stacked into kilns of approximately one thousand, leaving a tunnel at
the bottom running the length of the kiln. The large cube which has
thus resulted is plastered over in earth taking care that no openings are
left through which heat can escape. Grass mats and reeds are finally
piled over the whole and the tunnel of the kiln is fired for three days.

The bricks are allowed to cool before the kiln is broken up. Thereafter
the bricks are used in walls bonded in earth and plastered over in daga.
(Venda and Gazankulu).

k. **Load-bearing rubble walls.** Stone is laid into a wall bonded in earth or
cement, usually in two skins with the internal cavity filled with small
stones and gravel. Both interior and exterior are usually plastered over
with earth or cement. In some cases recorded in Qwa Qwa patterned
mosaics of stones or bas-reliefs cut into the plaster are used to
decorate the external facade of the dwellings. (Bophuthatswana, Qwa
Qwa).

l. **Load-bearing masonry walls.** Dressed stone is laid in earth or cement
and usually only plastered internally. Where external plastering
occurs it is done in limited areas such as door and window surrounds
to emphasise these openings. (Qwa Qwa, Transkei, district of
Herschel).

m. **Turf block walling.** The designated plot of turf is marked out by means
of a spade into parallel lines 300-400 mm apart and dug into the ground
to a depth of 100-150 mm. The builder then carries out the same
procedure but this time at right angles to the initial dig, turning the turf
block up as he proceeds. The turf blocks are laid into wall coursing,
sometimes being moistened first. In many cases the grass is
encouraged to continue growing once the blocks have been laid, thus
increasing their bind. (Highveld region, Transkei).

**Wall plate and eaves finish**

We generally find that where a timber frame bears the load of the roof or
even where the walls themselves are load-bearing, the conjunction
between walls and roof frame is not treated in any special manner. Often
the internal earth packing is allowed to be taken right up to the eaves.
Some interesting detailing has however been recorded, although these
represent the exception rather than the rule.

a. The timber columns supporting the roof are linked by a timber
ringbeam which in its turn serves to carry the roof frame. The roof
beams resting on the ring beam are either timbers naturally bifurcated
at that point or which have had a small dowel fixed into them at right
Detail I: Timber posts with "basket" core.

Detail m: Timber posts with monolithic earth wall within.

Tswana verandah house: sectional detail.
a. Brick kiln before firing: Donald Fraser Hospital, Venda.
b. Mopa e timber drum prior to the roof being raised: Makuya, Venda.
c. Cone-on-cylinder dwelling under construction: district of Bizana, Transkei.
d. Cone-on-cube dwelling: Schoemandsdal, KaNgwane.
angles. This provides the beams with a fixing point, and as a detail, it is believed to have originated from the Trek Boers of the last century. The walls usually stand proud and within the perimeter of columns and are seldom taken right up to the roof frame but are allowed to provide the room with a measure of lighting and ventilation. (Bophuthatswana).

b. As in the previous example but the external wall stands in column perimeter and is also stopped short of the roof frame for lighting and ventilation purposes. (Venda, Gazankulu, KwaZulu, KwaNdebele).

c. In many of the examples recorded, where the turf blocks, sun-dried blocks or masonry walls were load-bearing, some kind of timber wall plate running the length of the wall at the eaves was usually used. In one singular case metal plates or pads had been placed below every roof beam resting upon the wall.

Floors
Floors are usually packed earth regularly plastered with daga or just a cow dung wash. In general most floors are raised some 100 mm above the surrounding ground level although in Qwa Qwa some dwellings had floors as high as 1,000 whilst in yet other examples where the roof line was low, the floor had been dropped up to 150 mm below the surrounding ground.

Of note was one example recorded at Fabeni where the ground had been covered with evenly graded round stones some 80 mm in diameter, prior to the floor being built up in packed earth.

Roof structures
Various systems were recorded:

a. The beehive cone. Saplings are set into the ground in a circle and brought to a central crown where they are fixed. Concentric hoops of decreasing size running horizontally stabilize the frame. (Sotho)

b. The beehive dome. Saplings are set closely into the ground or fixed to the wall drum. They are brought over to form a series of arches which are greatest at the circle’s diameter and decrease in size as the limits are reached on either side. A second but more widely spaced set of arches is brought over at right angles to the first to form another dome. The two domes are secured at each point of crossing of the two sets of arches thus bracing the structure. A trellis carried by, usually two posts, serves to give the form internal support. (KwaZulu).

c. The conical roof without centre post. Roof beams are brought radially to a central crown where they are fixed. A small truss and, at
times, a cross-truss are used to secure the beams. Usually a centre post is used during construction but is removed once the thatching has been completed. Sapling battens set in concentric circles of decreasing size are fixed externally to both stiffen the structure and carry the thatch cover. (KwaZulu, Transkei, Ciskei, Bophuthatswana, KwaNdebele, Qwa Qwa, Lebowa).

d. The conical roof with centre post. The structure is as in the previous example but the centre post has been retained. (Bophuthatswana).

e. The conical roof with finial. The roof beams are brought radially to a central crown where they are abutted onto a carved timber finial. The crown is secured by a series of thin saplings wound about the finial and the abutting beams. Sapling battens are then set in concentric circles of decreasing size fixed externally to carry the thatch cover. (Venda, Gazankulu, KaNgwane).

f. The solid timber conical roof. A roof form which had been used in Venda at one time. It consisted of the frame described in the previous example but with further timbers abutted into it until, by means of considerable wedging and trimming of the beams, it presented a virtually solid cone. This, once positioned on the drum, was thatched.

Figure 134 a. c.
Raising the conical roof onto a dwelling: Tabankulu, Transkei.

a. Carrying the roof frame.
b. Hoisting the frame onto the drum I.
c. Hoisting the frame onto the drum II.
d. The finished frame.
Building the Thonga roof frame (photograph by the Transvaal Chamber of Mines).

externally and coated with earth internally with patterns, usually concentric, being painted on the plastered surface (Venda).

g. The Thonga conical roof. This was unique by virtue of its method of construction. Timber posts were set in a circle of the desired size and were joined at their head by a ring beam running the entire length of the circle. A small depression was dug in the ground at the centre. The roof timbers which had previously been shaped and notched at their head, were then rested upon the ring beam with their heads pointing into the central hollow, where they were secured together by means of bark strips. A round basket piece was set into the head of the now nascent cone and beginning from this point, a flexible 'rope' of saplings and reeds bound together was fixed to the frame and spiralled outwards and upwards. Once the cone was completed, the outer supporting frame was dismantled and the cone righted and placed upon the awaiting drum wall. The same procedure was then followed as before from the top of the cone but with the 'rope' now being spiralled outwards and downwards. A finial was finally formed at the apex in shaped timbers prior to the frame accepting the thatch cover. No such roof construction was recorded during the course of this study other than the one especially recreated by the Open Air Museum at Eiland.

h. The conical roof with truss. Although most conical roofs have some
kind of tie-beam this is usually situated in the shallow third of the roof void and is of little real value to the frame's structural strength. Several examples of more effective trussing have however been recorded:

(i) A second tie beam or a simple wire tie placed at the deeper third of the roof void (various locations).

(ii) Cross tie beams placed within the shallow third of the roof void but fixing into position a central post carrying the load to the ground. (Bophuthatswana).

(iii) Cross tie-beams trussing the roof at eaves height and carrying a central post from the crossing to the roof apex, leaving the floor clear of impediment. (Nagle Dam, KwaZulu).

(i) The pyramidal roof frame. This roof type derives its form from the fact that it is used in cases where the walls follow a square plan. There is otherwise little structural difference between it and the conical frame. The four hip beams are brought to a central apex, together with the other roof beams, where they are secured. Sapling battens are fixed in concentric squares of decreasing size to the outside of the frame. Most roofs of this nature recorded were usually cross-trussed in the upper third of the void barring one example in the Transkei where the tie-beams cross spanned at eaves height from mid-wall to mid-wall — as against from corner to corner. (KwaZulu, Transkei).

j. The minor ridge roof. This is basically a conical or pyramidal roof frame which has had the apex separated into two by a small ridge piece, seldom more than 600 mm long. The stress of the two halves tending to fall inward towards each other is taken up by the sapling battens. Such roofs recorded seldom showed any but the most minor and shallow of tie-beams. (KwaZulu, Transkei, Bophuthatswana).

k. The major ridge roof. The roof beams are trussed by a tie-beam usually placed in the top third of the roof void. In more advanced examples however greater skill was shown in the form of the truss:

(i) The tie-beam was placed at eaves level. (Various).

(ii) The tie-beam was placed at eaves level and a central king post was carried through to the ground. (KwaZulu, Transkei).

(iii) Two tie-beams, one at eaves level and one in the top third of the roof void gave a double truss. (KwaZulu, Gazankulu).

(iv) The tie beam sited in the top third of the roof void was reinforced by a wire tie at eaves level. (Various, Highveld region).

(v) The tie-beam was placed at eaves height and carried two struts to either roof beam. (Bophuthatswana).

l. Gable beams. Timber beams run the length of the building spanning
from gable to gable. Further beams span from eaves to ridge and carry sapling battens. This is an inefficient roof form as it invariably leads to sagging. Many of the examples recorded had a central post support to the ridge beam (KwaZulu, Bophuthatswana).

The thatching

a. Beehive mat and thatch. Grass mats are placed over the crown of the hut in varying layers and bound onto the framework. The whole is then thatched over with grass which is sewn onto the frame by means of woven grass ropes which, once the task is completed, have the appearance of a gigantic hair net. (KwaZulu).

b. Beehive thatch and mat. Grass thatch is sewn onto the frame in the same manner as above but the mats are then placed externally over the water-sensitive crown (KwaZulu).

c. Beehive thatch. The frame is thatched in the same manner as the above but no matting is used to waterproof the crown either internally or externally. Instead the woven grass ropes which overlay the thatch radiate from a central crown which has been fashioned into an ornate and decorative knot known as the "Ingqongwana". (KwaZulu).

d. Seed-end down thatching. Usually practised in Venda, Gazankulu and KaNgwane, it involves the placing of the thatch bundles with the seed-end down into concentric and overlapping layers working up from the eaves to the apex. Two methods may be used.

(i) thatch bundles are secured individually to the battens.

(ii) thatch bundles are laid side by side on the ground and tied into almost a grass skirt at the thick end by means of grass ropes. The resulting mat is then wound about the roof frame from the eaves upwards.

Once the apex is reached a grass mat as just described is wound about itself into a tight bundle or knot which is separated into three branches. The knot is finally inverted over the finial and the grass arranged evenly about the apex.

e. Seed-end up thatching: traditional shingled. A style of thatching which is now considered to be "old-fashioned", it involves the laying of grass bundles seed-end up upon the battens in rows beginning at the eaves and working up towards the apex or ridge. The bundles are broken and immediately sewn down, thus giving the roof a layered or shingled appearance (Bophuthatswana, KwaZulu and the Highveld region).

f. Seed-end up thatching: "Boer" style. The so-called "Boer" thatching

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f. Seed-end up thatching: "Boer" style. The so-called "Boer" thatching
a. Thatcher's wooden needle: Odi, Bophuthatswana.
b. Thatcher at work: Mukhume, Gazankulu.
c. Seed-end down thatching: Tshakhuma, Venda.

Figure 139 a.

has now largely superseded the layered or shingled tradition. It was interesting to note that in at least one place, Silwerkrantz, Bophuthatswana, the latter was considered to be "old-fashioned" and was actively discriminated against on those grounds although the more modern "Boer" style was not demonstrably superior in terms of structure and cladding. The thatch bundles are laid upon the battens and as they are broken open they are padded into a smooth surface by means of a wooden paddle or trowel, only then being sewn down to the frame below. Work begins at the eaves and proceeds upwards to the apex or ridge. (Widespread usage).

g. Seed-end up thatching: double layer. This seems to be a popular thatching technique in some areas where there is a shortage of suitable thatching grass. Two layers are applied: the first consists of coarse reed which in itself would not be suitable for thatching; the second of the normal thatching grass laid smooth in the "Boer" style. In both cases the bundles are laid seed-end up and the work is begun at the eaves and proceeds to the apex or ridge (Highveld region, Qwa Qwa).

In the above techniques the eaves are finally trimmed by the Thatcher to present an orderly and even edge.
Roof apex finishes
a. Tugela Valley, KwaZulu.
b. Tugela Valley, KwaZulu.
c. Lady Frere, Transkei.
d. Mongongwa, Lebowa.
Ridge cappings

a. The no-capping method. Usually found in the drier regions of the country, the thatcher has either been unable to cope with the detail or has not found it necessary to do so due to the lack of rain and the relatively small size of opening (Bophuthatswana, Highveld region).

b. The grass capping method. Found in regions where grass technology has reached a high degree of sophistication.

(i) Grass mats are laid over the thatching at the hut apex and are then sewn down over it. (KwaZulu).

(ii) Grass bundles are laid over the ridge and sewn down thus giving it a rounded appearance. (KwaZulu).

(iii) Grass bundles are brought into the ridge from either side thus being forced sharply upwards to give a pointed appearance. (KwaZulu, Highveld region).

(iv) The Zulu knot or "Ingqongwana" is the radial point for the grass ropes which serve to tie down the thatch cover. (KwaZulu).

(v) The Venda knot. A series of grass bundles secured with a grass rope at the "thick" end and wound tightly into a knot which is parted into three equal parts and then inverted over the roof apex. (Venda, Gazankulu, KaNgwan)。

c. Metal Capping.

(i) Self-made. May consist of corrugated iron bent over a roof ridge and fixed into place with either earth or cement plaster. Other ingenious ridge pieces were recorded in Lebowa where the builders had bent galvanized iron sheeting into shape and soldered various decorative motifs onto them (Widespread usage).

(ii) Industrial manufacture. Various mass manufactured conical cappings are available in the rural areas. Many, once bought, are further decorated by the owners. (Transkei, Ciskei, KwaZulu).

d. Plastered. Some instances were recorded where the waterproofing of the ridge or apex was resolved by plastering the opening over with either earth or cement (Scattered usage).

Doors and windows

a. Industrial manufacture. Such units are generally available to the rural dweller affluent enough to afford such a luxury and are coming increasingly into use as the effects of urbanization ripple out into the countryside.

b. Self-manufacture. The vast majority of rural dwellings make use of
doors and windows in this latter category. The doors are generally of the split or 'stable' type whilst windows are side hung timber shutters.

It should be noted that although this survey has attempted to set out the various methods of rural construction recorded during the course of this study, the list is by no means complete and definitive and indeed, it is doubtful that it will ever be. This chapter has looked at the various technologies partly out of their context aiming only to analyse the building methods and the materials used and not as a means of creating new combinations based on existing know-how. Such experiments should only be attempted by people having knowledge of local conditions and able to assess the various elements of culture, technological know-how and availability of materials as a whole.
CHAPTER 19: RURAL SETTLEMENT PATTERNS

"Our village is not the same anymore since two gents with white suits rolled up"
Wopko Jensma
"OUR VILLAGE"

Historical records, travellers' accounts and archaeological studies all seem to be in agreement on the fact that most of the tribal groupings in Southern Africa at one time built their settlements in the form of a circular plan, usually consisting of a central cattle enclosure surrounded by dwellings and, at times, fortified by an external perimeter of brush wood, stone walling or timber posts. Today the circular settlement has fallen largely out of use due to a combination of changing social, political and economic factors.

a. Social and economic pressures have brought about a decrease in the occurrence of polygamy with a subsequent reduction in the size of the extended family.

b. The fortification and security aspects of the circular settlement became less relevant with the imposition of a pax by white settlers over the region.

c. Changing social values have tended to reduce, in some rural areas, the importance of cattle as a measure of wealth.

d. Greater concentrations of population in the so-called "homeland" areas have reduced the amount of grazing land needed to feed cattle herds of increased size.

e. The policy of relocating rural inhabitants followed by the government of this land has destroyed many traditional settlement patterns where the people concerned, once uprooted, have not been able to re-establish them in their new environs.

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Hottentot settlement: Peter Kolbe (Beschryving van de Kaap de Goede Hoop 1727).

Manier van begraven onder de Hottentotten.
Assuming that the most basic function of the rural settlement was once of defence of the community as a whole and their common wealth in particular, then the circular plan becomes the most obvious solution. The circle offers the builder the largest area which can be contained within the smallest perimeter and for defence purposes it is equally strong at any point of its circumference. The central location of the cattle enclosure ensured that it was under the supervision of the settlement as a whole in times of peace and that the defence perimeter had to first be breached when, in times of strife, raiders might go after booty. Although it should be imagined that the defence of a kraal was a primary function the question was usually resolved when the party under attack simply dispersed its cattle into the surrounding countryside thus usually removing the cause for conflict. The position of the kraal also made it an ideal location for community activities and functions.

It will be seen however that as the extended family decreased in numbers so then did the perimeter of defence shrink in size until ultimately, the defence functions became irrelevant and only the social functions remained. Although no major rural conflict has occurred in South Africa since 1879, it has taken many years for the circular settlement form to fall into general disuse and it may still be found in some areas of KwaZulu today.

During the course of this study it became obvious that current settlement developments required differentiation to be made between the patterns established by the community as a whole and those of the individual.
household or family group.

Community settlement patterns

a. Prehistoric settlements. A large body of research already exists on the forms taken by Southern Africa's prehistoric settlements. Much of this work is of an archaeological nature but as Walton, and more recently, Dr Maggs have been able to show, the buildings of this region's Stone Age and Iron Age periods have much to recommend themselves to the architect.

Aerial photograph. Buffelshoek 471 IQ. Transvaal near Parys.
One settlement of architectural interest which was encountered during the course of this study was that at Buffelshoek 471 IQ, a site excavated by Michael Taylor of the University of the Witwatersrand Archaeological Department and who, generously, has allowed me to make use of it in formulating my personal thinking on this matter.

Buffelshoek 471 IQ is sited on the farm Buffelshoek some 20 km north of Parys and on the northern fringes of the Vredefort Ring. It is the remains of an Iron Age village which was almost certainly erected by
the Southern Tswana probably about the year 1750. As travellers to this area in the 1830's reported finding it deserted and long neglected, it is possible that its inhabitants were either killed or driven off during the Difaqane years. It is part of a chain of settlements in this area which are estimated to have been built within roughly the same period of time. Calculating an average of four persons per hut, it is probable that 471 IQ at its peak was occupied by more than 120 people. Overall it means that the immediate region must have supported between 3000 to 4000 people.

Buffelshoek 471 IQ: second stage of settlement.
Aerial photographs indicate that the average settlement in the area consisted of a central complex of cattle enclosures with the residential area spiralling out from this focal point. The reasons behind the development of a spiral settlement will probably never be fully known. One theory put forward is that when the cattle were brought home at night, they followed the spiral path into the enclosure thus allowing each resident to check that his own property was still intact and on the hoof. Although this cannot ever be anything more than conjecture, the

Figure 146. Buffelshoek 471 IQ: final stage of settlement.
shaping of some of the settlement's internal walls and those of the cattle kraal itself at 471 IQ seem to support this idea.

Buffelshoek 471 IQ appears at first glance, to be a deviation from the form of neighbouring settlements in that it resembles not so much a spiral as it does a "figure of eight". Closer inspection however reveals that it is in fact composed of three different spiral settlements which, through a slow process of growth and amalgamation, have merged into the present form.

The extent to which the three settlements coexisted is not known. Certainly the period of time concerned is too brief to be assessed accurately by current radio-carbon dating techniques and other clues must therefore be sought and assessed. It is at this point, I believe, that the architect is now able to make a contribution, not necessarily as a scientific researcher of fact, but as an evaluator of known information.

Assume a situation where settlement K1 is built, consisting of five bilobial dwellings, a small cattle enclosure and housing not more than approximately twenty persons, its waste being disposed of in a small midden area found just to the east of the settlement. As the family group grows so then does its wealth and its holding of cattle. This necessitates the building of further and larger cattle enclosures. The present kraal does not lend itself easily to expansion and modification and thus the group moves one hundred metres further up the hill into a slightly more sheltered position where K3 is begun.

The second group K3, is believed to have consisted of approximately 15 bilobial dwellings housing some sixty persons and its waste materials were disposed into various midden areas scattered about the perimeter of the walls. The presence of two small middens to the south of the K3 kraal would seem to indicate that at that point in time no further settlement existed to the south of K3 and that therefore it was permissible to dump one's waste there.

The settlement at K3 in its turn is subjected to new growth with an accompanying increase in the number of heads of cattle in its core. New cattle enclosures are thus begun at K2, being the largest and most ambitious to date. At the same time a central gathering place (at A) is built and paved with broken pottery shards. The walls to the south of K3, now being obstructions, are robbed extensively as are the walls of the now deserted K1, to form new walls, as the perimeter of the settlement grows southward. K2 however never reaches full completion. There are no sizeable middens to the south of it, the wall perimeter is not finished and four cairns of stones, probably laid ready

Figure 147.
Figure 148.
Figure 149.
for construction, are found within its confines whereas none are found near K1 or K3.

Accepting the present radio-carbon dating of 471 IQ, then the settlement's existence was terminated suddenly and probably violently in or about 1822, the years of the Difaqane, as evidenced by the discovery of burnt huts and shattered whole pottery during the course of archaeological diggings there.

b. The Venda fortified village. In traditional Venda society, the chieftainship was not necessarily hereditary from father to son but was elective and the new chief could be chosen by the two people nominated to the task from any one person within a small select circle. This often led to breakaways as one or other group attempted to wrest the chieftainship from the rightful claimant by force. We find therefore that the chiefs of the Venda built for themselves villages which were sited on sharply sloped hillsides and, aided by careful terracing, fortification and camouflage, were able to withstand almost any attack.

The fortified village of Mukumbani near the Donald Fraser Hospital was approached through the "Khoro" or gathering place. An initial flight of stairs led the way past the first of several sentry boxes and then ascended slowly up the hillside as a broad footpath. From the onset the whole area proved to be heavily wooded. As the path wound its way upward it passed first the place of slaughter and then branched off into two, the upper path continuing to the chief's quarters and the lower one running with the contour and leading up to the wives' quarters. Soon after this point the way narrowed considerably and progress was only achieved through a series of narrow passages, and hidden steps carved in the hillside. It would not have been difficult for one man armed with shield and stabbing spear to hold any one of these places singlehanded against attack. However once the chief's quarters were reached it did not seem that provision had been made for an emergency escape should the contingency have arisen.

c. The Zulu Royal Kraal. A fact which is not generally recognized is that the Zulu built two different types of settlement: the Royal Kraal and the domestic homestead and whilst they both shared the same plan form, they differed vastly in scale and purpose.

The Zulu Royal Kraal was essentially a military barracks, being circular in form and having a central enclosure where the drilling of the regiments could take place. Cetshwayo's kraal named Gingindlovu (he-who-swallowed-the-Elephant) had at its head, according to a