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The development of rural vernacular architecture in Southern Africa

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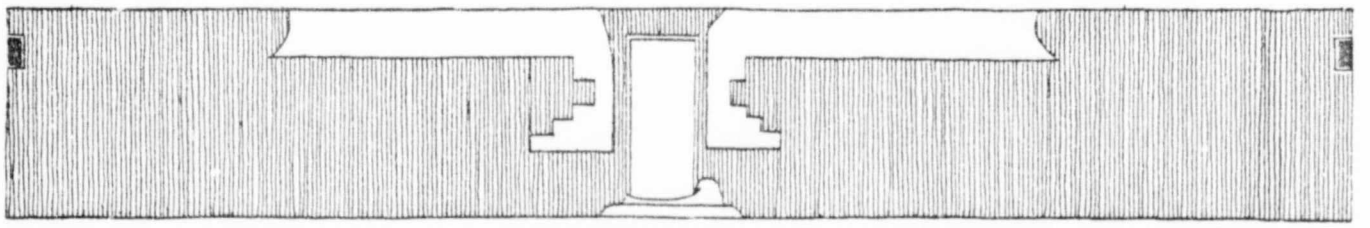

CHAPTER 11: THE RIDGED AND HIPPED ROOF

The form of the ridged roof on a square or rectangular plan is significant for it introduces into rural architecture one major structural innovation: the timber truss. It is true that conical roofs had up to this stage embodied some form of bracing at their apex which, in application, resembled "trussing", but as such it was too shallow and insubstantial to provide much strength to the roof framework. The bracing of the apex is typical of Ciskei, Transkei and KwaZulu conical roofs whereas in other areas the beams are butted into the crown, often with some kind of finishing finial.

In its early stages of development the division of the conical roof into two is tentative and achieved by a small ridge timber piece hardly longer than 450 m.m. At this point trussing is not really needed and indeed is seldom used, the floor plan usually being little more than a rather squat rectangle. As the floor plan moves into a full rectangle however, then the ridge is forced to increase in size and added beams have to be brought into this gap to carry the battens and hence the thatch cover. It is at this point and in order to steady the new beams that trussing becomes necessary.

The tie beam of the truss is usually placed at one third to a half of the depth of the roof void. In the areas of greater rainfall however this is increased to between three-quarters to nearly the full depth in order to account for the added weight of wet thatch. In some of the larger examples a king or central post has been added but the additional use of struts is virtually unknown.

The implementation of a ridged and trussed roof frame has also set the thatcher new problems. Generally he has met the challenge, the sharp turning of thatch abo ' the hips being a natural development of the cone-on-cylinder's roof. It is however in the waterproofing of the ridge that problems have been recorded. In many cases the thatcher's art has been unable to deal with water-sensitive area and he has had to turn to other means to resolve the detail. Ridge cappings of various materials, sizes and forms have been recorded including mud and cement packing,



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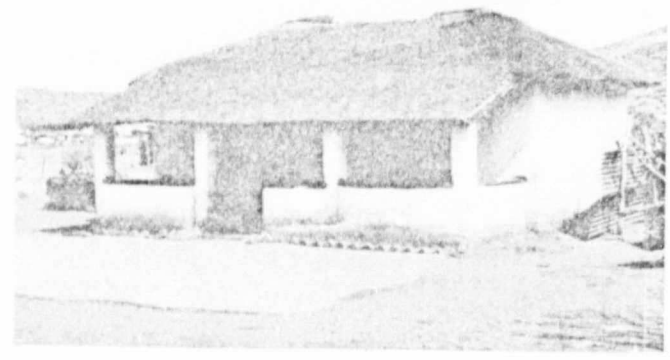

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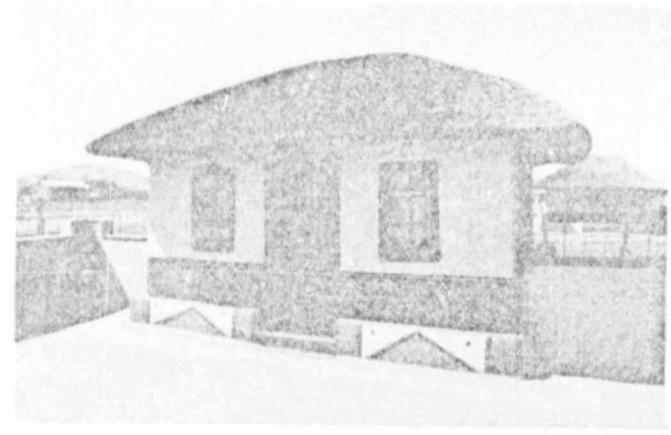
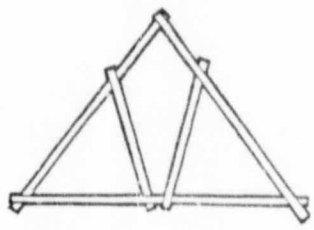


d

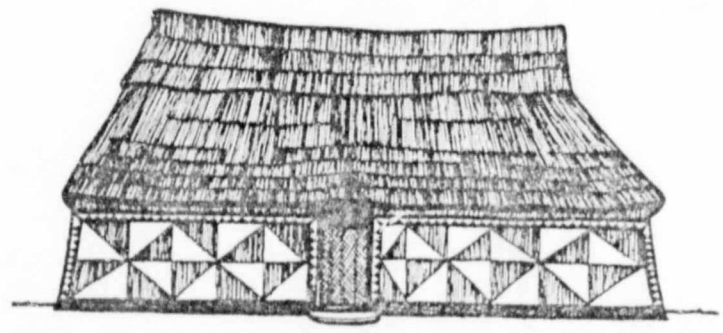
galvanized and corrugated iron and commercially manufactured ridge pieces. Of note in this field were the ridge pieces found in western Lebowa which were decorated with a variety of symbols and emblems, most popular being the forms of hearts, spades, diamonds and clubs as found on playing cards, although elaborate airplanes, roosters and birds also flourished. Field research however found that in the drier regions such as western Bophuthatswana, builders generally found it unnecessary to either turn thatch around the hips or to waterproof the ridge, the reasoning being that the rainfall there was so sparse as to make it a virtually irrelevant factor in roofing the house.

In a more general sense the floor plan has now become fully liberated from the constraints of a roof structure and henceforth in this development of

a. Dwelling: Alice, Ciskei.
b. Dwelling with front verandah: Moruleng, Bophuthatswana.
c. Dwelling: Xigalo, Gazankulu.
d. Dwelling: Mogongwa, Lebowa.

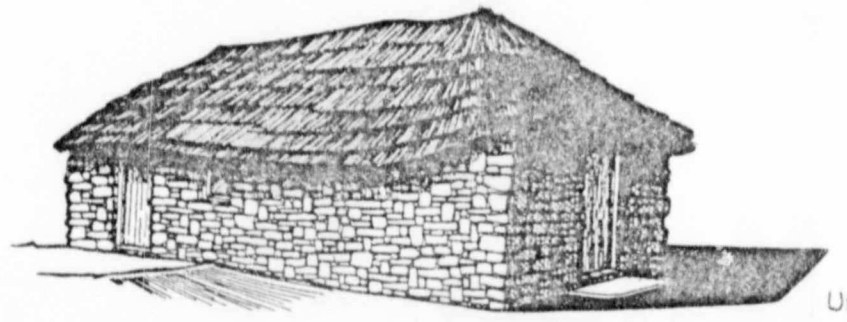


Detail
Roof Construction



Unit 23.

Ridged and hipped roof: Units 23 and 24.



Unit 24.

UNITS 23 AND 24.

- CLASSIFICATION: RIDGED & HIPPED ROOF.
- LOCATION: UNIT 23 : STANDERTON.
  UNIT 24 : MARIKANA.
- CONSTRUCTION: UNIT 23 : THE WALLS ARE BUILT UP IN LOAD-BEARING, SUN-DRIED EARTH BLOCKS BONDED IN EARTH & PLASTERED WITH DAGA. THE WALLS ARE LIGHTLY BUTTRESSED TO ACCOUNT FOR THE LATERAL THRUST OF THE ROOF STRUCTURE. THE ROOF TRUSSES ARE TIED IN THE SHALLOW THIRD OF THE ROOF VOID. THATCH LAID SEED-END UP.
  UNIT 24: UNDRESSED FLINTSTONE IS BONDED IN EARTH. THE ROOF TRUSSES ARE TIED AT EAVES LEVEL AND EACH BEAM IS TIED TO THE TIE BEAM BY A STRUT. THATCH LAID SEED-END UP & SHINGLED.
- SOCIAL GROUPING: NEITHER UNIT BELONGED TO A SETTLEMENT OR HOUSEHOLD OF DISCERNIBLE PATTERN. UNIT 23 FUNCTIONED AS A LIVING/SLEEPING AREA; UNIT 24 FUNCTIONED AS A CHURCH.
- GENERAL: SMALL WINDOW OPENINGS, TIMBER SHUTTERED IN BOTH CASES. CONDITION OF BOTH UNITS IS GOOD ALTHOUGH UNIT 24 SHOWED THE BEGINNINGS OF WALL CRACKING.

the house form it is dictated by the spacial demands of the residents. The house is now able to grow linearly although it is seldom that more than two rooms are built and no house greater than three rooms has to date been recorded.

In terms of materials, it is significant to note that dwellings of this form are usually found in areas where there is a lack of suitable thatching grass due to either climatic conditions, large settlements of people, the land being subject to intensive farming methods or a combination of any of the above. Whereas previously rural society would, under different conditions, have built two or three separate rooms, a shortage of materials as well as larger population densities have created conditions which encourage the development of more compact multiroomed structures.

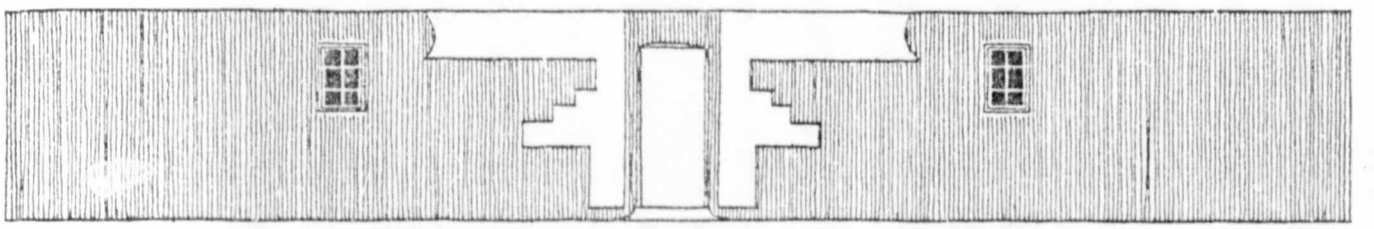
Structurally, the walls of ridged and hipped buildings are generally load bearing, being made of monolithic sun-dried packed earth bricks or of undressed stone bonded in earth. A few exceptions have however been recorded, mostly in areas strong in timber-framed construction such as KaNgwane and KwaZulu. This means that for the first time in this study, the wall can be said to have reached full structural maturity, fulfilling the functions of bearing the roof-load and defining internal space, the task of creating shelter now being the exclusive preserve of the roof.

One of the major failures of this type of house form occurred where the tie beam was placed too high in the truss thus allowing the roof beam to spread outward and place a lateral stress upon the side walls. In one specific case, recorded in the Transkei, structural failure of the wall had occurred following torrential rains. In another near Standerton, Transvaal, collapse seemed imminent and the walls had to be propped up with timber supports. In yet more examples recorded the builder seemed to be aware of this shortcoming, but instead of lowering the tie beam to a more effective level, he had buttressed the walls to take up the lateral stresses imposed by the roof.

Figure 84. Unit 21.

Figure 87. Unit 23.

On the other hand a high degree of sophistication was achieved in some examples in Bophuthatswana where systems of struts were used to distribute the weight of the roof and in yet others, in both Gazankulu and KwaZulu, the tie beam was made fully functional and in at least one example also served to support a loft within the roof void.



CHAPTER 12: THE GABLED ROOF

The main theme which has emerged from this study thus far centers about the growth and development of the rural house form. We have seen how the hut was able to emerge from its humble beginnings, and through social pressures and technological innovation was able to grow into a dwelling of some substance and of more conventional architectural character. The last chapter described how the roof finally ceased to be the major determinant of form and has finally become subjugated to the dwelling demands for a more sophisticated floor plan, thus opening the way for multi-roomed structures.

The demand for multi-roomed dwellings is probably the result of a combination of factors:

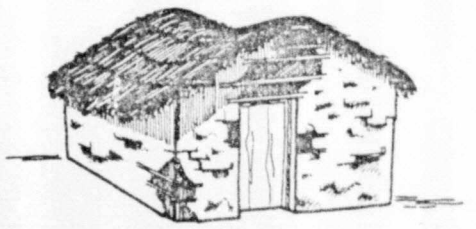
a. Economically, it is more feasible to combine the various functions of a family group under one roof than to scatter them to three or more separate structures.

b. The spread of Christianity and monogamism has reduced the need to give the various wives status within the extended family group.

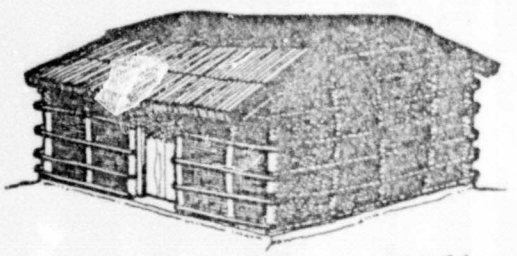
c. The extended family group has in some cases tended to fall by the wayside as increased urbanization on the one hand and political resettlement of communities on the other have resulted in smaller family units and the dismissal of many of the traditional norms and values of rural life.

d. The aesthetic of the multi-roomed dwellings of white society are being increasingly imported into the more traditional rural areas.

Despite all of the above factors, the development of multi-roomed dwellings has only been recorded in a rural context in such semi-urban conglomerations as Bushbuckridge in the Eastern Transvaal, Phuthaditjhaba in Qwa Qwa and Edendale near Pietermaritzburg, as well as on the white-owned farmlands of the Transvaal and Orange Free State highveld. More isolated examples were also recorded in Bophuthatswana

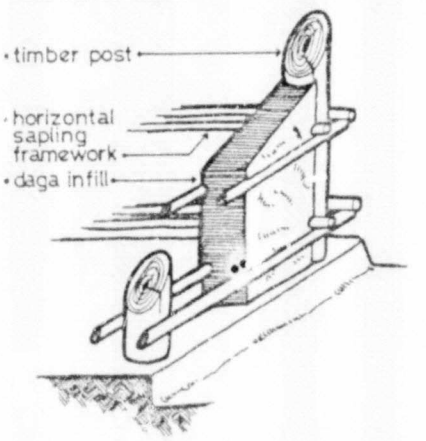


Unit 25



Unit 26.

Detail:
Wall Construction



Gabled roof: Units 25 and 26.

UNITS 25 AND 26.

- CLASSIFICATION : GABLED ROOF.
- LOCATION : UNIT 25 : MELMOTH.
  UNIT 26 : GREYTOWN.
- CONSTRUCTION : TIMBER POSTS ARE SET INTO THE GROUND AT 1200 m INTERVALS. SAPLINGS ARE FIXED TO THE INTERNAL & EXTERNAL PERIMETERS OF THE WALL, SPANNING FROM COLUMN TO COLUMN PARALLEL TO THE GROUND SPACED APPROX. 300 mm APART. THE CAVITY THUS FORMED IS PACKED WITH EARTH & THE WALLS ARE PLASTERED OVER WITH DAGA. IN UNIT 25 TIMBER BEAMS SPAN FROM GABLE TO GABLE & TAKE THE THATCH LOAD DIRECTLY RESULTING IN SAGGING OF THE ROOF RIDGE. IN UNIT 26 THE BEAMS ARE SHALLOWLY TIED INTO TRUSSES WHICH SPAN FROM WALL TO WALL PARALLEL TO THE GABLE ENDS. SAPLING BATTENS CARRY THE THATCH COVER. THE RIDGE IS RESOLVED BY SEWING THATCH BUNDLES ACROSS IT THUS GIVING IT A ROUNDED APPEARANCE.
- SOCIAL GROUPING : ZULU HOMESTEAD WITH A CATTLE ENCLOSURE AT ITS FOCUS FOR UNIT 25 WHILE IN THE CASE OF UNIT 26 NO DEFINITE PATTERN WAS DISCERNIBLE.
- GENERAL : BOTH UNITS FUNCTIONED AS LIVING/SLEEPING AREAS. CONDITION OF UNIT 25 - POOR; UNIT 26 - GOOD. BOTH UNITS AVERAGE TO RESPECTIVE HOUSEHOLDS.

and the Transkei but these were usually developments within more traditional house forms or were in the way of hybrids or the combination of several different dwellings linked to each other.

If the demand for a more economic and compact rural dwelling is indeed one of the main factors in the development of the multi-roomed structure, then one of rural architecture's more marked failures has been its inability to develop the gabled roof structure to any great degree of sophistication. The ridged and hipped roof, whilst allowing several rooms to be built in a row, once built, was as limiting to further expansion of the dwelling as any of its predecessors. This limitation was overcome by the replacement of the roof hips by a ridged roof frame terminated at either end by gable walls. Such a building can allow almost unlimited linear growth of the house by the mere abutting of more such structures to the original building.

However little if any such development was recorded during the course of this study. Few gable-ended examples were found and none consistently in any one rural area. Most were unable to cope with the structural problems presented by the roof frame and instead preferred to run a ridge-beam from gable to gable with the roof beams then spanning from it to the side walls. The resultant and predictable sag in the ridge beam was taken up by one or two central support posts. Several such structures were found in Bophuthatswana west of Mafikeng, mostly functioning as kitchen or cooking huts.

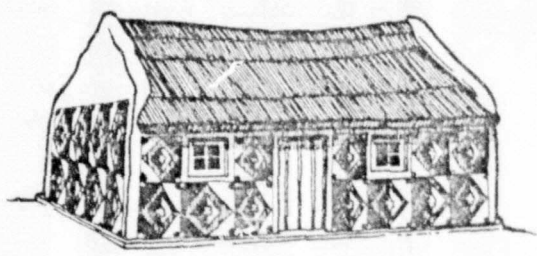
Figure 90. Unit 25.

A few variants to this structure of some import were recorded. One unit, near Melmoth, was a timber framed cavity wall structure, the cavity being packed with earth and plastered both internally and externally with daga. Timber beams ran the length of the dwelling from gable to gable with cross-beams being placed over them. The whole was then thatched over. As the gable beams were of little substance and no central supports were used to prop the roof structure up internally, considerable sagging of the roof had occurred. A similar structure near Greytown showed signs of roof trussing although the end walls were not brought over the roof into full gables.

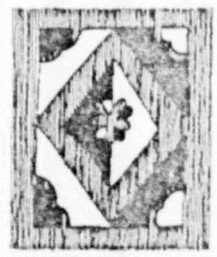
Figure 90. Unit 26.

Figure 92

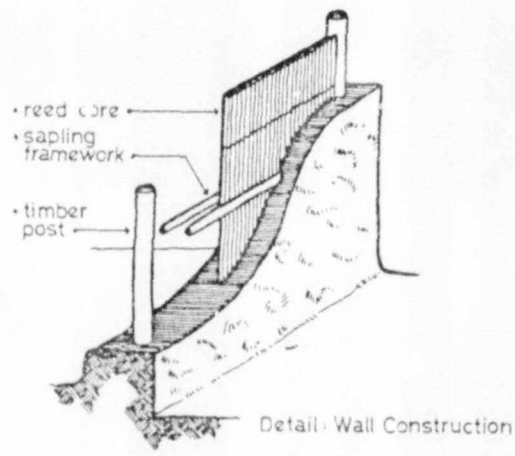
One of the few examples which showed any signs of forming the roof frame out of triangulated trusses was recorded on white farmland in the district of Balfour. A monolithic sun-dried earth brick wall carried a roof structure formed of beams brought to a central ridge and having a tie-beam set at approximately one-third of the depth of the roof void. Battens were run at right-angles to the trusses and the whole was then thatched over. The shallow truss of the roof was due to the need for head-room within the dwelling. This however placed some stress upon the walls which



Unit 27.



WALL PATTERN



Detail : Wall Construction

Gabled roof: Unit 27.

UNIT 27.

- CLASSIFICATION : GABLED ROOF.
- LOCATION : BALFOUR.
- CONSTRUCTION : TIMBER POSTS ARE SET INTO THE GROUND. A REED SCREEN LAID VERTICALLY IS SANDWICHED BETWEEN SAPLINGS LAID TO THE TOP & BOTTOM OF THE PANEL & PROTRUDING ON EITHER SIDE. THE PANEL IS FASTENED TO THE TIMBER POSTS AND AN EARTH PACKING & DAGA PLASTER IS APPLIED BOTH INTERNALLY & EXTERNALLY. A SLIGHT BUTTRESSING OF THE WALLS HAS OCCURRED TO COMPENSATE FOR THE LATERAL THRUST OF THE ROOF. THE ROOF BEAMS ARE TIED AT EAVES LEVEL BUT THE EAVES BEING ONLY 1,600 m HIGH, THE FLOOR HAS BEEN EXCAVATED BY 200 mm TO INCREASE THE INTERNAL HEAD ROOM. THE THATCH IS LAID SEED-END UP.
- SOCIAL GROUPING: NO SETTLEMENT PATTERN WAS EVIDENT IN THE HOUSEHOLD. UNIT FUNCTIONED AS LIVING/SLEEPING AREA.
- GENERAL : WINDOW OPENINGS SMALL. SASHES IN TIMBER & GLAZED. A SMALL OPENING TO REAR OF UNIT HAS BEEN GLAZED BY SETTING THE GLASS INTO THE WALL. CONDITION OF UNIT GOOD BUT ABOVE AVERAGE FOR THE SETTLEMENT.

showed some signs of buttressing in compensation.

Two dwellings which did seem to make full use of the extension possibilities of a gabled roof were recorded on the Orange Free State highveld. In the first example near Villiers, a central gabled and thatched structure was bracketed on either side by two rooms roofed over with corrugated iron. In this case the three rooms appeared to have been built simultaneously and as a whole thus negating the expansion possibilities of a gabled structure. The central part, being thatched, functioned as a kitchen/living space, an aspect of highveld settlements which will be discussed in a later chapter.

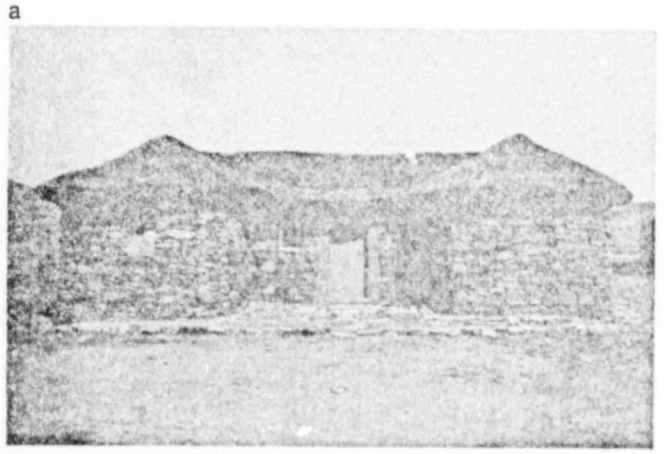
Figure 106 b.

A second and more important group recorded near Warden reversed this sequence, consisting of a central unit roofed over in corrugated iron with two ridge and end-hipped units abutting onto the gables on either side. The three rooms thus resulting appeared to have been built at different stages leading us to the conclusion that as the resident's needs for internal space grew, so then was the dwelling extended to cater for this need.

Perhaps one of the factors which may well account for rural architecture's failure to bring the gabled roof to full maturity lies in the growing use of corrugated iron in the vernacular and the development of the "highveld" house, whose lean-to form effectively supplies the builder with three gable-ends from which to extend his dwelling. Such a house form has the added advantage that whereas the gabled roof without the invention of the roof valley, can only grow in a linear direction, the Highveld house can grow in virtually any direction and to any size. In such a case, a growing scarcity of suitable thatching grass and the "cultural" preference of a "modern" material over an older and more traditional roofing medium may mean that the social pressures which brought about the need for a multi-roomed structure come too late to allow the gabled roof to develop as a widespread vernacular house form.

a. Front elevation: "U-plan" dwelling, Thaba 'Nchu, Bophuthatswana.
b. Side view of same.
c. Internal detail of roof of same.
d. "L-plan" dwelling: Loskop, KwaZulu.

a



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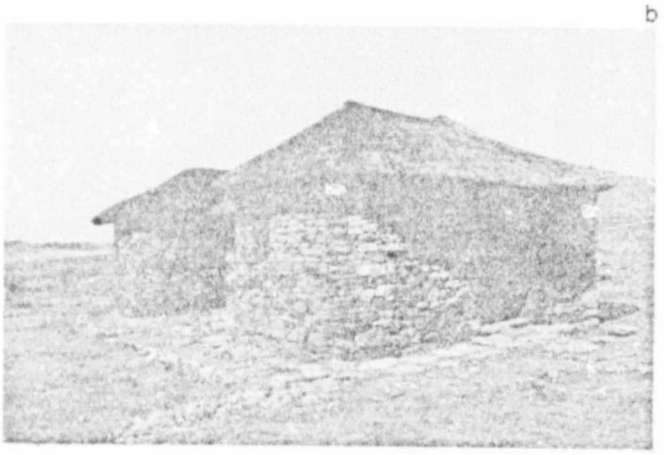

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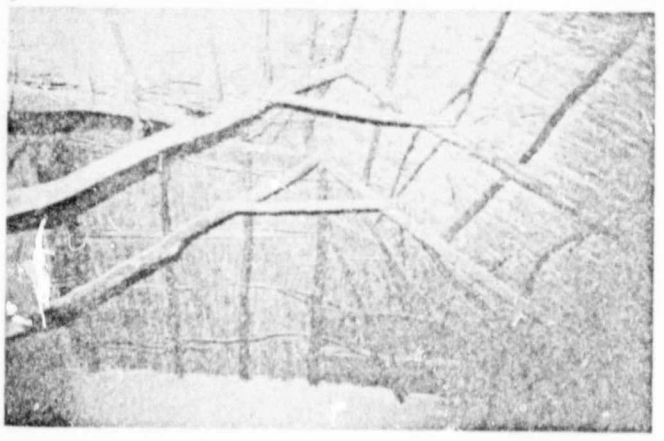

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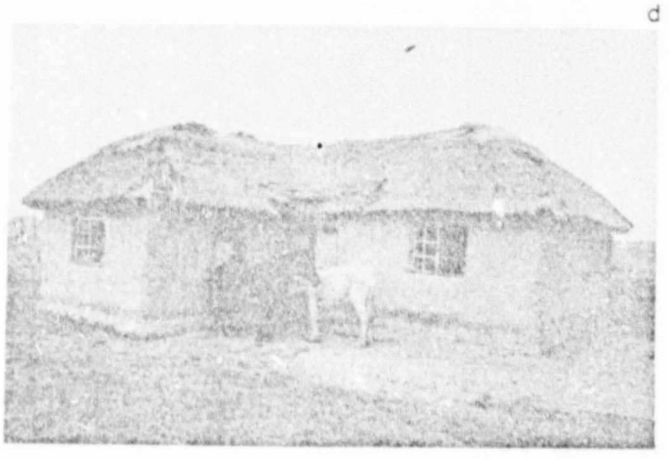
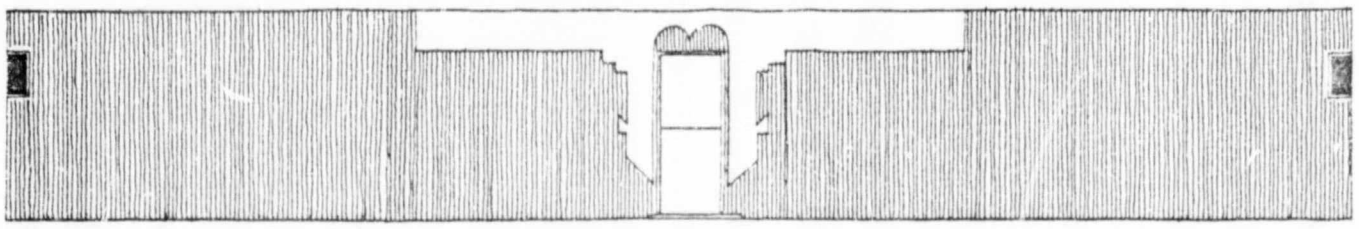




CHAPTER 13: VARIATIONS ON THE RIDGED ROOF

It would be pleasant and satisfying to be able to report in this chapter that, as the demands of the rural inhabitant on his dwelling grew in terms of more indoor space, so then his dwelling was able to respond and provide for these needs whilst still remaining within the present limitations of natural materials. The contrary is in fact generally correct.

In previous chapters we saw how the roof truss had made possible the construction of dwellings based upon a rectangular plan. We also saw that regardless of whether the roof was gabled or hipped, development of these dwellings was only possible in a linear sense. Of all examples recorded, the biggest such grouping did not exceed three rooms: a central living room cum kitchen with bedrooms on either side.

There appear to be good reasons why linear development should not have exceeded three rooms. Assuming the existence of a long four or five roomed dwelling, such a structure would be aesthetically ungainly and have poor internal circulation; having such a long facade it would take up good homestead ground unnecessarily and would fail to create the hierarchies of buildings and spaces inherent in traditional rural society. Most important, being long and rambling, it would fail to achieve the economy of building which the multi-roomed structure sought in the first place. Therefore, if the rural dwelling is to continue to expand, it must look to more compact floor plans, such as perhaps, the 'L', the 'U' and the 'H' forms.

This marks a critical point in rural architecture, for further development of the floor plan must also be accompanied by similar and radical innovations in roof technology. It will be remembered that the roof had once before reached a stage of impasse resolved only by the invention of the roof truss. This time yet another such invention is needed; that of the valley, before the problems of roofing the new plan forms can be resolved.

The valley presents the rural builder with a waterproofing problem he has not met with up to now. The thatch roof needs to be resolved at two major

points: the ridge and the hips. In general most rural groups have managed to cope with at least the problem at the eaves and in some areas poor in rainfall the detailing of these points has not been attempted at all. The reason for this is probably quite simple: both act as watersheds and excepting for what little rainwater falls upon these comparatively small areas, the overall efficiency of the roof remains generally unimpaired. In the case of a valley however the situation is somewhat different. The valley acts as a collection point and run-off channel for the areas of roof immediate to it on either side. Thus if left unresolved, this point in the roof structure must undoubtedly lead to internal water seepage, damage to the wall and ultimately even structural collapse.

Faced with this problem the rural builder has, at this point, two clear alternatives. He must either continue to develop the house form within the limitations of the naturally-found materials or to begin to draw upon other sources. Generally and, I suppose, sadly, the latter choice is generally being made as more and more rural dwellers opt for the elasticity and freedom of house plan afforded by modern roofing materials, such as corrugated iron, against the limitations imposed by a free but dwindling supply of suitable grasses and a changing thatching technology.

It should not be believed that development favouring the use of natural-found materials ceases entirely. It does not, but merely dwindles to a few and scattered examples. During the course of this study no dwellings based upon an 'H' plan were recorded and only one 'U' plan was discovered, near Thaba 'Nchu in Bophuthatswana. This dwelling consisted of a central living room with two rectangular-plan bedrooms extending into wings on either side.

Figures 94 a. b. c.

The walls were in dressed stone with considerable skill being shown in turning the right-angled corners. Although the thatching technique coped with the problems in the valley, the roof framework in this area showed evidence of being in its early stages of development. The wings and the main body of the house each had trussed roof structures independent of each other being linked only the battens. No valley beams or jack rafters were used. The inhabitants were of Sotho stock although this region is predominantly Tswana.

A comparatively large number of L-planned dwellings were recorded in such geographically disparate regions as Transkei, Qwa Qwa and KwaZulu. In most cases the roof structure made use of valley beams but not of jack rafters. The example recorded at Loskop, in the Bergville district, seemed to have experienced some trouble in the thatching of the valley, although this might also have been the result of the building being in a poor state of maintenance. Similar problems were experienced in the

Figure 94 d.

a. Front view: "L-plan" dwelling, Redoubt, Transkei.
b. Rear view of same.
c. Front view: "L-plan" dwelling, Witsieshoek, Qwa Qwa.
d. Front view: "L-plan" hybrid dwelling, Keiskamma-hoek, Ciskei.

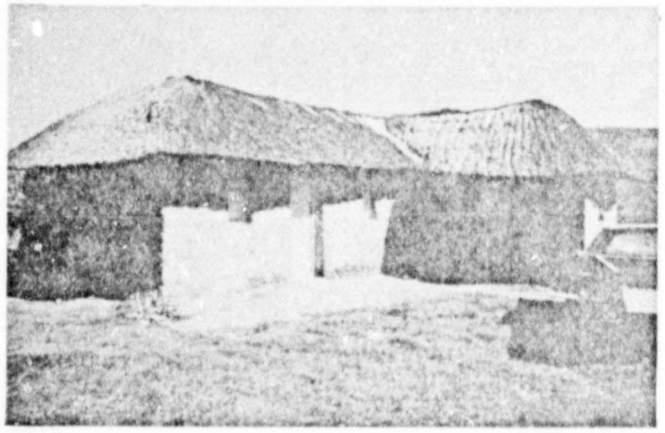
a



b



c



d



dwelling recorded at Witsieshoek, Qwa Qwa, where the valley, once thatched, was plastered over in cement.

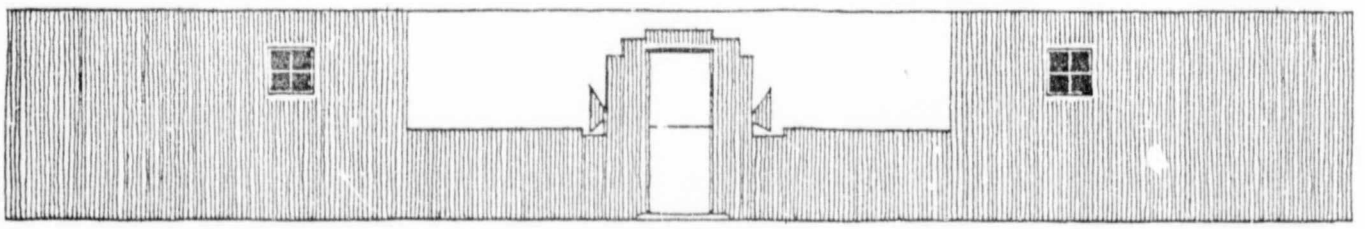
Figure 97 c.

The two examples recorded in the Transkei were probably of the greater relevance to this study. In both cases the main dwelling consisted of two rooms with a third room projecting forward to form the wing. In the first example however, the dwelling had also been extended to the rear by yet another two rooms roofed over with corrugated iron tucked underneath the thatch eaves. In the second a room, similarly roofed, had been added to the front of the house alongside the thatched wing.

Figures 97 a. b.

The Transkeian examples' relevance lies in the fact that it would appear that the rural dweller is making yet further demands of his habitation, demands which are leading to greater compaction of plan and economy of construction. It also begins to appear that even in cases where the rural builder has managed to incorporate valley construction in his repertoire of building techniques, this in itself may not have been enough. Perhaps what was needed in the first place was not the development of the valley but the invention of a roof truss able to span greater distances. As however span is a function of timber size, it is doubtful that the South African rural environment, poor as it is in suitable timbers would have been able to allow such development.

Generally it would appear that rural architecture has either been unable to meet the challenge of a more sophisticated plan using the natural and found materials or that perhaps it has not been necessary for it to do so. On the one hand modern roofing material is now easily available and on the other it might appear that once the rural family unit has reached the level of development where it requires a compact multi-roomed structure, it probably also would have reached a stage where their aspirations, rightly or wrongly, would demand the aesthetics of a "modern" dwelling. It might thus appear that the very forces which enabled the rural house form to develop are the very same which might ultimately bring about its demise.



CHAPTER 14: SOME HYBRID HOUSE FORMS

Although rural architecture has, during the course of previous chapters, been shown to be an architecture of change, it has, on occasions, also proved itself to be so tied to the forces of traditionalism as to stifle or modify such changes as may be impending. This unwillingness to change was demonstrated in the case of the Zulu beehive hut and, to a certain extent, by the development of octagonal and hexagonal plan dwellings in the Transkei and Ciskei.

It was therefore no surprise to observe during the course of this study that the traditional attachment of some areas to a specific house form was extended in those same areas onto the development of multi-roomed structures.

The development of hybrid structures incorporating two or more different house forms within the same dwelling, is almost exclusive to the Transkei. Invariably they consist of cone on cylinder forms linked linearly by rooms roofed over with corrugated iron, although variations on this theme involving ridged and hipped roofs have also been recorded.

The reasons for the evolution of such a house form can probably be seen in the light of previous developments. They include such factors as:

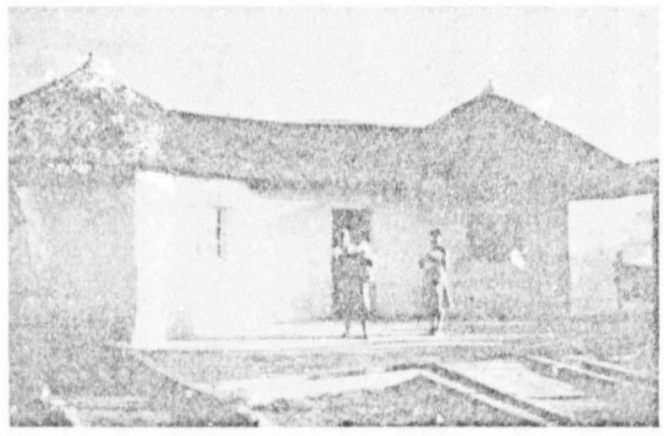
- the growing demand by rural society for multi-roomed structures.
- the inability of the rural house form under its present limitations to grow in any way other than linear.
- the growing availability of modern materials in rural society.

Architecturally, the combination of the cone on cylinder with the square, flat roofed structure offers some considerable advantages.

- the rotating axis of the cone on cylinder will allow the dwelling to grow linearly and yet not necessarily in a straight line. As a result we find that such structures usually curve and contain the external homestead spaces rather than simply face upon them.



a



b

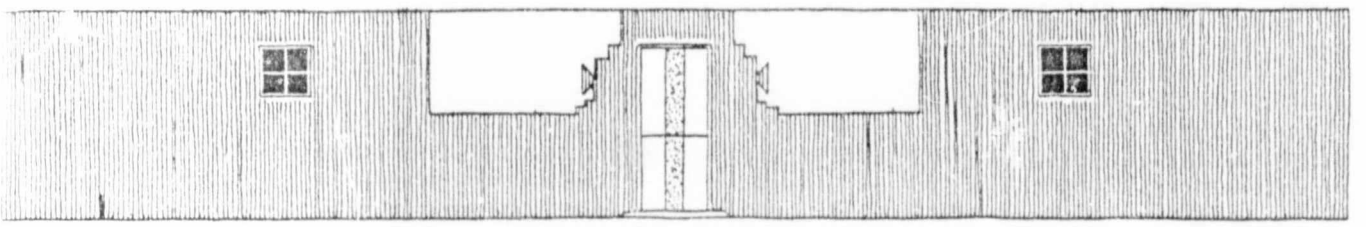
- the alternation betwen thatch and galvanizing provides the rural dweller with a module which will allow his home to grow in response to both spacial needs and economic realities.
- this house-form does not require the invention of new methods of construction, or new roofing techniques but can be implemented within the existing framework of rural technology and building experience. It also retains its links with traditional house forms whilst at the same time being able to introduce innovation.

On an average most hybrid forms recorded consisted of two cone on cylinders linked by a flat-roofed room, although several five-unit structures were also observed.

It may be that the combinations of ridged and flat roofs recorded on the Transvaal and O.F.S. highveld shoud also be grouped here. Whilst it is true that they must undoubtedly be classified as "hybrids", it is also true that they were generally part of strictly linear developments which did not make use of the modular growth potential of the hybrids. In these cases, the units could just as well have been roofed over entirely in thatch or in corrugated iron.

a. Hybrid dwelling: Kinira Drift, Transkei.
b. Hybrid dwelling: Qamata, Transkei.

Figures 100 a. b.



CHAPTER 15: THE HIGHVELD HOUSE

Vernacular architecture has thus far been discussed almost entirely as the architecture of the natural and found material. It is true that elements of modern mass production have inevitably crept in, in the form of doors, windows, glazing, ridge cappings and cement mortar but such innovations have been subject to the rural house form and building technology and have not become major determinants in their own right. This all changes with the introduction of galvanized sheeting which, together with rising rural expectations is now threatening the very future of rural architecture in the Southern African region.

The "Highveld" dwelling represents the last recorded development in this study of the evolution of the rural house form. It is so named because of its predominance in the highveld regions of the Transvaal and Orange Free State, although similar forms have been recorded as far afield as Cape Town, the Northern Cape, Lebowa and KwaZulu. It marks a stage where the relationship between wall and roof has travelled the full circle, from the time when the beehive hut offered no differentiation between the two, through various developments during which we saw a rising assertion of the wall as a full structural element until finally, in the Highveld house, the walls have become dominant and the roof is scarcely expressed.

The influence of Western cultural values and material technology at this point is undeniable. In innumerable interviews conducted with rural house owners and builders, the flat-roofed form was held up to be a paragon of "modern" living over thatched roof forms. To many a rural dweller the Highveld house is a stylization of the kind of dwellings found in urban areas, both white and black, and it embodies their aspiration towards a higher standard of living, better education and a more sophisticated lifestyle.

This however does not mean that the high degree of functionalism found in rural architecture is discarded indiscriminately for reasons based entirely on status and materialism. The contrary is generally true, as is

demonstrated by the dominance of the galvanized roof in the relatively drier highveld whilst in the wetter coastal regions very few inroads have been made in traditional thatch roof strongholds.

It would appear that several major factors militate for the development of the Highveld house form. These include:

- the proximity of a Western urban influence.
- the relative availability of galvanized roofing material.
- the relative prosperity of rural dwellers working in white farm or urban areas.
- the relatively drier weather conditions of the highveld.
- the relative lack of suitable thatching grasses in such areas.

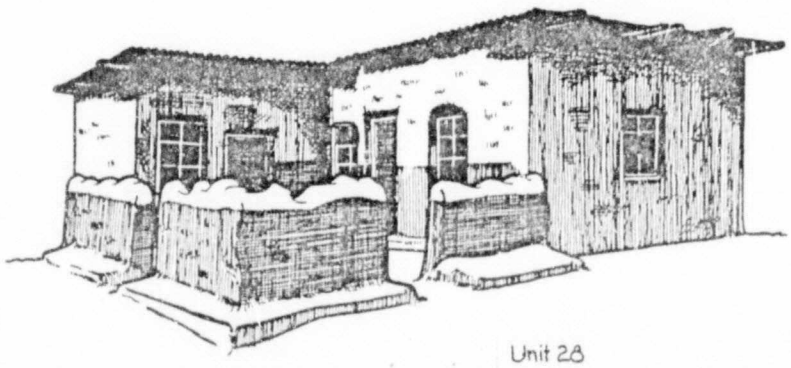
In terms of structure and building, we find that the use of galvanized iron in a rural environment creates several problem areas, not all of which are usually resolved. One such problem area relates to water-exclusion of both roof and walls.

Rural wall-building systems vary from the timber framed structure through to the use of monolithic sun-dried earth bricks. Whichever is used, is usually reliant on a certain degree of shelter from the elements being afforded by the roof eaves. The highveld house however not only dispenses with eaves on all but one wall but usually also entails a low parapet wall as a means of holding down the roof. Such parapet walls, unless properly waterproofed, become sources of extensive water seepage and wall cracking is a fairly common failure of this house form.

Amazingly, despite the low profile achieved by the roof of the highveld house, it none-the-less remains a major determinant factor of this architectural form.

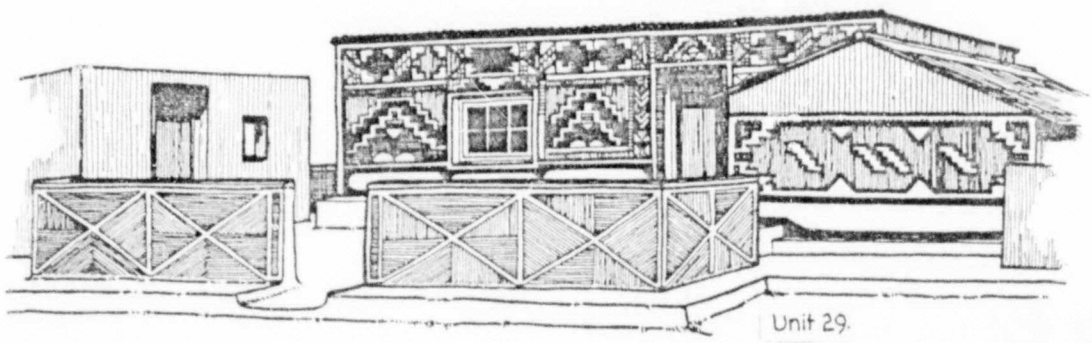
One of the problems experienced by the rural house in coping with the use of a new material, whose limitations are not all fully understood, lies in the fixing of the roof. Timber beams of limited size supporting the roof and running either in the direction of or at right angles to the sheeting corrugations have been recorded, but the function of these beams is limited to one of roof support and not of roof fixing. There is a general unwillingness amongst rural dwellers to puncture galvanized sheeting for a number of reasons:

- the house has a limited life-span of usually seven to ten years whilst the roof sheets are reusable.
- the unstable nature of some current rural societies where farm workers, having few legal rights, are subject to short notices and have



Highveld house: Units 28 and 29.

Unit 28



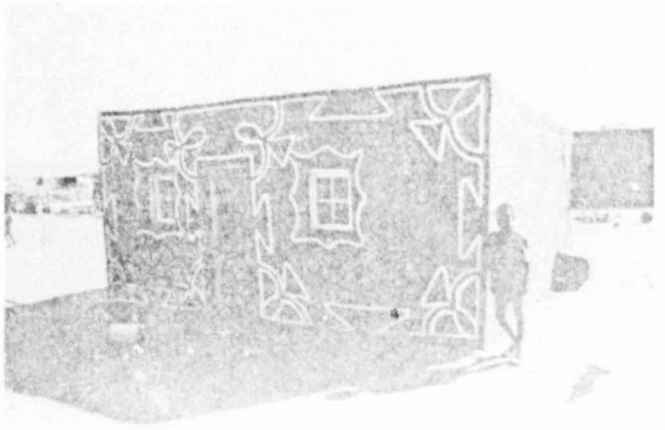
Unit 29.

UNITS 28 AND 29.

- CLASSIFICATION : HIGHVELD HOUSE.
- LOCATION : UNIT 28 : BUSBUCKRIDGE, LEBOWA.
  UNIT 29 : GA-RANKUWA, BOPHUTHATSWANA.
- CONSTRUCTION : MONOLITHIC SUN-DRIED EARTH BRICKS BONDED IN EARTH & PLASTERED OVER WITH DAGA. IN UNIT 28 THE ROOF BEAMS ARE TIED INTO THE WALL, THE CORRUGATED IRON IS LAID DOWN & SECURED BY A SECOND SET OF TIMBER BEAMS LAID EXTERNALLY & TIED TO THE FIRST BY WIRE HOOPS. IN UNIT 29 THE CORRUGATED IRON SHEETING IS SECURED BY MEANS OF WEIGHTS LAID OVER THE ROOF.
- SOCIAL GROUPING : UNIT 28 HAD BEEN BUILT IN TWO STAGES TO FORM A THREE-ROOMED L-PLAN DWELLING GIVING ONTO A COURT. UNIT 29 EXTENDED INTO TWO ROOMS GIVING ONTO A CENTRAL COURT SHARED WITH TWO OTHER UNITS & GIVING ONTO ANOTHER REAR COOKING COURT. BOTH UNITS FUNCTIONED AS LIVING/SLEEPING AREAS.
- GENERAL : BOTH UNITS MADE USE OF COMMERCIALLY AVAILABLE DOOR & WINDOW FRAMES. CONDITION OF BOTH UNITS GOOD & AVERAGE FOR THEIR RESPECTIVE AREAS. UNIT 29 MADE USE OF COMMERCIALLY AVAILABLE P.V.A. COLOURS.

a. Single-roomed dwelling: Kromdraai, Thaba 'Nchu, Bophuthatswana.
b. Two-roomed dwelling: road Bethlehem to Paul Roux, O.F.S.
c. Three-roomed dwelling: Winterveld, Bophuthatswana.
d. Five-roomed dwelling: Winterveld, Bophuthatswana.

a



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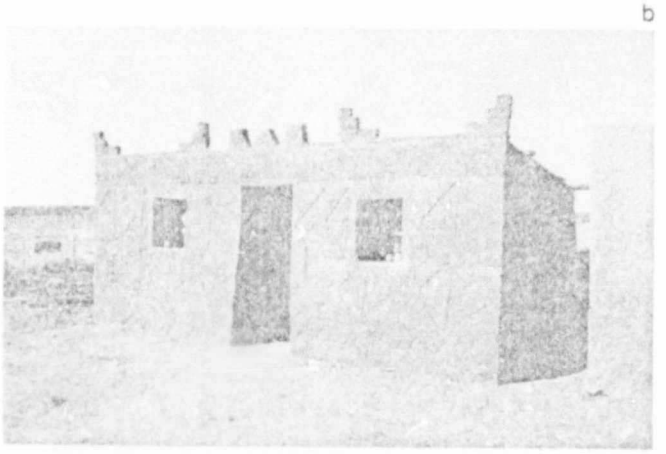

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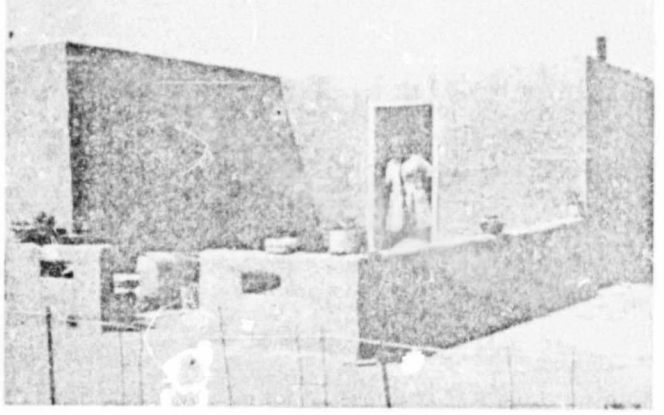

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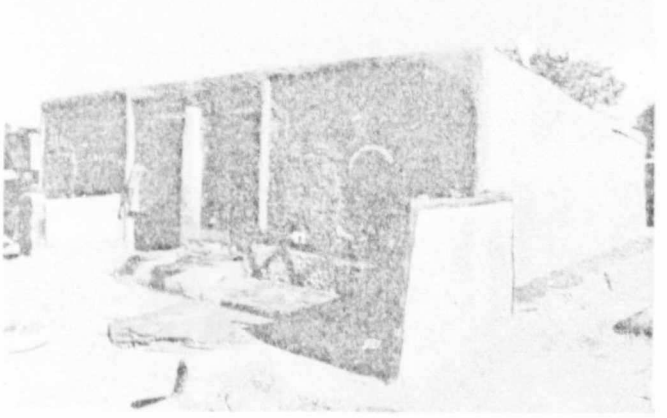


little tenure, whilst residents of the areas variously known as "Native Reserves", "Bantustans", "Homelands", and more recently "National States", have in the past and still are today subject to arbitary Government dispossession and removal, popularly known as "Homeland Consolidation" and "Black Spot removal".

Under these conditions where roof sheeting might be reused any number of times within a single generation, it becomes difficult, once it has been properly fixed, to guarantee that the same hole will be conveniently placed in second and subsequent occasions. Other methods of fixing must therefore be evolved and some ingenious ones have been recorded. These include placing timber beams at right angles to the fall of the roof both above and below the sheeting and binding them together with steel wire, thus sandwiching the sheeting down. In other occasions beams external to the sheeting have been fastened to a chain which was then secured to the ground by means of large boulders or stakes driven deep into the soil. Alternatively a chain would be thrown across the roof and similarly secured.

Figure 103. Unit 28.

The most common method of holding down the roof sheeting however, is still achieved by the simple expedient of loading the roof with bricks, stones, motorvehicle tyres, anvils and even on one occasion, a pair of railway truck wheels. This means that the house builder must play a fine balancing game as, on the one hand, he may not overload the roof lest it buckle and on the other he must not underload it lest it fly off in the cold winter winds experienced on the highveld. This has in its turn become a determinant of the house size. While the room may extend almost without limit in breadth, the depth has become a function of the roof sheeting and generally will not exceed 3,500 m.

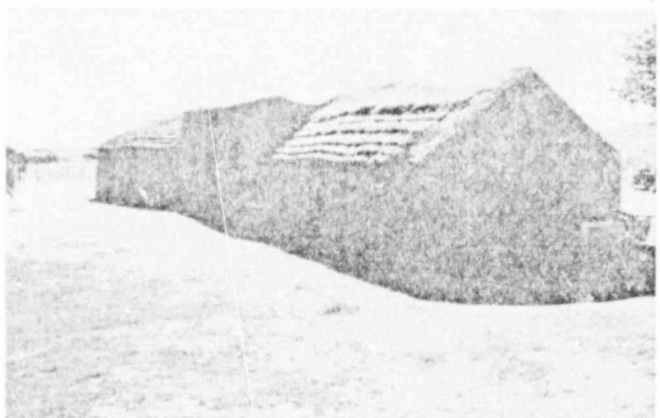
An important repercussion of the introduction of corrugated iron in housing has been the breakdown in the ecological cycle of the rural dwelling. It is the common practice of the country family to light fires within their homes to provide heat for comfort and cooking. The thatch roof is especially suited to this function for while it has excellent thermal qualities, it also allows smoke to percolate through. Galvanized sheeting unfortunately offers no such facility and as a result lighting fires within the highveld house is highly uncomfortable. Generally the chimney flue and the fireplace have not been invented in the rural vernacular and as a result the cooking functions of the family are now conducted either in the open or within a specially designated and usually thatched-roof unit. This has had the result of making the highveld house a difficult unit to heat but, more important, because fires are no longer built indoors, the rooms are not fumigated regularly as was the case previously. Where the walls and

a. Linear house development: road Heidelberg to Villiers, Transvaal.
b. Linear house development: Warden, O.F.S.
c. Two-roomed dwelling undergoing expansion: Greylingstad, Transvaal.
d. Abandoned dwelling: road Warden to Harrismith, O.F.S.

a



b



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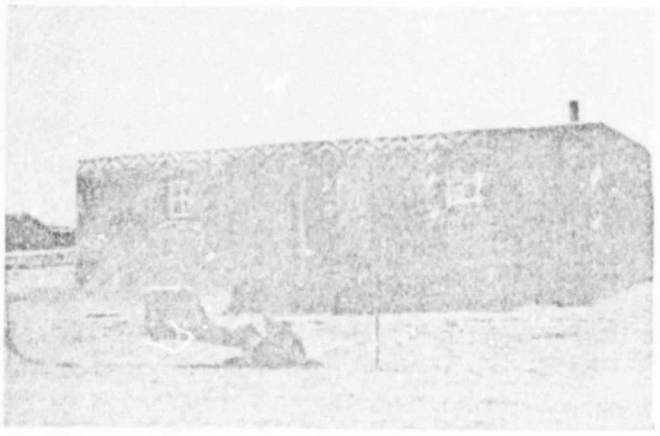

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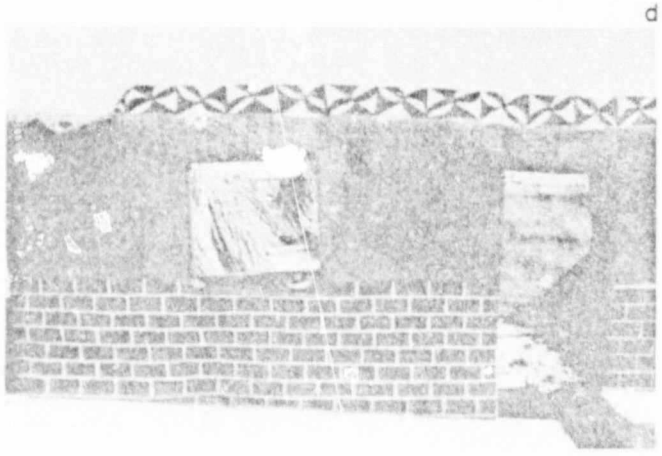

floors have made use of a daga plastering, a mixture of mud and cow-dung, this has had the effect of allowing insects, many of them harmful to man to breed within them. Thus we find that the lifespan of the rural house, which in some of the recorded examples was as long as 40 years plus, has in this case now been reduced to less than ten, and whereas before the walls and roof frame were retained and the thatch cover renewed, it is now the walls which are discarded as the family moves to a fresh site taking their roof with them.

Figure 106 d.

Because the highveld house is difficult to heat through the use of an open fire, we have also seen changes in the architectural and life-style patterns of the rural family. The kitchen unit will now be easily recognizable, usually being the only thatched unit in the highveld homestead. Also the family's social functions have now become increasingly centred on the kitchen, thus reinforcing existing rural custom.

Perhaps the most notable achievement of the highveld house lies in its ability to expand. Up to now the greatest restraint upon the development of the floor plan in rural architecture has been the inability of the roof to cater for anything more complex than the basic rectangle. With the introduction of galvanized iron sheeting, the floor plan is suddenly liberated and is now able to indulge the demands of the rural family to an extent never made possible by current thatch technology. The use of the flat lean-to roof also provides the rural dweller with a house form which is now able to respond to his financial realities as well as his spacial needs. The basic one-roomed highveld house represents a module which is able to expand as the family's spacial needs grow and according to their budget. The principle of lean-to shelter combining as it does with the parapet wall, ensures that the rural builder is able, through judicious placing of his roofs, to keep on expanding his dwelling almost ad infinitum.

Figures 104 a. b. c. d.

Figures 105 a. b. c.

One feature of the highveld dwelling has been its response to the climatological environment. The highveld is a region of summer rains and winter drought and often no rain may fall for the full period stretching from May to September. When the rains do come, their water is precious and to be stored. Thus guttering of some form can usually be found to the rear of the unit, falling off sharply into a series of barrels or a ground catchment area.

The expanding use of modern industrial materials in rural architecture has also given rise to a new set of values in the rural house owner. Previously should a family have to quit their dwelling or homestead for any particular reason, they did so in the knowledge that their home cost them little other than many hours of work and that it could be replaced at a similar cost. At

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