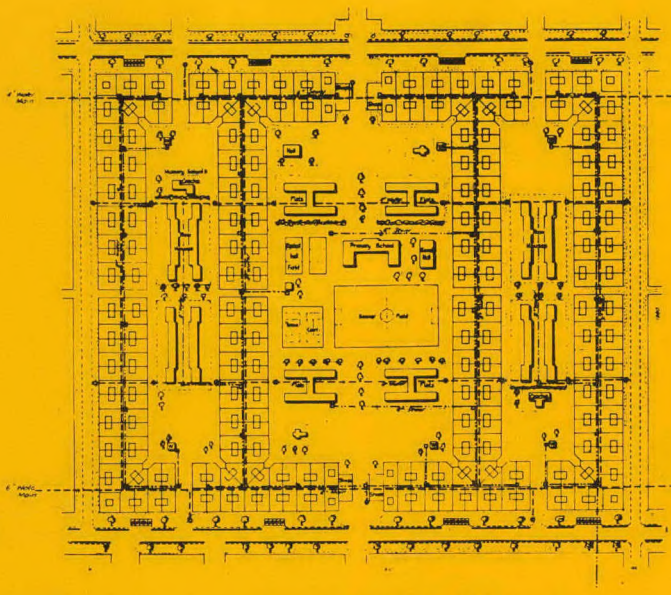
Now, I have already indicated that the Department of Native Affairs, until very recently, stipulated that the size of a plot should be 60' x 80' or 4,800 sq. feet. On this basis, with the necessary space for roads and amenities not many more than five plots can be obtained per acre. In making its recommendations to local authorities and the Township Board in respect of land to be set aside for Native Location purposes to serve industrial townships, the Department of Native Affairs states that for each acre of industrial land developed, provision should be made for the housing of 15 Natives. On the basis of five houses per acre, now, this implies that three acres of land are necessary for Native housing, to each acre of industrial land.

If in addition we took cognisance of the suggestion that the Natives should be housed adjacent to their place of work, this means that a Company developing an industrial township on (say) 1,000 acres of land would only be able to use 250 acres for the industrial township while the remaining 750 would have to be given over to Native housing. If again we consider that the amount of land suitable, at any rate, for heavy industrial development (i.e. is next to a railway goods yard and flat enough to accommodate sidings) is extremely limited and also very expensive, we will appreciate just how crippling and onerous is this requirement for land for housing purposes on the three to one basis. Were, however, the population density to be increased above the five houses (or 15 persons) per acre, obviously in direct proportion would be the amount of land necessary for location be reduced.

Our problem then is how to obtain the most efficient density and yet provide adequate and reasonable facilities for a complete social, communal and recreational life.

The Institute of Building Research has itself been working on these very lines and recently published a pamphlet suggesting that a density of eight houses (or 40 persons) per acre for a neighbourhood of 10,000 persons could and should be achieved. This figure is also advocated in the Post-War Housing Manual of England for new housing estates, which states "Where a

Cross Section of Road



## Details of BLOCK (or WARD)

| | |
|---|---|
| Total Area of Ward (incl ½ surrounding roads) | 50 Acres |
| Length of Roads | 1 Mile |
| Density of Ward | 10 Houses per Acre |
| | 50 Persons per Acre |

| | |
|---|---|
| Number of Housing units - | |
| Plots 40' × 70' | 324 |
| Row houses | 80 |
| Flats | 96 |
| Total | 500. |

| | |
|---|---|
| 1 Primary School | 1 Mission Building |
| 2 Nursery Schools with Creche & Child Clinic | 4 Business Plots |
| 2 Churches | 7 Ablution Blocks |
| 1 Social Hall | Lock up Garages |

160B

**NATIVE DORMITORY SUBURB**

full range of communal facilities (schools, churches, shops, open spaces) is provided the gross density will range from 30 to 40 persons per acre. In the case of redevelopment of existing congested areas, 60 should be a maximum." (Berea, incidentally, has possibly between 100 and 200 persons per acre.)

Maintaining at least 75% free standing houses, I am in full agreement with this density of 40, but I do find myself at variance however with the Building Research Pamphlet in regard to the areas suggested for schools and amenities, which I consider inadequate. My task has therefore been how to achieve this desired density and still provide adequate amenities. How this has been done will emerge from my explanation and the plans I will demonstrate as I proceed.

My next consideration after density and size of plot is the question of the incidence of wheeled traffic and thus the width of the roads required. On this point, I consider that (once water-borne sewerage has been established) the necessity for wheeled traffic within the actual residential areas is almost non-existent. Provision need only be made for the bi-weekly rubbish cart, and the occasional ambulance and emergency fire engine. On this thesis I have designed broad streets (70 and 120 feet wide) surrounding and serving the residential units and only 20 feet pedestrian roads for internal circulation.

The broad streets are the only ones that will be macadamised and will carry all the bus and taxi traffic, as also the inevitable bicycle on special cycle lanes. They are wide enough for a four-lane carriage way and a 6 feet cycle track on either side. In addition, space has been provided for Lock-up Garages on the verges of these streets. Thus all lorries, cars and even carts are kept out of the internal residential areas, and the pedestrian paths safe-guarded from the destructive and erosive effect of wheeled traffic. In fact it is hoped that with suitable soil these minor roads might be kept grassed, and at the worst they need only be gravelled. This system of protecting the surface of the access roads by keeping cars out of the residential units has long been employed in America. For example, G. H. Gray in "American Low Cost Housing" says: "Automobile compounds in residence neighbourhoods are more economical of space than individual garages and facilitate a better use of the interior of the block." In fact in many American layouts no provision is made at all for vehicular access to the houses, which are built in blocks at right angles to the road, and even the rubbish carts do not leave these roads, as the bins are brought out to them.

Considering now the general design, I think it is readily appreciated that there is nothing so dreary or demoralising as rows upons rows of small houses in endless straight lines, and in order to avoid this many planners introduce curves or bends in the street pattern in an attempt to limit the range of view (e.g. Orlando and Zwelitsha).) Such bends, however, in addition to being wasteful of land in the stand layout add so considerably to the cost of services that I am forced to regard them as too expensive a luxury for a Native Township to afford. Naturally, topographical features often make changes of street alignment necessary, and I am not referring to such bends, but those kinks and curves which are apparently introduced for no other reason than adding interest to the street pattern. Such objectives I feel can be achieved by other means such as judiciously placed groups of trees, and the use of the vertical change of grade, and I submit that all unnecessary bends or curves should be eliminated for the reason that they increase disproportionately the cost of services. *For example:*

In internal sewerage reticulation, the maximum distance allowed between manholes is 250 feet. When a change of direction occurs in a sewer an additional manhole at the bend is required, irrespective of the distance from the preceding manhole. For an average sewer depth of say 8', the cost of a manhole is £15. In a block of 400 houses these additional manholes might easily amount to £10 and thus the extra cost to £150. (These figures are obtained from a comparison of a portion of Zwelitsha — which will be demonstrated later.)

In addition, the sewers following the curves or bends to put up house connections very rarely provide the best drainage for that vicinity and additional sewers become necessary across the blocks to maintain efficient drainage. These connections add considerably to the length of sewer required and in the case I have taken account for an increase in cost of £4 per house.

Further, the conventional system of sewer drainage is to have the sewer in the road. This also necessitates additional sewer length as in every case the sewer in the boundary street is only serving houses on one side of it. In the case under consideration this extra cost amounts to £5 10s. per house.

The same thing occurs around Parks, Schools, etc., and again an additional £1 10s. is incurred.

In all the total length of sewer in this layout in excess of an area in my Ward is 12,000 feet, which together with the extra manholes accounts for an additional expense of £12 per house.

The same applies to street kerbing and guttering, and stormwater drainage. In electric light reticulation the increase in cost becomes very considerable. As with manholes, electric current poles have a maximum efficient distance (120). Every bend not occurring at this spacing decreases this efficiency and so increases the cost. Furthermore the poles at which the change of direction occurs require stays, at a further additional cost. In the extreme case of a continuous curve, such as a crescent of sharp radius, it becomes preferable to use underground cable. This process increases the cost to almost double that of straight overhead wires. The following estimates taken out for an actual portion of Pimville Location serve as an excellent example:

The design is a modified spider web pattern with various radials and crescents.

— For cable throughout ..... ..... ..... £43,000
— For overhead lines ..... ..... ..... ..... £23,000
— While, for the same number of stands in a straight-forward grid-iron pattern the cost would have been ..... ..... ..... ..... ..... £15,000

It should be mentioned that these costs were taken out a year or so ago, before the cost of copper had risen so tremendously. A more recent estimate is £66,000 for cable and £45,000 for overhead wires. The increase in price is now not so marked but the principle remains the same.

In the case of water reticulation, special fittings are required for every bend which is not the straight right angle. This additional cost amounts to £2 to £3 per bend.

Lastly, the cost of survey work (i.e. pegging the township) is almost doubled, and when all these items are totalled up this extra cost (on a comparative example I have taken of a Portion of Zwelitsha, see Appendix) amounts to nearly £42 per house — or an equivalent of over £350,000 on my entire township.

Moreover, as is obvious, all this additional work involves extra labour and extra time to complete the job, and inconvenience in running and maintaining the township, e.g. additional stay poles at bends, additional manholes, additional gutters, etc., all of which need extra supervision and add to the cost of maintenance.

In addition to the bends in the streets, however, there is another factor that contributes in some considerable measure towards the additional £42 quoted above, and that is the employment of the principle, so commonly stressed in text books and now fairly generally adopted, of running the more important streets, and the length of the stand blocks, in the general direction of the contours. On examination, it will be readily appreciated just how expensive this practice can become. To take the extreme example of a street which is almost level, the sewer depth in order to achieve good drainage soon becomes considerable. On the other hand, if it were possible for the street to follow the sewer at its most favourable grade, this would give the smallest depth of trenches and so the cheapest system in this respect.

On evenly sloping land, then, with a cross fall say of one in thirty, it becomes advantageous to locate the sewers almost at right angles to the contours, and not along them. Consequently, this means that the lengths of the stand blocks should also run across the contours, and that the main roads, following the easiest grades, would then have a general direction at right angles to the house blocks and the sewer lines. The roads actually in front of the blocks thus become merely of a subsidiary nature, and as I have already mentioned, in some American layouts these roads are left merely as pedestrian lanes, and carry no wheeled traffic at all.

Constrained then by the dictates of economics in the engineering services to adhere as much as possible to the straight line and the right angle, I have resorted to another — and perhaps a more important — device for providing interest and achieving a coherent and efficient plan in the inevitable mass of small houses on small plots. And that device, if it can be so called, involves merely the introduction of a system which was and is used by the Native himself in his original rural kraal, namely that of arranging a group of huts or houses around some central point of interest. Originally this focal feature was the kraal containing the cattle, the Native's most treasured possession, and the surrounding huts were grouped around it in the form of a horseshoe with an entrance at one end, and the headman's hut at the other end.

Thus the village took the form of a series of such horseshoes, each controlled by individual headmen who in turn were responsible to the sub-chief or chief. All individual behaviour was governed by the precept of the headman and the concensus of opinion of the inhabitants of the horseshoe of huts. As their pater noster the headman settled all disputes and assumed and exercised control of everyone within his horseshoe of huts.

As E. J. Krige says in her book, "The Social Survey of the Zulus": "The village is the basis and pattern of the political organisation and is a social organism of great importance." The disciplinary and guiding effect of this social organism was so great that it took precedence even over individual parental guidance. For instance, the education of the children was left almost entirely to the age group of the horseshoe or village, assisted in certain circumstances by specially designated adults who dealt with the moral and religious aspects of their society. The disciplining of children was thus far less a parental matter than it is among Europeans. When, therefore, the Native is abruptly thrust into conditions foreign to his traditions, can we be surprised if the youth is unruly and ill-disciplined, and the parents apparently lacking in control."

In my plan, therefore, I have tried to maintain this horseshoe and central feature pattern, replacing the cattle kraal with some other feature of interest such as a clinic, a creche, a school or a church, in a conveniently designed open space surrounded by houses. Within the framework of the courtyard or "close," as I have called my group of houses, some link is thus established with the Natives' past traditions, and opportunity is provided for the fostering of the social and communal impetus that is so important in preventing the disintegration of these people. As before, a headman will control each "close" and be responsible for the conduct of the people under his jurisdiction. During the day the courtyard provides a secluded place for the children to play in, separated and safe from all wheeled traffic in the passing streets, while in the evenings, as of old, the men will foregather at one end to smoke and palaver, and the women to gossip at the other end. The headman of each close would in turn be responsible to the man in charge of a block (i.e. the area between four streets) and these individuals would either themselves constitute

the Village Board or be responsible directly to it. Such a system has been tried out at Atteridgeville, Pretoria, and found to operate most successfully.

To an even further degree Germiston gives these headmen certain disciplinary powers almost amounting to powers of arrest and so successful has been the result that the normal staff of Location police has been reduced. Thus not only has financial expense been saved but order has been maintained, and much has been done to restore to these people their self respect and communal pride

My main "Block" then is composed of eight "close" areas grouped around a primary school The total number of houses or dwelling units in the block is 500 — a figure which, I am informed by the Non-European Social Welfare Department of the City of Johannesburg, provides the necessary number of families to support one primary school. Also included in the "Block" or "Ward" unit are four shop sites, two nursery schools, a creche, a health clinic, various ablution blocks, two church sites and a site for a possible mission school, or sub-administration office.

The school is shown as not being fenced off, as it is an essential part of the scheme that the playing fields should be open to the community on the lines of the English Village Green. A border of trees or a hedge would perhaps form a suitable boundary. Adjoining the school is a hall for use by the school children during the day and which could be used by adults in the evening for educational purposes or social functions.

In attempting to cater for all tastes and wants, as well as in the interests of space economy, I have introduced a certain number of row houses and flats, these latter being designed as double-storeyed buildings, and it is intended that these multiple housing units should be occupied primarily by those couples with no children, both the newly married and those whose children have grown up.

As previously indicated, the township is designed on the basis of water-borne sewerage, and every house will have laid-on water, but nevertheless it is now anticipated that every house will have a bathroom or even facilities for making hot water in quantity. Accordingly, I have included sites for ablution blocks, at which facilities for bathing, for clothes washing and the procuring of hot water, will be available. These blocks will be run by the Local Authority and financed from general funds.

To be successful, however, it is essential that the bath be divided into single units as the Native appreciates privacy, and in addition the baths for the different sexes should be in separate buildings, and not combined in one building with merely separate entrances.

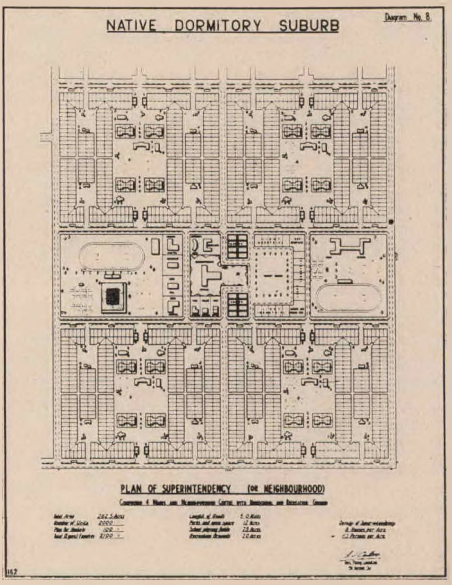
Another nicety that the Native appreciates in these matters is the separation of the age groups, i.e. the older men prefer not to bathe, or make use of communal lavatories, in the presence of, or in sight of the adolescents.

For all normal shopping purposes, that is to meet the family's daily needs (the butcher, baker, dairy, grocer, etc.), certain shop sites, which may possibly contain three of four shops each, have been provided within the block on a par with our European suburban shops, and the real shopping centre (i.e. for furniture, clothing, hardware, etc.) is provided elsewhere.

The block, therefore, provides for the carrying out of all the normal functions of life, without necessitating the crossing of the street boundaries, in addition to utilising the communal functions as a means of drawing the inhabitants together.

In fact, after the considerations of the engineering economics, this internal aspect is the crux of my whole plan, and I might well say that this Township has been designed from the inside out. To appreciate the life that is going on it is essential to go INSIDE a Block. There will be found all the features of social and communal life that are necessary to make up an active, live, pulsating neighbourhood.

Compare, for instance, the plan of my Block, with that of Orlando. Here, as you may see, sites have been left at the intersection of various streets, for the communal and social buildings. They have, however, no part with the houses themselves, except to form admirable vistas down the Avenues. Dignified and stately they look down and upon the rows of



houses, and from a distance attempt to impart to their occupants some spark of life or animation. In the Block I have described, however, these buildings themselves act as the heart and nerve centre of each residential group. Radiating their influence around them, they become pivots on which the lives of the surrounding residents may be hinged, and by this means is reborn in the Native the sense of social union that previously only existed in his native kraal.

With this multitude of inevitably small houses, I am convinced that this sociological factor is most important, and that the planning of the residential units in such a way as I have described is therefore an essential factor in a successful Native Township.

Such then is the make-up of a block or Ward — the name Ward incidentally, is obtained from the Johannesburg Non-European Affairs Department, who have concluded that approximately 2,000 persons is a suitable population to be controlled by one Native headman, whose area thus formed is called a ward.

It is 50 acres in area, and contains provision for 500 housing units, housing approximately 2,500 people. These 500 units are made up as follows :—

| | |
|---|---|
| Normal Building plots, 40' x 70' ..... ..... ..... | 324 |
| Row or Terraceal houses ..... ..... ..... ..... ..... | 80 |
| Flats ... ..... ..... ..... ..... ..... ..... ..... ..... | 96 |

In the diagram the houses have been shown as semi-detached purely for ease in draughting. They can, of course, either be constructed as semi-detached or as free standing houses. The building lines have been specifically varied as this serves the purpose of breaking the monotony of long straight lines of houses. The resultant density including the area of the school and open spaces plus half the width of the adjoining roads, is 10 houses, or 50 persons per acre.

So far as the houses themselves are concerned, I have in other papers on other occasions expressed my opinions as to the different types and categories I consider necessary. There is no time to-night to develop this theme but I would like to outline briefly the general overall pattern so that the position of the dormitory suburbs we are considering may be appreciated.

This overall pattern then is as follows :—

1. An area set aside for a Native Village — that is a suburb on an exact par with a European township, intended for the married African, and in which he can obtain a plot as large as he wishes. Freehold tenure is, of course, preferable, but failing this I myself consider that long lease tenure could be quite satisfactory.

2. Areas for home ownership where the not so well-to-do Native, but one who has a steady job with a reasonable wage, can build or buy his own home.

3. Areas for municipal houses of a good standard let as an economic rental.

4. Then sub-economic houses for those who are unable for any reason to earn an average wage. This class will include the aged and the physically deficient.

5. And lastly, of course, hostels for occupation by single men and women — also run on an economic basis.

All the last four categories can be catered for in the suburb I am suggesting, and only the village has been omitted, for in that case the economics are of no importance as the occupants can afford to pay for extravagant or luxurious layouts.

*NEIGHBOURHOOD — OR SUPERINTENDENCY — CENTRE*

So much for one Ward, which could function quite well by itself, but if a greater population is expected, provision must be made for additional facilities, as for example, Superintendent's Offices, Sick Bays, a Beer Hall, Hostels, etc.

The Union Native Affairs Department has from experience determined that between 8 and 10 thousand persons is a suitable population to be controlled by one superintendent, so that to obtain such a population I have combined four Wards to make one Neighbourhood Unit or what might thus be called a Superintendency. Provision is then made for the neighbourhood Centre, with sites for the offices for the Superintendent and his staff, the central Health Clinic, a Maternity Home, an Assembly Hall, a Fire Station, Hostels for men and women, the Beer Hall, a Restaurant, a Police Station, a Post Office and the Main Shopping Centre. In addition a large Market Square or Assembly Ground is provided surrounded by sites for light industrial purposes. These include the Tailor, Handyman, Tinker, Carpenter, Bootmaker, Laundryman and so on. At one corner is a Garage and at the other a Bus Station.

The population of the Neighbourhood area being about 10,000, it can now support a Secondary School. The entire Superintendency, it will be noticed, has now four primary schools, which is considered the correct proportion for one High School. With this population, a Recreation Ground for Adults becomes necessary and 20 acres is set aside for this purpose. Such an area permits of all kinds of sport including a large swimming bath and a gymnasium.

The High School and Recreation Ground are on either side of the Neighbourhood Centre and together provide a good open air "lung."

The total area of the Superintendecy is 262.5 acres, with 2,000 housing units to which must be added the accommodation in the Hostels, making an equivalent total number of 2,100 families that could be accommodated.

On this basis, the gross density of the composite Superintendency is now eight houses, or 40 persons per acre.

*THE TOWN (OR SUBURB)*

The combination of four of these Superintendencies will form a complete town or suburb, as I prefer to call it. The total families will be 8,450 with an estimated population of 41,000 persons. It now becomes necessary to provide a Civic Centre

for the more important Central and Local Government Buildings. These will include the Law Courts, the Town Administration Offices (housing for example, the Local Town Engineer, the clerks, the Medical Officers of Health, etc.), the Theatre, the Central Library, the Museum and one or two Hotels.

Adjoining the Civic Centre provision is made for the Hospital and Home for the Aged, the sites for each being 23 acres in extent. On either side of these are 33 acres of open space, to be kept as undeveloped Parks and held in reserve for any special purposes. This strip acts as a Green Belt cutting right through the Suburb, and with the Recreation Grounds and the playing fields of the Secondary Schools provides an excellent pattern of "Lung" areas for the massed housing units.

In the combination of the four Superintendencies, taking into account the available playing fields in all the Schools, I have considered that only two Recreation Grounds as such need be provided. Provision is then made for a Technical College and a Domestic Science College. The total playing fields area (including those attached to the schools) is now 202 acres, which on the basis of a population of 41,000 is just five acres per 1,000 persons. The area of Parks and Open Space works out at just less than two acres per 1,000 persons. As a percentage, the total area reserved for Parks, playing fields and open space is just over 10%. The total area of the Town is now 1,180 acres, and the final gross density 7.2 houses or 37 persons per acre.

A Cemetery, generally, is not considered as part of a Suburb, but I have shown an adequate area set aside for such purposes, as I consider this acts as a very suitable barrier between the railway line and the Township. The main road connecting the two nearest suburbs or other centres of importance is also carried parallel to the Railway and on the other side of the Cemetery barrier.

In those cases where it is necessary to consider the proximity of another suburb occupied by a different race I suggest that at least a 500 feet strip should be left between these suburbs, which may be used for Road, Park, School or Cemetery purposes. In fact any of the "Lung" strips I have shown could be well used for such a purpose.

The Railway Station is sited opposite the central road leading to the Civic Centre and from here a local bus may be necessary for occupants on the farther side of the township. The whole township is only two miles across, which is not an unreasonable walking distance, but at the end of a working day no doubt a bus-ride home would be welcome. For any buses coming directly from the industrial or European desidential areas, bus termini are provided in the Neighbourhood Centres.

As the usual arrangement of S.A. Railway Stations is for the goods yard to be constructed on the side of the main line opposite to that used for the passenger traffic, it is most likely that the central Market will have to be established on the other side of the railway from the town. Of course, every effort should be made to avoid this, but if a rail crossing is unavoidable, it should be bridged. This market, however, is provided purely for wholesalers, as the individual should make his purchases at the Superintendency Market.

There remains, now, but one more item to be discussed — the Sewage Disposal Works. Topography and the choice of a suitable position will determine where this should go. About 100 acres is needed for the plant, and an additional 600 or 700 acres should be available for the drainage of the effluent. This area, I suggest, should be laid out as small holdings, and here should be grown the vegetables eaten in the Township.

* * *

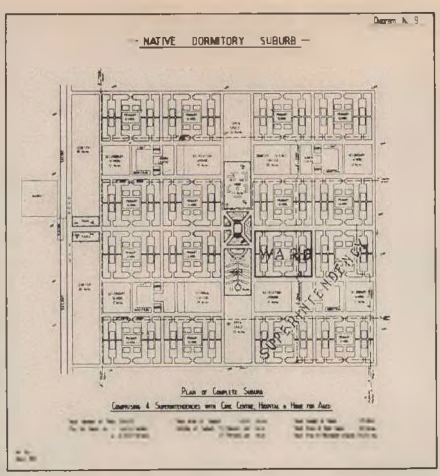
This then completes my picture of what I consider a realistic Native African Dormitory Suburb. And I would stress again, and could not possibly do so too often, that the fundamental basis for this plan has been pure economics in the provision of engineering services. To reduce these at a reasonable minimum, the width of plots has been reduced to 40 feet, mid block sewers and water reticulation have been employed and the amount of roads reduced to a minimum. As far as possible all reticulation mains have avoided unnecessary bends to save expense in special fittings and to allow man-holes and electric poles at their maximum distance.

A schedule of prices for servicing the Township is attached, and in arriving at these figures water and sewer mains have been taken as sited in the middle of the block. The houses are sited 20 feet from the rear boundary of the stand to reduce the length of soil water pipes from the house to the main. The cost of one 20 foot connection per two houses has been included in these estimates — but the cost of the sanitary fittings have been considered as included in the cost of the house.

The cost of these services plus completely surfaced main roads with storm-water control and adequate street lighting, amounts to only £99 per house compared with a cost of £150 to £250 for townships laid out in customary lines.

In conclusion, it should be stressed that the suburb's resultant density of 37 persons per acre, approximating as it does the density of to-day's crowded Orlando, yet provides for complete civic and social facilities for the residents in the township. It must be remembered that items are included that are not usually found even in the most advanced locations, viz. the industrial sites, the home for the aged, the hospital and the generous open space. If my town or suburb is to be complete, I am obliged to include these items, but if for any reason (for instance the pre-existence of a neighbouring hospital, permanent open space, etc.) a local authority can omit any of these provisions, naturally the density figure will be improved.

Lastly, I would like to emphasise again the sociological basis of the "close" pattern, in which is made an attempt to




give the Native some link with his past customs and traditions, and establish some stabilising and unifying factor in his rapidly urbanising life. With the adoption of this system — i.e. of introducing centres of interest for each group of about 50 houses, and having a senior resident in charge, responsible to a "block man," in turn answering to the responsible Village Authority, it is contended that the Native will accept and respect this responsibility, and become a more contented and more law-abiding "citizen" — to the ultimate benefit of all concerned — himself, his family, his neighbour, his employer, and finally to South Africa as a whole.

I suggest also that such objectives and such planning are not only necessary for the safety, but essential to the well-being and prosperity of this country.

*COMPARATIVE ESTIMATES FOR COST OF SERVICES*

In obtaining these figures the costs were taken out for a block of 416 houses in Zwelitsha Township, and for a Ward in the Dormitory Suburb.

| | *COST PER HOUSE.* | | |
|---|---|---|---|
| *WATER* (Class D Everite Piping). | Zwelitsha | Close. Plan | Saving |
| Allow :— | | | |
| — 2,000 ft. of 8" Main. | | | |
| — internal reticulation of 6", 4" and 2" mains, including excavation, laying fittings, fire hydrants, etc. ..... ..... | £19 | £13 | £6 |
| *ROADS.* | | | |
| Grading and forming to width of 21 ft. on main roads, 12' for Zwelitsha internal roads 3" consolidated water bound Macadam, primed and finished with a 2 course surface treatment. Table drain finished with Tarmac for 2 feet, and including for stormwater drainage at essential points ..... ..... ..... | £39 | £20 | £19 |
| *ELECTRICITY.* | | | |
| Street lighting only Zwelitsha, but including "close" area on other layout ..... | £34 | £29 | £5 |
| *SEWERAGE* | | | |
| Allow :— | | | |
| Sewerage plant for 80,000 persons (2,000,000 gall. flow) plus outfall sewer. | £16 | £16 | £0 |
| — Internal sewer reticulation: 6" pipe. Zwelitsha in street "Close" plan mid block | £27 | £15 | £12 |
| TOTAL ..... ..... | £135 | £93 | £42 |

*NOTE.*—For complete servicing of "Close" plan include £6 per house for 20 feet connection from house to main, making total £99

# CRADOCK HEIGHTS

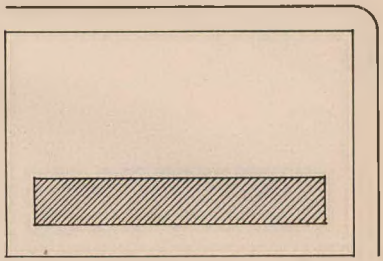
An attractive block of flats which creates a livable, domestic environment in a busy Johannesburg suburb.

ARCHITECTS

H. H. LE ROITH AND PARTNERS

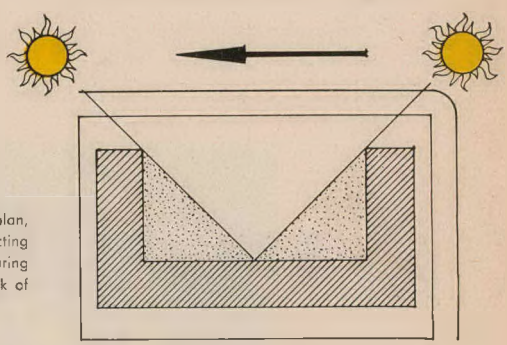
Cradock Heights was erected under the D.S.D.C. Scheme and the architects had therefore to provide a block of economical Bachelor, two- and three-room flats, consistent with the comparatively moderate rentals to be charged, yet preserving the 'rus-in-urbe' atmosphere characteristic of the northern suburbs of Johannesburg. From the preliminary research to determine the most suitable development of the north- and east-facing corner site arose the following most suitable alternatives:

1



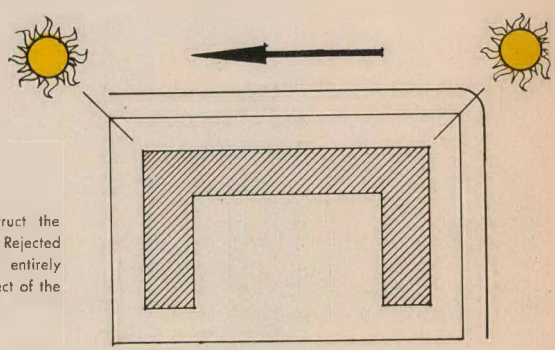
The perfect solution would have been to erect a single north facing block set well back from the street. This would only have been an economical proposition had a tall building been allowed, but this was unfortunately precluded by zoning regulations which forbade more than three floors of flats under any circumstances.

2

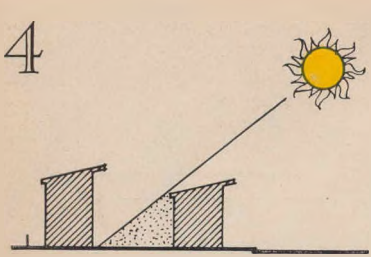


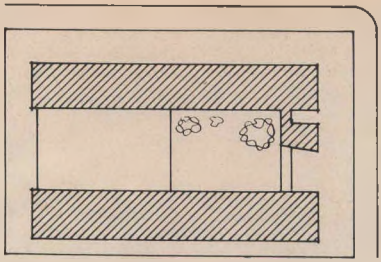
Arising from the previous solution is the U-shaped plan, good in many ways, but finally rejected because the projecting wings deprived the main north facing block of sunshine during a considerable period of the day, and because of the lack of privacy attendant on the court-type of plan.

3



A plan shape in which the wings do not obstruct the sunshine and in which no flat overlooks another. Rejected because of its strictly urban character considered entirely unsuitable for a "garden" suburb and undesirable aspect of the West Wing.



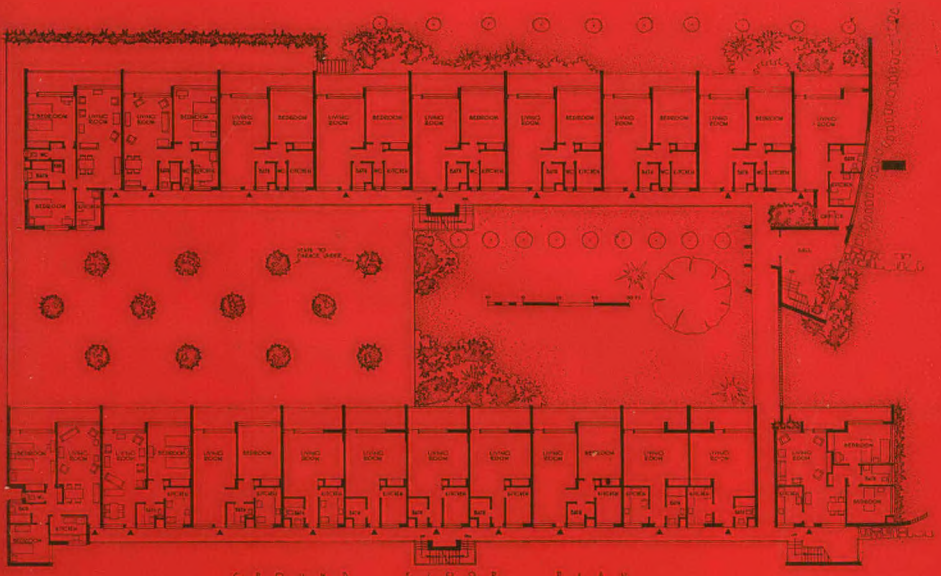
4. The final solution: Two north facing blocks exploit the site in a most economical manner; provide the most desirable orientation for all flats and also maximum sunshine even in the winter.

The two blocks are linked on the east by the staircase and access gallery which screen the garden behind, ensuring a semi-private character. The ground falls rapidly to the west and advantage has been taken of this change of level to provide garaging beneath the typical floors for the entire width of the site from north to south, thereby also providing a unifying compositional element.

Servants quarters have been placed above the typical floors in the rear block.

Siasto, brick and tyrolean plaster, all richly textured materials, the pitched roofs and the carefully landscaped garden layout, enhance the semi-rustic atmosphere which has been aimed at by the Architects.

2



GROUND FLOOR PLAN

EAST ELEVATION

CROSS SECTION

PHOTOS :

1. E. ROBINOW
2, 3, 5. B.R.S. PHOTOGRAPHERS
4. L'ATELIER

3

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