The History, Form and Context of the 19th Century Corbelled Buildings of the Great Karoo

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Thesis presented for the the degree of Master of Philosophy
in the Department of Archaeology
University of Cape Town

February 2012

Slingersfontein

PLAGIARISM DECLARATION

I know the meaning of plagiarism and declare that all of the work in the thesis, save for that which is properly acknowledged, is my own.

ABSTRACT

The major objective of this thesis was to record, document and describe the corbelled buildings of the Great Karoo, a form of 19th century vernacular architecture. The thesis builds on the pioneering descriptive work of James Walton in the 1960s. Description of these structures lays the foundation for a more contextual interpretation of them. This focuses on the 19th century trekboer small stock farmers who occupied these buildings, and whose cultural history dates back to their 18th century movement onto the VOC Cape frontier that resulted in ongoing interaction with indigenous people and the Karoo habitat. The thesis specifically suggests that these corbelled buildings were an outcome of these cultural exchanges and interactions with Khoe and southern Sotho-speaking farmers. The research examines evidence for the chronology of these structures between the 1820s and 1870s, reasons for their discrete distribution in the Karoo and the engineering of construction. A typological scheme is constructed that provides a basis for a discussion of how the corbelled structures, and consequently, the domestic dwelling unit, was expanded and changed with additional structures in the later 19th century. This is discussed in the context of the rapid growth of the merino wool export economy and the influence of this on changes in the domestic structure of households. The typological scheme will also enable future researchers to assess the main features of corbelled buildings quickly and efficiently. Problems regarding the conservation of these buildings are discussed and some suggestions made for future research.

ACKNOWLEDGMENTS

This project would not have been as successful and enjoyable without the assistance of a number of people. My husband, John, drove us everywhere, negotiating some really dreadful roads along the way. He also took most of the photographs and helped me to create the digital maps and organogram. Dr Judy Maguire accompanied us on our field trips and, apart from having personal contacts all over the Karoo, was a source of information on many topics, including the geology and botany of the Karoo, and many lively discussions took place in the course of the field trips. A field trip with Vernacular Archaeology Society of South Africa in 2006 introduced me to corbelled buildings and once this project got under way members of the Vernacular Architecture Society helped measure the buildings. Thanks to them for their sterling work under sometimes quite difficult conditions. Thanks to Nigel Amschwand for his detailed field drawings, to Celeste Scholtz-Burger for using her family's farming connections in Loxton to get us started and Val Taylor and Ralph Malan who helped with the measuring. Dr Antonia Malan, apart from producing excellent field diagrams, read and commented on this thesis and gave advice on the organisation of references and the bibliography. Dr Simon Hall, my supervisor, proved to be a constant source of inspiration as he directed me down new avenues of research. His meticulous notes and comments on the thesis are greatly appreciated. Finally, thanks must go to all the farmers who allowed us onto their farms, and in some cases, took time off from their busy day to guide us to isolated corbelled buildings.

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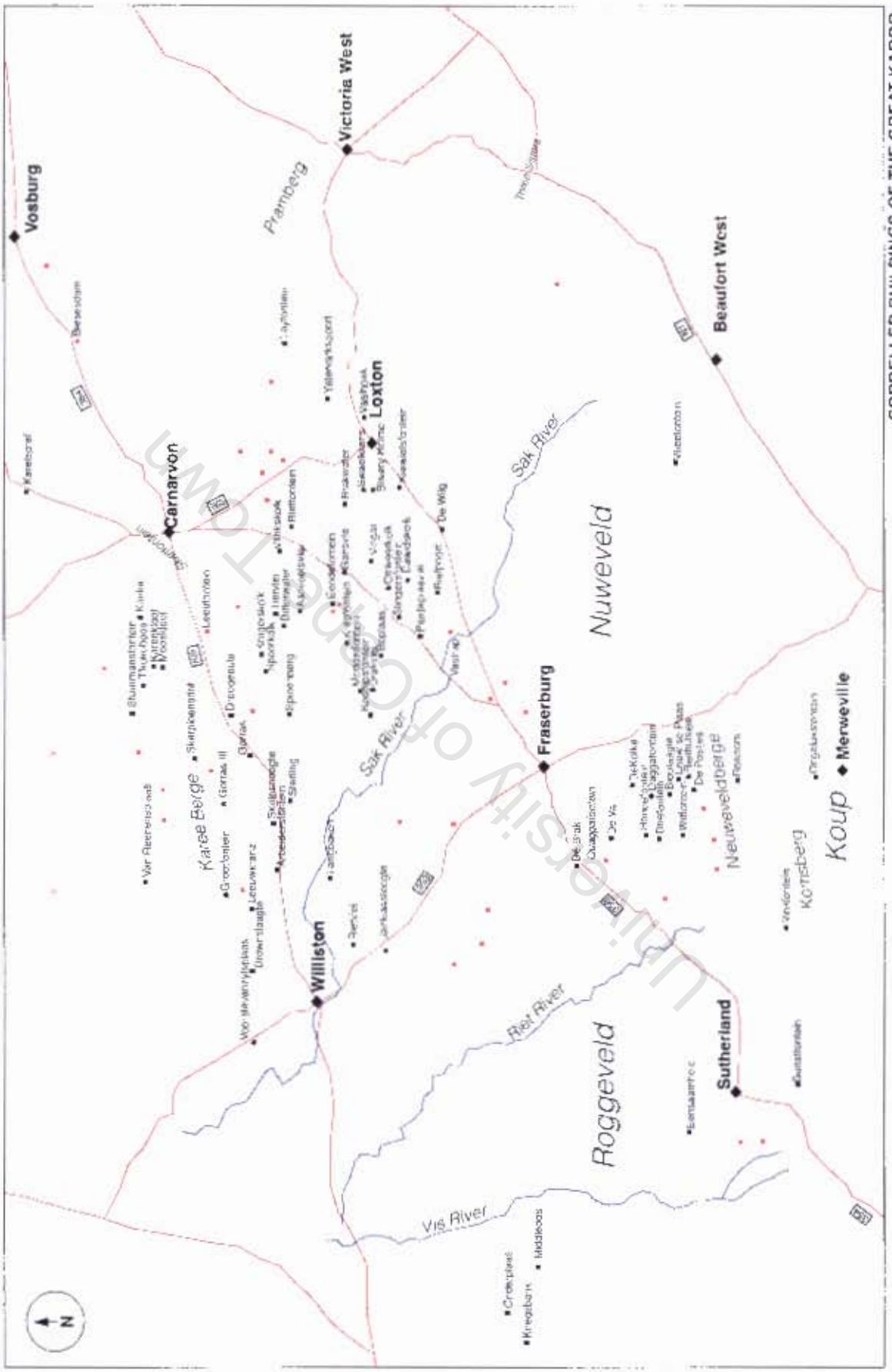

Figure P.1 Corbelled buildings of the Great Karoo.

CHAPTER ONE

INTRODUCTION

In 1959 James Walton, an expert on South African vernacular architecture, was asked by B.D. Malan, then secretary of the Commission for the Preservation of Natural and Historical Monuments, Relics and Antiques, to investigate corbelled buildings in the Karoo. It is worth quoting from Malan's letter:

> The Commission has been asked to take some action to preserve one or more of a peculiar type of 'rondawel' of which some examples still exist in the district of Williston, Cape Province. I enclose a translation of a report we have received from the Magistrate of Williston and also a small photograph which gives some idea of the appearance of one of them.
> We feel that there is no great urgency to protect these rondawels or a specimen of them, but would appreciate your comments and would be glad if, when you have an opportunity, you could visit the place and submit a report. Unfortunately Williston is somewhat remotely situated between Calvinia and Carnarvon in the country east of Victoria West and I find it difficult to imagine a reason for a visit to those parts.[1]

Malan, probably immersed in cultural history which was an important focus in the 1950s and 1960s, had a somewhat dismissive attitude to the corbelled buildings, clearly regarding them as relics that could await attention until someone found the time to pass that way – in fact, the Karoo itself appeared to be a place not really worthy of making a special effort to visit.

Walton, however, was obviously intrigued because he visited the corbelled buildings the following year and submitted a report, as a result of which Arbeidersfontein, Stuurmansfontein, Gorras, Grootfontein and Schuinshoogte were declared National Monuments in the 1960s. In his report (1960) Walton describes the 16 buildings which he visited, many accompanied by diagrams, and lists other buildings which he had been told about by local people. He was clearly impressed by the large, imposing buildings such as Stuurmansfontein, as the declared buildings were all large, impressive examples of corbelled buildings. He describes his first view of a Karoo corbelled building as follows:

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[1] Letter to James Walton from B.D. Malan dated 4th May 1959, a copy of which was found in Walton's album, now stored at Stellenbosch University in the G,S, Gericke Library (Ref. 247.D.1.). Copy in Appendix II as well as copy of the original report from the magistrate in Williston.

> I have studied the corbelled huts of Italy, France and Britain and I fully expected the Karee Berge buildings to be similar to the less imposing examples from these parts of Europe. I was both delighted and amazed, therefore, with my first distant glimpse of Stuurmansfontein as we passed through the nek overlooking the farmstead. It nestles in an amphitheatre of basalt hills crowned by pinnacles of glistening patinated black columns eroded into gaunt fantastic shapes. Against these burnt semi-desert surroundings, which had seen practically no rain for four years, the tiny whitewashed homestead stood out clearly in the brilliant sunshine. Even at this distance the giant stone beehives were a strange and fascinating sight: one which I had never expected in South Africa and almost as remarkable as the beehive villages of Alberobello, Gordes or Tel Bisseh.... (Walton, 1960: 2).

Since the 1960s a further five buildings have been declared National Monuments, but research on corbelled buildings remained stalled for 50 years after Walton's report, probably because there were more "important" buildings to be dealt with than the humble architecture of isolated rural people. This lack of interest is explained by Merrington (1998/9) quoted in an article by Malan (2004: 18): "Perhaps the most abiding architectural contribution of national identity at the time of Union in 1910 was the rediscovery and restoration of Cape Dutch homesteads and their adaptation into a new architectural idiom for the new state, known as the 'Cape Dutch Revival'".... "A theme emerged from this intense study, that is that the Cape Homestead represented the vernacular essence of establishment, progress, vision, cultivation: in sum, the will to plant, build and define a nation". Later in the 1960s this fixation on Cape Dutch buildings continued: "...the Historic Monuments Commission continued to define South Africa's heritage mainly in terms of its White, Cape origins" (Malan, 2004: 20).

In addition, the approach at the time was primarily one of conservation and with a number of corbelled buildings now protected and Walton, having declared them to be the abodes of colonising trekboers, attention was concentrated on other areas. Since Walton's initial descriptive work new approaches to archaeology, and specifically vernacular architecture, has opened the field for a new look at the corbelled buildings as part of the colonial 19th century social history of the Great Karoo.

Interest in the corbelled buildings was revived in 2006 when the Vernacular Architecture Society of South Africa visited some corbelled buildings on a field trip. In 2008 members started a project to locate and record as many of these buildings as possible, with the help of

Walton's album (n.d.) and information gleaned from farmers in the Loxton district who had connections with the Vernacular Architecture Society.

Karoo frontier

In recent years researchers have begun to turn their attention to this neglected region, not only because the buildings are disappearing, but because historians and archaeologists have shifted their approach from "conservation" to "research" and are showing increasing interest in understanding the "frontier" and the meaning of "frontiers" and "boundaries" and their link to identities. The corbelled buildings of the 19th century Karoo are a vernacular expression of these dynamics.

Research on frontiers and the ensuing contact between peoples with different economies and identities is also taking place in other parts of the world where "outsiders" moved into areas already occupied by indigenous people. One example of this is the interaction between Russian traders and local Indians at a 19th century Russian trading outpost in northern California (Lightfoot & Martinez, 1995: 484). The topic of frontiers and cultural contact is of particular interest in South Africa where history has been adapted and distorted for many years and the "frontier" has been associated with the Great Trek and the ensuing 'Bantu, Boer and Briton' battle (Penn, 2005: 10). Against this background, the northern frontier of trekboers slowly moving forward through the Karoo encountering indigenous San and Khoekhoe along the way was ignored. "For the time being, the rather obscure early eighteenth-century frontier of trekboer expansion was forgotten" (Penn, 2005: 10) in the face of the "drama of the Great Trek" (Penn, 2005: 10).

Frontiers are not stable places nor do they necessarily follow the official lines of the boundaries drawn on maps. The trekboers, who moved north into the Karoo, formed a moving, mobile frontier which totally ignored the formal boundaries set up by the 18th century Dutch East India Company (VOC) and later by 19th century British authorities. This constantly moving frontier lurched forward and retreated repeatedly in the area for a hundred years, from about the 1740s and 1750s until the final farms were granted in the Kareeberge area in the 1890s and the area was fully settled with no place for indigenous peoples, except as labourers.

This northern frontier in the Karoo is an ideal area for the study of frontiers and the resultant culture contact between the colonial trekboers and the indigenous people because this contact took place over a long period of time in an area which remained 'open' for many years and contact was, therefore, not confined to a small area or a compressed time period.

The meeting of coloniser and colonised was punctuated by intermittent outbreaks of violence. Nevertheless, cultural contact resulted in entanglement or "cultural cross-pollination" (Frescura, 1985: 91) and this project considers "cross-pollination" in relation to indigenous architectural change. Entanglement is the process whereby people of different cultures adopted behaviour or material objects from other cultures. Ideas moved in both directions, from the colonists to the indigenous people and vice versa. The opinion that "the transmission of most cultural innovations proceeds from the dominant center to the passive periphery" (Lightfoot & Martinez, 1995: 472) is not appropriate in this context. From the second half of the 18th century people lived in close contact with one another in the Karoo, often in the form of master and servant, and it is logical that knowledge about living there would pass back and forth between groups. Consequently, while this project is predominantly a descriptive account of corbelled buildings of the Great Karoo, they are located in the centre of an area which was in flux and a moving frontier of entanglement even as that frontier closed from the mid-19th century. The corbelled structures of the Karoo are a vernacular architecture that reflect this situation.

Vernacular architecture

Corbelled buildings are typical vernacular buildings – they literally rise out of the ground, built from the very materials as the landscape itself, so much so that unless they have been painted white, it is almost impossible to see the buildings, so thoroughly do they merge with their surroundings (Fig. 1.1).

Vernacular architecture is defined as those buildings which are not designed formally by architects and do not rely upon imported materials. They are instead structures which are built from the materials available in the surrounding environment. One definition is: "Building in indigenous styles, constructed from locally available materials, following traditional building practice and patterns, and not architect-designed". Another definition defines it as: .... "Architecture built to meet specific needs, accommodating the values, economies and ways of

life of the cultures that produce it (VASSA, 2010). The builders had to use the raw materials available to them. This, combined with the tools at their disposal and whatever knowledge or experience was available to them in the community, provided for the very basic human need for shelter.

Figure 1.1 The corbelled building at Koppiesfontein is almost invisible in the surrounding environment.

A description of what vernacular buildings are *not*, also helps to explain clearly what they *are*: "They are quite distinct from those buildings whose design is dominated by a concept such as power of mystery, which are designed by professionals according to rules agreed by theorists in academies, and which are built of materials selected the better to match the concepts enshrined rather than simply to take advantage of which might be lying around waiting to be used" (Brunskill, 1981: 21). But as Fresoura (1985: 61) points out, although people are somewhat limited by the building materials available to them, what he calls "pre-determination", "it is equally true that man the builder reserves and often exercises an option in the resolution of certain key details in the design of his dwelling". This is the reason for the individuality of every corbelled building.

In South Africa vernacular architecture is expressed in many forms and shapes in various parts of the country. The vernacular architecture of the indigenous peoples is a study of its own, already dealt with by Fresoura (1985), while the vernacular architecture of white settlers appears, until recently, to have been largely ignored, except in the case of Cape Dutch architecture and a few other notable cases such as the research on dwellings of 1820 settlers in the Eastern Cape (Winer & Deetz, 1990) and the longhouse dwellings around the Verlorenvlei

in the Western Cape (Gribble, 1987). The vernacular architecture of the Karoo is rich in stone structures and it is only recently that a start has been made in their documentation. This is timeous because, either through natural forces, or as a result of destructive ignorance on the part of the landowners, this historical resource is seriously threatened.

Corbelled buildings in the Great Karoo

The subjects of this thesis are the corbelled buildings of the Great Karoo. They are located in a fairly limited area and this distribution can be attributed to a combination of environmental factors, the chief of these being the availability of suitable stone and the total lack of trees for roof beams (see Chapter Three). However, although the environment played a vital role, it does not address the significant question of their origins and influences. Additionally, the issue of who lived in these buildings is possibly very different from the historical substrate that gave rise to their construction.

Figure 1.2 Map showing distribution of the majority of the corbelled building as well as the few "outliers" (indicated with dots).

The majority of the structures occur in a roughly rectangular area (Fig. 1.2), although a few fall outside this area towards the Sutherland district in the west. I visited and recorded over 100 buildings in this area. While they conform to the essential construction principles which keep a dome standing, they do show a great deal of stylistic variability. The raw material limitations alone do not address the origins of the corbelled form and a significant question this thesis addresses is that of origins and influences beyond the environmental.

Corbelled buildings worldwide

Corbelled buildings have existed in certain parts of the world for thousands of years - circular settlements at Skorba, Malta have been dated at 4850BC and corbelled buildings were built throughout the Mediterranean and Middle East, as well as Britain over the centuries (Juvanec, 2000: 2). The trulli of southern Italy (16th century), cabane of France (17th century) (Fig. 1.3) and barraca of Spain (17th century) are well known, as are the corbelled buildings (clochan) of Ireland, the most famous being those at Skellig Michael where Irish Christian monks lived from the 7th century for 600 years (UNESCO, n.d.) (Fig.1.4). Corbelled buildings are still constructed to this day. Modern corbelled buildings are found all over Egypt and locally a few farmers in the Karoo have constructed corbelled buildings to use for storage or as cool rooms.[2] The one factor which corbelled buildings around the world have in common is that they all occur in environments in which there is a lack of timber for roof beams, that is, they are a common response to a particular problem.

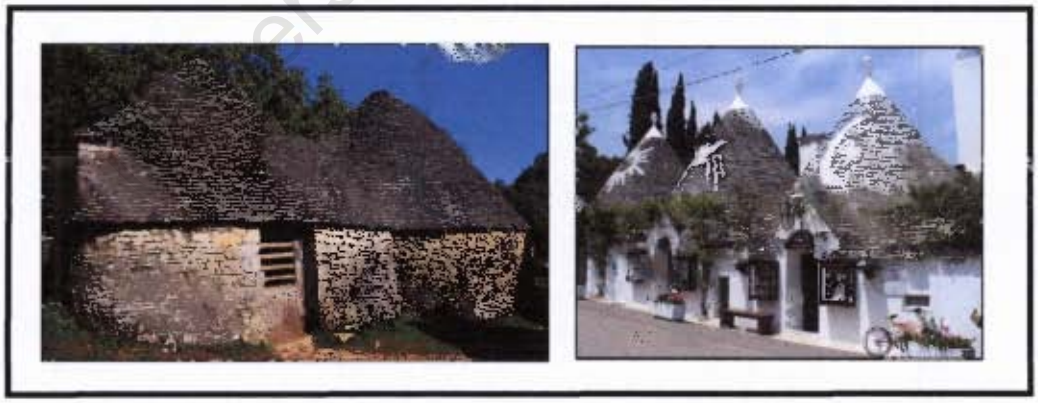

Figure 1.3 Examples of European corbelled buildings: cabane of France *(left)*, trulli of Puglia in southern Italy *(right)*.

[2] Mr Gert Maritz of Hondefontein, Fraserburg, is just one farmer who constructed his own corbelled building when he needed a cool room.

Figure 1.4 Corbelled building at Skellig Michael, Ireland, which would not be out of place in the Karoo.

Quite clearly, the principle of 'equifinality' could indicate that the practice of corbelling is a disconnected common response. "In archaeology, equifinality refers to how different historical processes may lead to a similar outcome or social formation...generalizations based on cross-cultural comparisons cannot be made uncritically" (Wikipedia, n.d.). One of the questions which arises in regard to origins and influences in the construction of the corbelled buildings in the Karoo, is whether corbelled buildings in other parts of the world were observed by colonists and the idea introduced to the Karoo. However, if the cross-pollination between indigenous architectural traditions and European influence in the creation of the corbelled buildings of the Karoo has to be considered, then it is also valid to *consider* the theory of equifinality, or a spontaneous invention of corbelling without any outside influence.

Written sources

The builders of corbelled structures in the context of the 19th century Karoo did not write down or describe their daily activities, although many could read and write. As a result the lives of these rural people is hugely under-documented and, until fairly recently, largely ignored. Despite extensive searches in libraries and museums both my myself and Judy Maguire, a fellow researcher in the Karoo, not one piece of contemporary 19th century writing by the trekboers of the Great Karoo could be found which described their day-to-day activities. Information about trekboers has to be gleaned from the records of outsiders who were in the area at the time, but not partaking in trekboer activities themselves.

One source of contemporary information is the official reports of the VOC company officials, and later British government officials, as well as the reports of the activities of official commandos which were assembled to track down and brutally deal with the San or Khoisan who were plaguing the settlers. The commando reports are useful in that they name farms that the commandos visited as well as farmers who took part in the commandos, thus giving some idea as to how far beyond the official boundary trekboers had already claimed and named farms. Other sources of incidental official information are to be found in the perpetual quitrent grant records at the Surveyor General's Office, and the Inventories of the Orphan Chamber of the Cape of Good Hope (Cape Archives MOOC8), which give some idea of the personal possessions of the trekboers.

Another source of contemporary information comes from books written by the early European travellers in the area. Unfortunately, the Great Karoo, being such an inhospitable environment, tended to be avoided by most travellers. Travellers such as Henry Lichtenstein in 1803 and William Burchell in 1811 made extensive written observations on the landscape, animals and people they encountered and they did provide some descriptions of the type of shelter which the trekboers were using.

While Karoo vernacular architecture is almost invisible in 19th century sources, 20th century literature that discusses corbelled buildings in the Karoo in any depth is also limited. Only three writers have written on the topic in any depth. They are James Walton, G. Van der Waal-Braaksma and O.J.O. Ferriera. The latter two jointly authored *Die Noordweste* (1986), a book which deals with various aspects of the early farming culture of the north west Karoo (an area reaching from Namaqualand into the Karoo as far as Fraserburg (Fig.1.2), in which there is a chapter on corbelled buildings.

James Walton left a remarkable legacy of books and articles on vernacular architecture in southern Africa. His initial work dealt with the vernacular architecture of indigenous peoples living in Lesotho, the Free State and eastern Transvaal (now Mpumalanga). From about 1960 onwards, he became involved in the vernacular architecture of the then Cape Province, writing extensively on various aspects of it and his books are still sought after as valuable references on local vernacular architecture.

In addition to his report of the investigation of corbelled buildings in the Karoo, which he undertook at the behest of the then National Monuments Council, Walton made a second visit to the area in 1964 and then created an album, in which he listed all the buildings he had seen, some with photographs and diagrams, as well as many he had been told about, but had not had time to visit. It is this album, now stored at Stellenbosch University, which formed a useful starting point for this project (J.S. Gericke Library Ref 247.D.1). Walton also discussed corbelled buildings in a number of his published books, for example *Old Cape Farmsteads* (1989).

Considering his limited time in the field, Walton's output is admirable. He produced a piece entitled *Early Settlement in the Great Karroo* (n.d.), a brief history of the trekboers, and came to the conclusion that "when the first farmers settled in this part of the Karroo at the beginning of the nineteenth century their first homes were single stone beehive, either circular or rectangular in plan" (Walton, n.d.: 4). I consider the chronological evidence for the corbelled buildings in more detail in Chapter Two.

Walton proposed three possible origins for the buildings. He first considered the suggestion that they were built by the "Ghoya", Sotho-speaking builders of corbelled structures on the Highveld, with which he was well acquainted (Walton 1956, 1965). He dismissed this possibility of origins because: "...the Ghoya huts are small, roughly constructed structures which are not comparable in any way with the fine corbelled buildings in the Karroo" (n.d.: 12). It is quite clear that he saw the colonial and indigenous building traditions as completely separate. His second possibility was that they were the "invention of a local settler". This, too, was dismissed as he found "no indication of experimentation and development" (n.d.: 12). His third, and favoured, suggestion, was that someone who knew corbelling building techniques from Europe came into the area and taught this style of building to local people. In his opinion "...the corbelled buildings in the Karroo represent one of the most interesting regional developments in South African vernacular architecture" (n.d.:12). As indicated, this issue of origins is a theme that is returned to throughout this work.

Corbelled buildings are mentioned by two other writers. Anonymous (probably a land surveyor) described a corbelled building at Onderste Doorns in about 1869-1870:

> Those [houses] at Onderste Doorns are models of ingenuity in their way. Materials for roofing being scarce in this part of the country, the difficulty is surmounted by throwing brick arches over the stables and out rooms, while the centre chamber, used as a corn-mill, being inconveniently large for a common arch, is domed (Schaefer, 2008: 155).

A second, Karel Schoeman in his book *Die wereld van die Digter* (1986), also mentions a corbelled building, this time on the farm Gunstfontein where he describes the accommodation provided for the Baadjes family just after the Boer War:

> Die posisie van Februarie Baadjes op Gunstfontein het die voordeel ingehou dat hulle ten minste die vensterlose karbeelhut eenkant van die opstal mog bewoon, wat hulle vir hulle ingerig het met 'n paar stoele, kissies, en bedde van velkomberse op die grond (1986: 129).[3]

The large corbelled building at Grootfontein was still occupied by the present owner's parents in the 1940s (Nico Hodgson, pers.comm.), Vlieëfontein was occupied by a Mrs Marais until 1916 (Shearing, 1977)[4] and Brakwater was occupied until the 1940s (Dries Wiese, pers.comm.) and some are still occupied by farm workers to this day. The question is not when they stopped being occupied, but when construction stopped.

A few writers have described daily life in the 19th century Karoo. The trilogy of books on trekboer life by Van der Merwe offer invaluable background information (1937, 1938, 1945, 1995). There are a few other books which provide additional 'feeling' for the subject, books such as *Karoo* by Lawrence Green (1955) and *Land of the Thirst King* by Willem Steenkamp (1975). Even texts such as *The Breath of the Karoo* by L H Brinkman (c. 1914) – "a story of boer life in the seventies," provides some background against which the architecture can be set. Interesting facts can also be found in books such as *Fraserburg en sy kerk* by D.A. Scholtz (1976).

Information about early farming and its effects on the environment, specifically as a result of the introduction of merino sheep as the 19th century progressed, is provided by Beinart (2003) and Talbot (1961), a geographer, who described water utilization in the arid areas of

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[3] The position of Februarie Baadjes on Gunstfontein came with the privilige that they could at least, occupy the windowless corbel hut on one side of the farmyard. They furnished it with a pair of chairs, kists (boxes) and bedding of skin blankets on the floor.

[4] Letter from Taffy Shearing to James Walton dated 2 March 1977. J.S. Gericke Library, Ref. 247.D.1.

South Africa. Water played a key role in the settlement of the region, so it is important to understand the different means of obtaining water from what is, to the naked eye, a dry land. The *Tydskrif vir Volkskunde en Volkstaal* carried numerous articles on the topics of *bakkiespompe*[5] and *putte*,[6] as did an invaluable chapter in Van der Waal-Braaksma and Ferreira's *Die Noordweste* (1986).

These are just a few examples of the kinds of material which provided useful background information against which to set the corbelled buildings. All of these sources, however, deal only with white settlers in the Karoo and San, Khoekhoe and Bantu-speaking peoples are only mentioned in passing.

Literature which adds balance to the picture of the history of the Karoo and adds indigenous people to the mix of population in the area is scarce. Penn's book on the history of the Roggeveld area, *The Forgotten Frontier* (2005), has been the most valuable for setting the historical background of cultural conflict in the area – settlers (white and Bastard) versus the indigenous San and Khoekhoe – and although he deals mainly with an area slightly to the west of the Great Karoo, the same problems spilt over into the central Karoo.

One work which does not deal with the corbelled buildings of the Karoo is Frescura's huge and comprehensive doctoral thesis *Major developments in the rural indigenous architecture of southern Africa of the post-difiqane period* (1985). Frescura makes brief reference to corbelled buildings built by Sotho-speaking farmers, but makes no mention of the corbelled buildings of the Great Karoo. This omission perhaps indicates that he sees no connection between the two groups of corbelled buildings and regards the Karoo buildings as solely a European creation with no connection or input at all from indigenous peoples? He certainly appears to make a clear distinction between indigenous vernacular and vernacular buildings built by Europeans or settlers and makes no connection between the two groups of buildings.

The ruins of corbelled buildings built by Sotho-speaking people have been found and studied in the Free State and Mpumalanga. Walton initially wrote about stone corbelled buildings in the northern Free State which he attributed to the Ghoya. His book, *African Village* (1956)

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[5] *Bakkiespomp*: bucket pump system powered by a donkey.

[6] *Put*: pit, usually dug through bedrock down to the water table.

and his subsequent article, "Early Ghoya settlement in the Orange Free State" (1965), are valuable sources of information on the indigenous corbelling building tradition. The research by Maggs, *Iron Age Communities of the Southern Highveld* (1976), provides a much more comprehensive examination that places the corbelled huts in the much wider scheme of settlement organization.

Structure of the thesis

As a result of the lack of direct documentary evidence about Karoo corbelled buildings, the focus of research on these structures has led to an archaeological approach. This focusses on the method of construction, the sequence of construction and typological variation as stepping stones to assessing the social implications of their mute and menial status. However, even though direct documentary evidence is lacking, there are other records from which the general historical background of the area can be constructed so that the corbelled buildings can be placed in their historical context.

Deetz (1988: 363) expresses this opinion as follows: "...archaeologists should seek explanations for their data in terms of the known history of the region and time represented by their material. Such explanations can then be used to frame further questions to be asked of the archaeaological data, and the answers to these questions again formulated with the historical record in mind". He also points out the value of archaeology to the historical record. First it provides information about people who are not described in the historical record, and secondly, it deals with the commonplace. Since vernacular buildings do not have architects or plans, information regarding the buildings and their place in society needs to be revealed by careful analysis of the building and its surroundings. "There is sufficient documentary evidence to inform the archaeology, but not in such a quantity as to make archaeological analysis a weaker component in the total research design" (Deetz, 1988: 367).

Using careful observation and analysis of the buildings set against a background of historical records, this research project on vernacular corbelled buildings seeks to answer questions about the origins of the buildings, including the implications of entanglement with indigenous peoples, practical issues such as the construction of the buildings, piecing together a chronology and the social implications of the original structures and their extensions.

Furthermore, in addition to merely measuring and mapping the buildings, it became apparent that this collection of buildings was an invaluable source of information about life in 19th century Karoo which is under-documented. An archaeological approach became critical in order to flesh out the scanty historical and cultural records. This, in turn, led to this research project.

In Chapter Two I examine the historical background against which the construction of the corbelled buildings can be placed. Here I discuss the history of the trekboer movement and its eventual arrival in the Karoo, the other cultural groups present in the Great Karoo at the same time and the possibilities of cultural cross-pollination, as well as setting out the legal situation with regard to land ownership. The attitude to land and whether it could be sold or bequeathed no doubt had an effect on the way land was viewed by the stockfarmers. I conclude this chapter with a review of evidence that provides a more precise chronology for the corbelled buildings.

Chapter Three sets out the environmental conditions of the Great Karoo, conditions with which all the inhabitants of the area had to deal. Most importantly for this thesis, the geology provided suitable building stone, but harsh climate did not allow for the growth of substantial or plentiful trees for timber. These are key factors in the construction of corbelled buildings throughout the world. The interconnecting roles played by the geology and the availability of water is also discussed.

In Chapter Four the construction of the buildings is dealt with in detail. I set out the principles and engineering which keep a corbelled building standing and then go on to discuss the raw materials used in the construction of the buildings. Apertures (doors and windows) as well as features (shelves, niches and hooks) are discussed.

This extensive field research has led to the realisation that not all corbelled buildings are the same – that there is significant variation in style, size and function. Chapter Five deals with the question of variability and I present a typology for the buildings in order to create some order out of a diverse collection of buildings of various shapes and sizes.

A number of the corbelled buildings have extension buildings attached to them. In Chapter Six each extension is described and analysed as the extensions provide information about the way in which the settlers wished to present themselves. Extensions also provide evidence for changes in domestic behaviour.

In Chapter Seven, I summarise all the information which this project has revealed and set out my conclusions.

Chapter Eight focusses on the future of the corbelled buildings and other vernacular architecture in the Great Karoo. These are subject to damage on two fronts, from nature and from farmers who do not realise their historic value. With regard to the latter, I make suggestions to improve the situation.

Winer and Deetz sum up the aims of historical archaeology as follows: "In the last few years historical archaeology has become an important tool in the delineation of many aspects of South African history and promises to provide a more objective, less value-laden account of the past" (Winer & Deetz, 1990: 55). Hopefully, this project will go some way towards achieving these aims.

CHAPTER TWO

THE TREKBOER FRONTIER

This chapter sets out the historical background against which the presence of the corbelled buildings must be viewed. As a rationale, one of the problems with the vernacular structures is that form and function have dominated over historical context. The buildings have tended to be treated as specimens and described rather than placed into a detailed historical framework. This chapter comprises a discussion of all the groups of people on the scene at that time, the legal situation with regard to land and buildings and a review of the comments of 19th century travellers who passed through the region.

The drive northwards

> His [farmer without land] usual course, we have observed, is to migrate to the frontier. A very limited capital will enable a man to begin the world as a *vee boer*.[7] He purchases, say
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> An old waggon for about..... 350 rix dollars
> A span of ten oxen..... 150
> A horse and two mares 200
> Fifty cows and young cattle 500
> Five hundred sheep and goats 1000
>
> Rix dollars 2200
>
> The above, with a large gun, an axe, adze, and hammer, a couple of waggon-chests, a churn, a large iron pot for boiling soap, and one or two smaller ones for cooking, are all that is absolutely requisite to establish a stock farmer in South Africa.
> With this property, he marries a wife, hires a family of Hottentots, and drives forth into the wilderness. Water and pasturage are his first objects. He encamps near some unoccupied fountain, pool or river, changing his station according as necessity or inclination may require, until he at length finds some eligible spot, where he thinks he can advantageously fix himself (Thompson, Vol. 2, 1827: 133-135).

Controlled from the rear by the VOC, the trekboers formed a moving frontier. In terms of its cultural underpinnings and practical knowledge, trekboers had to learn and adapt to a completely new environment, and much of this knowledge was gained from indigenous Khoe small stock pastoralists. Being a trekboer was not a mentality that had been imported intact –

[7] *Vee boer*: stock farmer.

it was a product of the frontier. In this way the frontier was a place of creativity and innovation.

The trekboers also gradually enveloped or destroyed the indigenous peoples they came across along the way. This was brutally expressed in the destruction of the Khoesan, but equally the relationship was one of exchange and cultural borrowing and interbreeding. Lichtenstein (1812: 74) reports on one case of cultural borrowing that he observed:

> At some distance from the Cape Town, the slaves, and upon the borders, even the children of the colonists are clothed in leather prepared by themselves, and there is abundance of plants which afford excellent materials for tanning. Even the savages of Southern Africa are very adroit in preparing leather, and have the art of giving it an extraordinary pliability. In the houses of the colonists, the seats of the chairs, and the frames of the bedsteads are generally made of leather.

As Lightfoot and Martinez (1995: 473) put it "...when colonists began encountering other people in a more consistent and insistent manner, one person's homeland may have become another's frontier". Frontiers are not fixed borders or boundaries, but fluid as settlers move through the landscape in an irregular manner, not in a straight, rigid line, but rather groupings around good water sources. On occasion they even retreated in search of rain or pastures to an area they had previously visited. The importance of the frontier lies in the fact that it is an area in which various cultural groups make contact with each other, in other words a "zone of interaction" (Lightfoot and Martinez, 1995: 473) develops.

The underlying factor which drove the trekboers and the frontier northwards was livestock. Sheep pastoralism was their source of livelihood and the welfare of the herds resulted in a constant search for water and pasture. The colony expanded northwards through Tulbagh, the Olifants River Valley up to Koue Bokkeveld, through the Ceres Karoo to the Roggeveld and Hantam, where "grazing licences" were granted in the 1740s (Fig 2.1).

The conditions attached to these grazing licenses had changed considerably over the years. Initially, in the early 18th century, the area covered by the license was vague and imprecise and they were granted rent-free. This system evolved into one in which payment of six rix dollars, a tithe of any crops grown and annual renewal of the rent subsequently became the norm. In 1732 a new form of tenure was introduced, in terms of which the land was leased for

15 years at an annual rent. However, the lease conditions now clearly stated that if the VOC reclaimed the land, the farmer would only be compensated for "the mere buildings or plantations at a proper valuation" (Botha, 1962: 84).

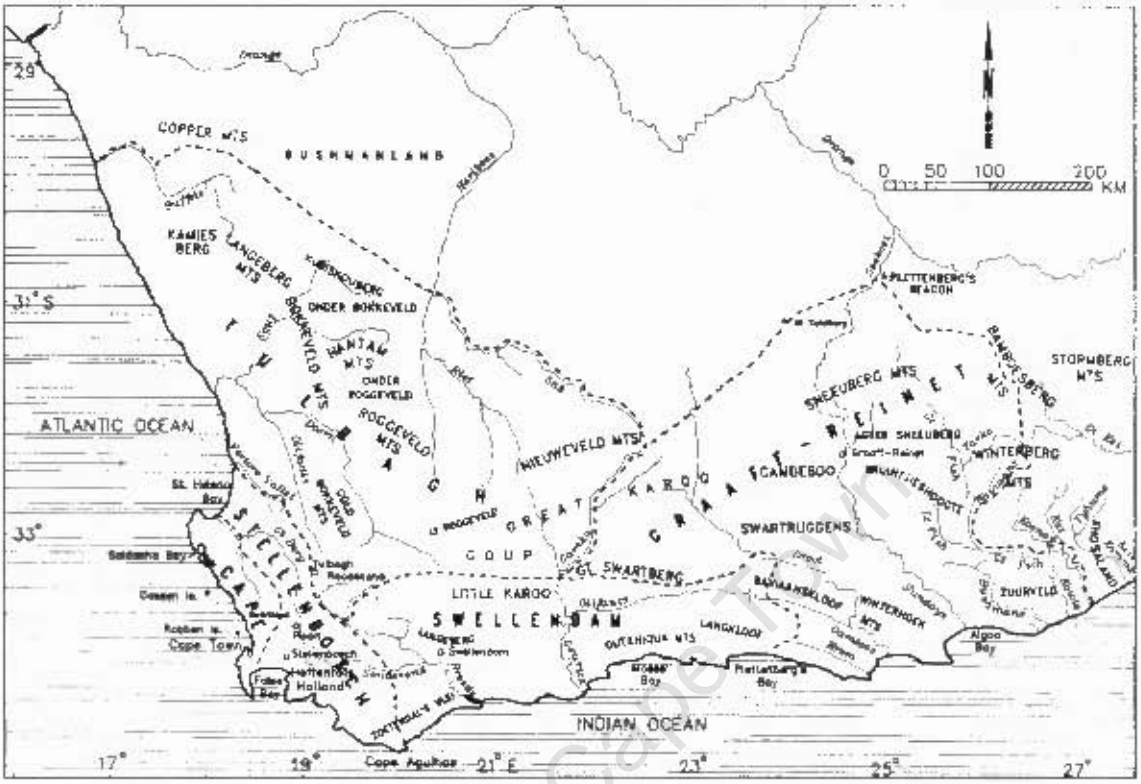

Figure 2.1 The Cape Colony at the end of the 18th century. The Sak River boundary (1805) is clearly shown. (From: Van der Merwe, 1995: 132).

At the time when the trekboers were entering the Roggeveld (Fig. 2.1), there was yet another change to the land tenure leasing conditions. In 1743 land tenure was changed to Loan Freehold or Perpetual Loans (Botha, 1962: 84). In terms of this new regulation, a loan freehold place would be 60 morgen in size, would have to be shown on a diagram and a rent of 24 rix dollars was payable annually. This, it was felt, would make the farmer feel more secure on his land. All along the VOC were reluctant to give out land on a freehold basis, and in this way they could retain ownership *and* gather an annual rent. Nevertheless, there would appear to have been little control over the grants of land and trekboers requested land and gave it up again – as it suited them or their requirements. There was also no limit to the number of licenses one person could hold. After all, land was plentiful and the VOC had little energy or desire to closely monitor the hinterland.

In about the 1740s it would be fairly accurate to say, movement stalled for a short while as the Karoo beyond the Roggeveld was a more demanding environment and the stock farmers

faced renewed Khoesan resistance. Stock farming in this area was based on transhumance, that is, "the seasonal movement of people with their livestock over relatively short distances". As Talbot (1961: 307) put it "mobility was the key to survival", and if success in stock farming depended on mobility, then this would clearly influence the kind of dwellings that were built.

The structure and strategy of transhumant livestock farming had long been worked out by pastoralist livestock farmers in the landscape over the last 2000 years (Smith, 2002: para 3), and the trekboers learnt from Khoekhoen experience as stock farmers in the area. In the Roggeveld area transhumance was necessary because the topography ranged from high plateaux to lowlands. The pastoralists moved their stock from the higher, colder regions in winter down to the low-lying, warmer Karoo (Fig. 2.1). This had the added advantage of allowing pastures to recover in their absence. As this was also a winter rainfall area, some moved to the Agterveld, around the Sak River in search of summer rains. The area in which most of the corbelled buildings occur lies in the summer rainfall zone and as trekboers moved further and further east into the summer rainfall area, it became difficult for them to return to the Roggeveld. Consequently, these farmers moved their stock following rainfall and good pastures within this area rather than return to the winter rainfall areas to the south and west.

The trekboers

The "white" trekboers were culturally heterogeneous and there were Germans, Dutch, French and many other European identities represented – some of whom might have had experience of corbelling before travelling to the Cape. Many were sons or grandsons of established farmers at the Cape in search of their own farm and independence, and moving out was common upon marriage. A large number were former members of the VOC garrison at the Cape who worked for farmers for a while before setting off on their own. Others were part of a steady stream of immigrants to the Cape (Ross, 1975: 222), people like the Gaertners, whom Burchell met on his travels in 1811 (1822: 273). Gaertner was German and his wife had been born in Holland. They had been servants to a rich boer in the Roggeveld for five years and when Burchell met them were making their way as trekboers near Quaggafontein. In 1824 Thompson (1837: 416) reports that when he reached Slinger-Fontein (north of modern-day Calvinia) in the Hantam area, "the last place inhabited by colonists," he found an old German named Richert, living in a "miserable reed hut".

There were also Baster trekboers. The Basters were people of mixed descent, and at this time they were not unusual at the Cape and Ross (1975: 230) reports that in the 18th century the population at the Cape consisted of many more men than women, so at least 10% of the white men married Khoekhoe, slaves or bastard women and marriages between whites and baptized slaves or Khoekhoe were concluded with full social approval and religious sanction (Van der Merwe, 1995: 203). The mixed race offspring from such marriages were accepted into the white community (Van der Merwe, 1995: 203). It appears that Baster trekboers mixed freely and shared resources with white trekboers and together they encountered the indigenous people on the frontier. They applied for and received loan farms because Ordinance 50 of 1828 "affirmed the right of Khoi and 'other free persons of colour' to own land..." (Nell, 2005: 126). But due to competition and a growing shortage of good farms driven by the growth of the merino sheep industry in the 19th century, prejudice did gradually evolve. By 1847 the Basters were feeling the pressure to such an extent that most of them gathered together and trekked northwards towards the Gariep River. According to Guelke (1985 quoted in Amschwand, 2009: 150), this move was also prompted by their resentment at having to do commando duty on behalf of white farmers. Names such as Moos, Stuurman, Van Wyk, Maasdorp, Beukes, Okhuizen, Louw, Jager, Titus and Manel were common Baster names in the Kareeberg and Sakrivier districts (Van Vreeden, 1965: 6).

Travelling with the trekboers and their families, were their slaves (if they had any), Khoekhoe and possibly San, servants and herders and miscellaneous people such as "meesters" (often former sailors) for the children. Penn mentions Johan Jurgen Faber, an illiterate ex-sailor working as a *knecht*[8] (Penn 2005: 102), while Thompson (1837: 409) writing in 1834 describes another: "At a place called Welledag (Karel van der Merwe's) [north-north east of Calvinia] where I halted, I found an English settler from Clan William, a carpenter, working at his trade in the service of the farmers. Adventurous persons of this description are now to be found scattered through the remotest parts of the Colony...". On another occasion he met "an English settler of the name of Freyer, a man of considerable intelligence and enterprise...." (1837: 412). The Karoo was literally a melting pot of backgrounds and abilities.

What factors drove and drew these subsistence farmers into the interior? The inability of the VOC to prevent the spread of the settlers northwards, far beyond the official boundaries of the

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[8] *Knecht*: farm manager, or just a European farm worker (Amschwand 2009:175).

colony, was key to the spread of the trekboers. This was not helped by the fact that in 1703 William Adriaan van der Stel, Governor at the Cape, started issuing grazing licenses beyond the settlement's boundaries. His father, Simon van der Stel, had tried to curtail expansion by means of fines and punishment, all of which had been ignored. It was becoming increasingly difficult for the VOC to control the hinterland from the administrative base at the Cape. Many farmers had large herds of cattle and sheep in addition to their agricultural farms, but increasingly stock farmers did not own agricultural farms – or any land at all. They moved around freely seeking good pastures. The pressure on the land drove expansion and it was inevitable that once it had started, it was impossible for the Company to halt it. One thing the VOC was determined not to do with these later licenses, was to grant any more land on a freehold basis. The Company was a trading entity and its interests at the Cape primarily focussed on supplying ships with the necessary provisions.

Four other factors relating to family also played a role in the spread of stock farmers. First, the inability of the VOC to control land acquisition was bolstered by local inheritance practices based on Roman-Dutch Law. In the case of freehold land, this meant if the owner died intestate, the estate had to be divided into two halves, one half to the widow and the other divided among the children, of which there were often many. The father had some powers of discretion at his disposal as to how much each child received, but each child had to receive at least one-third of what would have been their original share (the "legitimate portion") (Botha, 1962 in Amschwand, 2009: 7). If there were enough loan farms in the estate to go around, the lease would be transferred and each son could continue farming. However, if the estate was divided into too many small pieces that were not viable and one member of the family could not afford to buy the others out, then the entire estate would be sold and the money raised distributed amongst the family. Consequently, "the family group would then conclusively divide as any sort of economic unit, adding considerably to the motive for expansion" (Ross, 1986: 220). This forced sons, whose only skill was farming, to leave and find a new place to farm. Only in 1874 did the British make a change in the inheritance law which abolished the "legitimate portion" which meant that now all the property could be left to one child only (Amschwand, 2009: 8).

The Putter family is a typical example of the effects of this inheritance practice. Patriarch Diederik Putter (or Potter) was born in Kessel, Germany and died in Cape Town in 1699. He and Zacharia, his wife, are listed in the muster rolls from c1686[9] until 1698. Then, in 1700, she is listed as the widow of Diederik Putter. His children are listed as given in the inventory drawn up after his death in May 1699.

At Putter's death he owned freehold land – a house and land on the height (mountainside) called Roodebloem and a farm with buildings situated in the Tijgerbergen. Roodebloem, 17 morgen in extent, lay at the foot of the Windberg in the Tafel Vallei (Greater Cape Town) and had been granted 31 March 1669. It was sold out of his estate on 1st August 1705 with adjoining grazing land rented from the Company.[10] The farm in the Tygerberg was sold in 1714 to Hendrik Bouman and Putter's estate was distributed among his heirs in 1716.

Putter had seven children. The career of their daughter, Zacharia, and her descendents illustrates how families spread out around the country. She married Pieter Ernst Kruger and died in 1794 in the Roggeveld. Her grandchild was born in the Bokkeveld and died in Richmond in 1859. Her great granddaughter was born in the Winterveld around Graaff Reinet and died in the Herbert district. Her great-great grandson was born in De Aar in 1883 and died in 1915 in Krugersdorp and his wife had already died in 1894 in Barkley West. As is the case in many of the Karoo farmers, it appears that these descendants eventually left the land and travelled first to the diamond fields and then to the gold mines from the 1870s.

Loan farms could not be divided on the death of the lease holder. Although theoretically, only the *opstal* (buildings and farm improvements) could be bequeathed, in fact, the whole loan place would usually be leased to the heir without a problem. Orphan Chambers documents illustrate this as loan places are listed as part of the inventory of the deceased. But the land could not be divided and this led to additional male members of the family moving to new farms. This was also largely responsible for the rapid spread of the trekboers.

Second, and linked to the issue of inheritance, was the large number of children in many families, a result of the young age of women on marriage. If they survived childbirth, women

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[9] The Ball family are descendants of Putter. www.ballfamilyrecords.co.uk/kfp/I069.html

[10] CA MOOC 9/1/20

could bear many children. As Ross (1981: 218) points out: "In Southern Africa the generally low age at marriage and consequent population increase derived from the opportunities for independence provided ultimately, by the open frontier in land. As the frontier closed [land became scarce], the age at marriage went up". Many of these children would eventually also apply for loan farms, moving further into the interior.

Third, many people simply wanted to remove themselves from the influence of the VOC Company or the authoritarian rule of their father or as Van der Merwe (1995: 145) put it, they pursued "the desire for an independent existence".

And, finally, the practice of a father giving stock to his sons so they could build up their own herds and establish their own farms encouraged independence. "The majority of farmer's sons who grew up with their parents usually already owned some livestock by the time they were old enough to get out on their own" (Van der Merwe, 1995: 142), and "The great ambition which the African colonists have is to see all their children settled upon "full places" (Thompson, 1827: 55).

Trekboers also moved into the interior for commercial reasons, even though the trekboers are thought of as subsistance farmers, they did require money for farm equipment, taxes, etc. They also wanted to improve their financial position in the long term. One way of raising capital was to build up their herds and sell stock for the Cape Town meat market. Butchers' agents toured the countryside buying stock for the meat market and many MOOC inventories list these butchers' promissory notes. The inventory of Casper Steenkamp, dated 1 July 1794,[11] who had a quitrent loan farm in the 'Nieuwevelt', lists just such a note: "een slagters briefie ten laste van Jan Michiel Elzer 244:4:4 rix dollars". Stock farmers were, however, loathe to sell stock unless absolutely necessary and relied heavily on the sale of other farm products.

In the *Records of the Cape Colony* dated 1795 a list of the export duties included butter, tallow, sheeps' grease, aloes, candles and tanned sheep skins which are all products of the Karoo. (Theal, 1897: 218). Ostrich feathers and eggs, elephant tusks and soap were also

[11] CA MOOC8/22.7. One butcher's note from Jan Michiel Elzer 244:4:4 rix dollars

important commercial products from the Karoo. The travelling *smous*[12] also played a part in the remote farmers' commercial activity – transporting goods into the area and the farmers' products were either sold for cash or bartered.

It was possible to make a living even if only at a subsistence level, although many did well financially. *The Beaufort Courier* dated 13 Jan 1871 lists the contents of the auction of the farm Esterville, which was a perpetual quitrent grant in 1838. Some of the items on offer were: plough, harrow, threshing machine cost originally 150 pounds, one tent, brandy still, mealie cleaner, chaff cutter, 1 800 oats sheaves, 11 000 barley sheaves and 10 000 wheat sheaves PLUS piano, mahogany drawing room furniture, numerous carpets, dining and sitting room furniture, brass and iron bedsteads and wardrobes. Among the stock for sale were 3 600 sheep. This is an example of a farmer who did exceptionally well over a period of just over 30 years.

A lack of capital, however, to buy an established farm could be a problem, for, although there was an incipient banking system at the Cape, credit to buy a farm would only be extended to those who could afford it, forcing those who could not raise financial backing to look for "free" land. Therefore, "those who went to the frontier to conquer new areas did so in part because they were too poor to compete for better farms in the south-west" (Ross, 1986: 70).

The trekboers suffered many setbacks and many had to give up the land for which they had applied and received as a quitrent loan place. During the 19th century, the Great Karoo was the scene of constant comings and goings, of success stories and disappointments. Very few farms today are still in the hands of the original perpetual quitrent families. A look through the perpetual quitrent registers at the Surveyor General's Office shows that many farmers began to sell off portions of their land, or even the entire grant, very soon after obtaining it. For example, Rietfontein was a perpetual quitrent grant to Nicolaas George Kock in 1841. In 1843 it came into the possession of Jacobus Ludovicus Esterhuyzen and later that year he sold half to Frederick Rupping. In 1850, on Esterhuyzen's death, Rupping obtained the remaining half, thus becoming sole 'owner' of Rietfontein.[13] Therefore, within 11 years the farm had changed

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12 *Smous:* Travelling hawker. The term appears in a Dutch dictionary dated 1766 (Sewell). Apparently many were German Jews with the name Moses (*Mousje* in Dutch), which then became *smous*.

13 Information obtained from records in Surveyor General's office, Cape Town.

hands three times. In this way many of the original quitrent farms disappeared and others morphed into larger entities.

Drought was also a factor which forced many farmers off the land. A number of droughts occurred throughout the 19th century. In 1824, for example, Thompson (1827: 390) mentions the "prevailing drought" in which no rain had fallen for five years, and Anderson (1987: 64) mentions drought in 1831 and in 1846-1847. In order to survive, the farmer had to be able to move with his stock to another unaffected area. Even if springs did not dry up during droughts, the veld still deteriorated. The Great Trek movement which started in about 1838 also saw many farmers giving up their farms to try their luck further north and parts of the Karoo were left "empty".

A critical shift in the concept of land and agricultural production was prompted by the wool boom of the 1840s, the result of the industrial revolution in England. Initially, however, smaller farmers refused to change from fat-tailed sheep to wool-bearing merinos because of the expense involved, but also because they were inherently conservative. Additionally, the veld in this part of the Karoo was not as rich as that in the Graaff Reinet-Middelburg districts to the east, where the 1820 English settlers in the Eastern Cape in part drove the merino boom. Expense consequently was not a problem for the wealthy landowners and merino-sheep farmers such as J. C. Molteno of Beaufort West. These men set about buying up key farms and forcing the less successful trekboers and small farmers into the drier areas further to the north and west. They also owned the major trading stores in Beaufort West and founded the Beaufort Bank and in this way they controlled credit and could deny it when it suited them. As a result many smaller farmers were reduced once more to becoming trekboers without land of their own (Anderson, 1987: 62). This interface between a global export wool economy and a deeply embedded local trekboer economy rooted in the Dutch occupation at the Cape, is a critical and relates directly to the nature of the corbelled vernacular structures.

Many struggling farmers saw the discovery of diamonds near Kimberley in 1866 as their chance to make money and joined diamond-hunters from all over the world at the diamond fields. "Thousands left their properties and trekked towards the Vaal River, leaving their farms or town houses in the care of aged native servants" (McNish, 1968: 78). Many apparently

made money, not from diamonds, but from supplying stock at greatly inflated prices to the diggers.

Thus we can see that much of the population of the Karoo was fluid and mobile due to upheavals in their daily lives, but also because of a deeply rooted cultural approach to land and living. This led to farms shrinking and expanding in size according to the farmer's circumstances. Some farmers lost everything and moved away, while others consolidated their position with larger and larger landholdings. All these factors would have had an effect on the kind of houses which were constructed. I assume that wealthier farmers built large, imposing and designed farm houses, while poorer farmers would have persisted with vernacular buildings. This fluidity in pastoralism and land ownership was directed by larger-scale events which impacted on the farming methods and wealth of the Karoo stock farmers. While this practical correlation makes sense, we must not lose sight of the deep-seated values associated with a vernacular dwelling form in which cultural values and approaches to dwelling are difficult to shift. I address this issue below.

Indigenous people

Central to the whole trekboer movement was the attitude that there was plenty of land available and it was there for the taking. Of course, the land was not "empty": it was already occupied by the San and Khoekhoe. Thompson (1827: 325) wrote, "He [trekboer] encamps near some *unoccupied* [my emphasis] fountain, pool or river..." and "it is the practice of the boors here [Sneeuberg], when one of them wants a farm to proceed beyond the nominal boundary of the Colony, and take possession of the choicest situation he can find in the Bushman country" (Thompson, 1827: 54). As we now know, 'unoccupied' did not necessarily mean that the water source was unused at another time or season. This the trekboers would discover to their cost when they entered the drier Nieuweveld and Kareeberge, for "Water directed the footsteps of its pioneers, circumscribed its agricultural economy..." (Talbot, 1961: 299). Indigenous people had been living in the Karoo for millennia when the trekboers moved into the region, even though the landscape gave the impression of being unoccupied.

The San were hunter-gatherers who inhabited the area and had done so for thousands of years (Smith *et al.*, 2000: 4) while the pastoralist Khoekhoe had been present in the Karoo for at least 2 000 years (Smith, 2002: para 3). The arrival of the trekboers forced the San into a

steady retreat, though not without a fight for which they were the victims of brutal genocide through the commando system. They, too, were dependent on the land for food – water, game and *veldkos*[14] – but being hunter-gatherers, the depletion of game as a result of hunting practices of hunters and trekboers, placed their lifestyle under severe strain as did the appropriation of water resources. It would appear that in times of drought, the pressure was particularly severe which resulted in livestock theft, an action which escalated the deadly skirmishes between the settlers and the San. Initial Khoesan resistence in the Bokkeveld and Sandveld was crushed in 1739 (Penn, 2005: 81). Unfortunately for the trekboers entering the Roggeveld and the Nieuweveld, stock raids by the Khoesan, some involving fatalities, became increasingly common again. This was largely the result of pressures which the San were feeling on their hunter-gatherer lifestyle.

Initially the trekboers were scattered thinly on the ground. In 1746 there were 225 stockholders and 600 in 1770 in the Colony (Penn, 2005: 81). This was not a lot of people for such a large area, but the fact is that they were in direct competition with the San for the same limited resources, mainly water. The trekboers, with their system of transhumance from one loan farm to the other, severely impeded San mobility and they were forced to make a stand in the Nieuweveld and Kareeberge because to the north the environment was even harsher.

The 1774 General Commando against the Khoesan, although responsible for the 403 deaths with 239 captured, did not remove the threat and attacks continued into the 1790s throughout the area, including the Nieuweveld and the Kareeberge (Fig. 2.1). In fact, the Nieuweveld was abandoned by demoralised trekboers in 1786 and only reoccupied in 1800, and San attacks continued in the Kareeberge and on the Brak River into the 1800s. Attempts to pacify the San by providing them with meat and settling them on a mission station on the Sak River failed and between 1800-1804 the frontier was again in ferment in the Nieuweveld, exacerbated by a severe drought. Through the weight of numbers and the power of guns and genocide, the San succumbed and were imprisoned and the remnants forced into service.

By the 1830s the San no longer posed a real threat to the trek farmers of the Nieuweveld and Kareeberge. Men were killed and San women and children were taken into service of the farmers. As Thompson (1827: 391) reports in 1824: "In the evening we were entertained by a

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[14] *Veldkos*: food found in the veld, not cultivated.

Bushwoman, in the service of Nel, playing on the *Raamakie*.... The commandant informed me that this woman had lived in his household from her infancy, and that a better or more trustworthy creature he had never had in his service. He remarked that Bushmen in general, when taken young, make good and active servants; but those who have gown up in the wilds to adult age, can seldom or ever be induced to remain in the service of farmers".

By the 1750s pastorlist Khoekhoe as a cohesive group had been broken and they had been divested of a large proportion of their stock, around which their society revolved, and decimated by disease. Many were employed as herders and farm labourers by trekboers and all the early travellers mention boers travelling with, and supported by, their 'Hottentot' servants. Lichtenstein (1812: 177) mentions visiting a farm in the Roggeberg where "the wife only was at home : the husband had rode out with his Hottentots, in hopes of recovering some cattle stolen the preceding night by the savages". The role of the Khoekhoe as a source of labour for stock farmers was entrenched by the Hottentot Code of 1809 which decreed that farmers had to have employment contracts with their labourers, but that the labourers in turn could not leave the farm without a pass. There was also the problem of Khoekhoe being prevented from taking their own stock with them when they left the farm, thus tying them closely to the farm. By 1778 Von Plettenberg, on his travels though the colony, could not find any Khoekhoe who were not working for farmers (Theal, 1896: 11) and there is a deep irony here because, as Van der Merwe states, the "Khoi taught trekboers how to exploit the environment" (1938: 142). In many cases their treatment was cruel and heartless and the only other alternative for a Khoekhoe farm labourer was to run away and become a raider, that is, join groups of other runaways, including San and slaves, to raid the trekboers' stock and to live as outlaws.

The legal situation with regard to land

When the British took over the Cape in 1806, they set about trying to bring some order to what had become a chaotic land ownership situation. In 1810 M. C. Gie, an employee of the Cape Government, reported to Deputy Colonial Secretary Christopher Bird that he was having great difficulty trying establish a full account of the land situation at the Cape and that he was trying to piece together information based on the *Wildschutte Boeken*, old records, diagrams and old inhabitants (Theal, 1901: 428). Two years later W. S. Ryneveld, Fiscal in the Cape Government, in another report to Bird, stated that he was still trying to sort out the

"present vague and uncertain tenures" (Theal, 1901: 256). This process had implications for the relative permanence of dwelling structures.

The British identified three kinds of land ownership: freehold; permanent loan where no rent was paid initially, but was gradually introduced and in 1811 stood at 24 rix dollars per annum; and quitrent (called loan freehold by Botha (1962), where the land was granted for a period of 15 years, on payment of an annual rent. All the freehold land seems to have been in the farming areas close to the Cape. All other land was considered to have remained the property of the VOC, and now became Crown land.

Initially under the grazing licence system these stock farmers could return to their permanent or "home" farm (*woonplaas*) close to the settlement at the Cape, but as they moved further away, a new approach emerged where farmers who had no fixed freehold farms moved around freely with their stock in order to optimise exploitation of the best pastures and water supply. However, having found a good site, the farmer returned annually to the same spot and became increasingly unwilling to share this grazing and water with others. The result was that fixed boundaries were progressively defined. In this way the grazing license system gradually evolved into the quitrent loan place system.

In 1714 the Company introduced an annual rent (*recognitie*) (Amschwand, 2009: 4) which was a lease that ran for one year. A crude system of measuring the farm size evolved which involved walking for half and hour in all directions from the centre (usually where the spring was situated). There was no limit to the number of farms that one person could rent and farmers tended to have a number of loan farms. There was the main farm and others to which they moved their stock seasonally.

In 1732 the terms of tenure were changed. Under the new law, tenure could be held for 15 years and there was an annual quitrent payable. Additional changes were made in 1743 and tenure was now called Loan Freehold. The old system of walking for half and hour in each direction to mark out the extent of the loan property was replaced with a ruling that the loan place had to be 60 morgen in size and accompanied by a diagram. Rent of 24 rix dollars per annum was payable.

What was the relationship between loan places and loan freehold places and buildings? According to Van der Merwe (1995: 59) "A farmer desiring grazing rights for his livestock normally picked out the spot himself where he wanted to construct his homestead. It later became the practice that as soon as someone found an acceptable spot for a homestead he erected a marker there to make known his intention to other farmers". He also notes that this practice was already in place by 1706 (1995: 57) and quotes the Original Ordinance Book of 1691: "they constructed houses, cages and pens on the livestock posts they set up on their own in the interior" (1995:57).[15] The farmers even began to till the area and grow wheat, all of which provided stronger inducements to return to the same place the following year. The VOC turned a blind eye to this illegal practice of planting crops, thus reinforcing the farmer's impression that he had the right to do so. Van Ryneveld, President of the Court of Justice writing to Bird in 1812 states: "It is true that the original lease of a loan place (*ordonnantie*) consists in nothing else but in a mere permission to the possessors to graze their cattle on a certain spot on condition of paying a certain rent, obliging them at the same time to have the lease renewed annually. But reflecting upon what has been the consequence of said leases, and the constant practice since even one century, not only under the eyes of Government but even countenanced by the same...." (Theal, 1901: 256). He continues: "the agriculturists felt themselves fairly secure in their possession, and built homesteads and made general improvements" and "the effect of this good faith on the part of the farmers is so strongly manifested in the trouble and expenses some of them have been using for the improvement both in buildings and in cultivation of the ground" (Botha, 1962: 89).[16]

It was the official view that since farmers did not own the land, they would not make improvements and this was generally detrimental to agriculture in the Colony. In fact, this was not correct. As mentioned above, farmers were already constructing buildings even when they only had grazing licences which were quite informal.

In 1759 the trekboers applied for the first loan places along the Riet River (Fig. 2.1) and throughout the 1750s and 1760s farms were taken up in this area, especially in an area that is today called Die Rante. This area has distinctive dolerite outcrops and a higher rainfall than

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[15] Original reference quoted by Van der Merwe: Original Ordinance Book, 19 October 1691, p. 104.

[16] Letter 24.1.1812 from W.S. van Ryneveld, President of the Court of Justice to Deputy Colonial Secretary Bird, as quoted in Botha, 1962: 89.

the rest of the Nieuweveld, hence its attraction (Scholtz, 1976: 9). The area around the Sak River (Fig 2.1) was traditionally known as the *trekveld,* and considered commonage to which the trekboers travelled for summer grazing. This *trekveld* was increasingly curtailed as loan places were requested there. The rest of the Nieuweveld was not as attractive as it has a fairly low summer rainfall, but does have the advantage of a geology which produces many springs. Since the official VOC border was only moved to the Riet River in 1798, all this activity actually took place outside the colony's borders, and consequently, the boundary was meaningless.

Meanwhile the trekkers, unable to expand to the north because of the dry conditions, continued to move eastwards and north-eastwards across the Sak River (Fig. 2.1). By 1770 Van Reenensplaas, which is at least 60 kilometres north of the Sak River was well established with a farm supervisor. The Sak River was only made the official boundary of the colony in 1805 and it is perhaps salient that in this trans-frontier context the farm manager was murdered by San in 1770.

The MOOC inventories illustrate the impracticality of the legislated colony border. They also give an insight into the possessions of the trekboers, which in turn provide clues as to the kinds of accommodation needed to house these goods. The 1765 inventory of Johanna Louw Jacobs, for example, indicates that the family already had a *lenings plaats* north of the Sak River[17] and the inventory of Joggens Koekemoer of 1773 shows loan farms in the Camdebo area,[18] while that of David van Heerden of 1774 lists loan farms as far away as the Sneeuberg[19] (Fig. 2.1). Loan farms in the Nieuweveld area are also mentioned regularly from these dates. The trekboers had apparently applied for loan farms right across the area in which the corbelled buildings exist today, though it appears that the wealthier more settled farmers were on the Roggeveld escarpment since some of the MOOC inventories for this area mention houses and outbuildings and others list furniture, which obviously indicates a domestic structure. Of interest is the reference in 1815 to Andries Cornelis Esterhuisen of Modderfontein[20] on the Riet River of possessions, such as a chair, which was not actually at

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[17] CA MOOC8/11.34b

[18] CA MOOC8/14.47b

[19] CA MOOC8/15.4a

[20] CA MOOC8/31.47

Modderfontein, but still kept on the "woonplaas", that is, on the home farm. This reiterates the 'possession' of a permanent farm and the use of others as grazing outposts.

The MOOC inventories also give some idea of the trekboers' possessions and a clue to whether a building would be needed to accommodate these possessions. For example, a return to the inventory of Johanna Louw Jacobs shows that her family's *leg plaats* was over the Sak River and their possessions consisted of 110 *runderen* (cattle), 900 sheep, one half covered wagon, one horse with saddle and bridle, one flintlock gun and one pistol.[21] The inventory taker did not note basics that must have existed such as cooking utensils, but nevertheless, one can infer that they lived in their wagon or in a tent. Johannes van Aswegen, on the other hand, who died in 1789, and had two loan places, one on the Brak River and the other in the Nieuweveld (Fig. 2.1), must have had some sort of abode to accommodate all his possessions, which included two tables, a bed, kists, numerous pieces of kitchen equipment, tools and ploughing and harvesting equipment. He also had four slaves. Van Aswegen was therefore settled in the corbelled area, living in some form of building and growing grain.[22] By 1767 Christiaan Godlieb Lessing, who had two *opstals*, was already selling grain "20 mudde koorn verkoft de mudde a 4 guldens an Willem Steenkamp in de Roggveld, nog niet betaalt".[23]

Once trekboers established the routine of returning to the same place regularly they inevitably made improvements, even if only to build kraals and walls. A shelter of some sort would be built and gardens laid out and grain, fruit and vegetables planted. This placed a "moral obligation" on the government to renew the lease when it came up (Van der Merwe, 1995: 85). In addition, the VOC charged the purchaser of a loan farm 2½ per cent tax on the purchase price of the loan place, thus reinforcing their moral obligation. There is also evidence that the farmers were unofficially selling their loan farms for the full price (that is, land and building improvements) (Van der Merwe 1995: 89). In the ongoing efforts to clarify the land issue, Van Ryneveld pointed out to Bird that although the legal position was that only the *opstal* (buildings) on the loan farm could be sold, in fact farmers were selling the land as well with the full knowledge of the Government. He stated: "In the mean time Government knew very well that many premises consisting only but in a hut not worth more than 25 or 30

[21] CA MOOC8/11.34a

[22] CA MOOC8/19.68

[23] CA MOOC 8/13.19. 20 muids corn sold at 4 guilders a muid to Willem Steenkamp in the Roggeveld, not yet paid.

dollars were selling for 20 000 or 25 000 gulden. Government received the duties upon *this sum*, confident that it was not the mere *opstal*, but the real value or calculated utility of the place for which said duty was paid, so that not only the *opstal* but the *whole place* was virtually disposed of with the complete sanction of the government" (Theal, 1901: 258). He goes on to say that the purchaser, in view of the above, considers "himself safe in the possession of his place" (Theal, 1901: 258).

So it would seem that under the loan farm system, farmers were building houses and infrastructure from an early date even though the land was still owned by the VOC and subsequently by the British government. It was generally understood, however, that a loan farm would not be taken from the owner except under exceptional circumstances, therefore those who had loan farms had every reason to believe that their tenure was reasonably secure. Leases had to be renewed and the rent paid annually, but even this fell away with time and it became accepted practice that the lease would simply "roll over" until the farmer gave it up or it was removed from him, but this occurred only in extreme circumstances. Even in the case of inheritance, the inheritor could simply apply to have the lease transferred to his name.

A loan farm would be withdrawn if it impinged on the pasturage or water source of neighbouring farms, as happened in the Sandveld area in the 1750-60s when the farm Witfontein was withdrawn from one Coetzee after complaints from neighbours that his loan farm intruded on their pasturage (Smith, 1985: 40). Even non-payment of rent did not seem to warrant withdrawal of the loan place. Cornelis Coetzee of the farm Klipfontein paid his first year's *rekognisie*, and then nothing for 10 years, giving his widow a nasty shock when he died in 1755 leaving a decade of rent owing to the Company (Smith, 1985: 26). Engela Erasmus who died in 1764, had three *opstals*, two in the Roggeberg and one in the Karoo. The MOOC inventory shows that the rent on all three *leningsplaats* was 6 years and 3 months behind,[24] and this is reflected time and time again in the MOOC documents. In another case, the 1789 inventory of Johannes van Aswegen's possessions indicated that the estate owed five months rent on the farm Varkens Kop and 11 years and five months rent on a second loan farm, Weltevreden.[25] In 1793, 1 959 of the occupied loan farms owed a total of 325 067 rix dollars (Van der Merwe, 1995: 87).

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[24] CA MOOC 8/11.6a

[25] CA MOOC 8/19.68

The conclusion drawn from these examples is that as far as land was concerned it was almost a free for all. Lease holders of loan farms crossed official boundaries with impunity, they failed to pay their annual rent with impunity and sold loan places at their full price with impunity. "Thus we can conclude that land ownership under the quitrent loan farm system was not so uncertain as is often maintained; that the farmers never doubted the permanence of their leases; and accordingly, that the theoretically temporary character of the leasing rights under the loan farm system did not make the farmers afraid to cultivate their farms intensively and to make improvements on them by the application of capital and labour" (Van der Merwe 1995: 93).

An exasperated Truter, the Fiscal at the Cape, wrote to Bird in 1812 suggesting that "the uncertainty of tenure be removed and that quitrent be amended to allow the farmer to sell and bequeath his land officially but, in order that the Government not lose out in any way, that this land not be granted as freehold but as perpetual quitrent with payment of a moderate annual rent" (Theal, 1901: 270).

After the Cradock Proclamation of 1813, when it became officially possible to sell and bequeath land, there must have been a change in attitude to the land, but not all land. A change in attitude arose to what could be called the main farm which was the home base from which they trekked when circumstances (rain, drought, fresh pasture) demanded it. Although some farms had been in existence for over 50 years, it suddenly became more urgent to secure a good, permanent location and by 1814 there were 2 291 loan farms in the Colony (Van der Merwe, 1995: 93). After a slow start, a spate of surveys in the 1830s which translated into perpetual quitrent grants in 1838 must have led to an increased rate of farm development. For example, the first issue of the *Beaufort Courier* appeared in 1869 and it immediately began carrying details of farm sales and auctions. On 3 December 1869, it published the auction notice of the estate of the late widow Maria Louisa Francina Krugel of the farm De Kerk (also Kerkplaats). This farm was surveyed in 1830 and granted in 1838. By 1869, the very period when the larger, more northerly corbelled buildings were still being constructed in the Karoo, De Kerk boasted two dwelling houses, gardens, an orchard, arable land, numerous livestock and farming equipment, as well as tables, chairs, bedsteads and all the furnishings for a comfortable house.

In the same edition of the *Beaufort Courier*, the farms Salt River Poort and Salt River Valley were also offered for sale. Together they had a dwelling house (which cost 900 pounds), outhouses, a cottage of three rooms, stable, wagon house, shearing house and dams. The yield of grain was an astonishing: "12 300 sheaves of wheat, 59 muids of mealies and 10 loads of pumpkins" (3 December 1869). The *Beaufort Courier* does not mention corbelled style buildings in any of its issues, but the notices of sales do show that within 30 years of being granted perpetual quitrent, some Karoo farms were fully established.

It appears that the early farmers did not feel insecure on their loan farms and over a period of 50 years (c1760-1813) it is impossible to believe that no improvements were made particularly on the permanent or "home" farm, though whether improvements would have included corbelled buildings is still not known. The real boost for farm development seems to have occurred after 1813 when perpetual quitrent was introduced and when actions which had become custom, were implemented as law.

In 1832 laws regarding land tenure were changed yet again. It was decided that the system of perpetual quitrent grants would be replaced by land sales. Grants continued to be made until 1839, when the issuing of further grants was forbidden (Christopher, 1971: 4). The Cape was now to fall in line with Imperial policy in other British colonies and a price was set at 5 shillings per acre in 1841, regardless of the quality of the land. After very few sales and great resistance, the price was reduced to 2 shillings an acre, but sales remained negligible. Resistance was based on the fact that people were accustomed to the perpetual quitrent grant which required no initial capital outlay, and there was cheaper, better quality land to be had across the Orange River (Christopher, 1971 :4). After 20 years of stagnation, this policy was abandoned in 1860 and replaced by the Crown Lands Act in 1861, which marked a return to the rent system of land tenure. The land was to be sold at public auction and thereafter a perpetual rent was payable. The differences was that farms could be of any size and the Surveyor General's Office could set the price according to the quality of the piece of land (Christopher, 1971: 6).

Early traveller records and corbelled structures

The inhabitants of the Great Karoo did not write about their daily lives themselves, but outsiders did. "The colonists on and beyond the fringe of settlement were, it may be

assumed, in the main typical frontiersmen, rough and ready and unusually unlettered. If they wrote at all, it was but small in quantity and significance, and practically none of it survives. .....Therefore, the documents that are available ..... were largely composed by two classes of person, namely, private travellers on visits from Europe and servants of the Dutch East India Company" (Forbes, 1965: 3). Early 19th century travellers who passed through the Karoo made comments on what they saw, both the natural and cultural environment.

William John Burchell was one traveller whose writing is widely quoted. He was a keen and acute observer and prolific note taker. On 14 July 1811, Burchell crossed through Karoo Poort and looked out on the plains of the Ceres Karoo. His party followed the established route through the Karoo to the north, passing through the area which is now known to have corbelled buildings. He would spend the next two months travelling across the Karoo, reaching the site of Carel Kriegler's Grave north of Carnarvon on 11 September. Kriegler was killed by an elephant and buried at this spot. The farm also has three corbelled buildings and is now called Karelsgraf. After this point he left "corbelled building territory" (Fig 2.2).

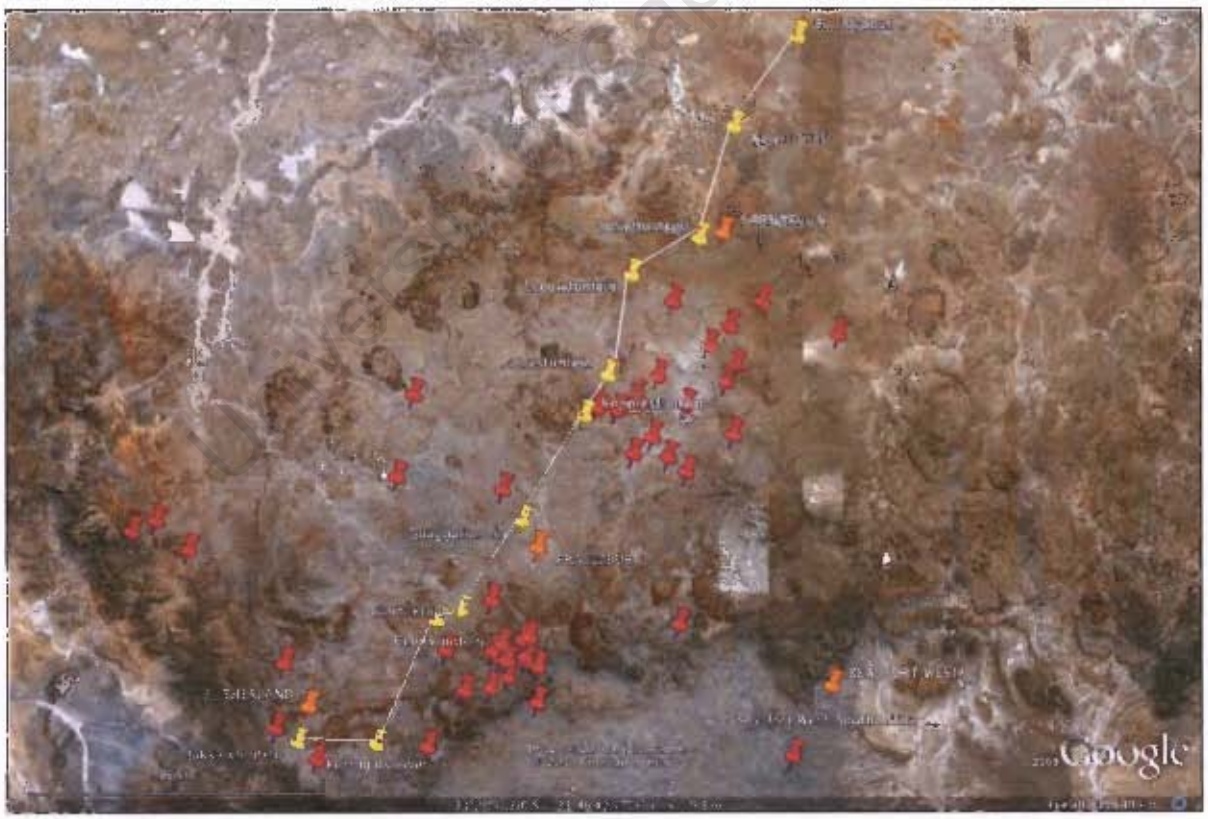

Figure 2.2 Map constructed on Google Earth which shows the route followed by Burchell, and earlier by Lichtenstein (yellow markers). The red markers are corbelled buildings locations.

Yet Burchell makes no mention of any structure that fits a corbelled building. At the home of Veldcornet Gerrit Snyman at Windheuwel (in the Roggeveld) he describes in some detail the "small oblong low hut" (Fig. 2.3) which served as home to Veldcornet Snyman and also comments on the presence of "two out-buildings which at a little distance might be mistaken for hay-cocks... " (1822: 237). His sketch of this little farm indicates that the "outbuildings" appear to be rondavels with thatched roofs (Fig 2.3). Wood was available in the Roggeveld at this stage as the house has a pitched roof and the "eyebrow" over the door reflects the architectural influence of the Cape.

Figure 2.3 Burchell's drawing of Windheuwel (Burchell, 1822: 238).

There is also the critical point that Burchell's sketch makes (and his text) that is, there are rondavels in the Roggeveld in 1811. The rondavel is associated with Sotho/Tswana far to the north (summer rainfall) and the Roggeveld is an area where indigenous architecture is the dome-shaped *matjieshut*[26] or rectangular *hartbeeshuise*[27]. This could possibly indicate contact with people far to the north. In this part of the Roggeveld and Nieuweveld Burchell mentions buildings at least four times. Once he reached Kleine Quagga Fontein (Fig 2.2), there are no more references to buildings, although he does mention in two instances passing "boor" families with wagons and one with a grass hut (1822: 273).

[26] *Matjieshut* or *matjieshuis*: Dome-shaped structure made of reed mats over a frame made of thin branches. Indigenous to the Khoekhoe.

[27] *Hartebeeshuis*: Structure with a roof and vertical walls made of thatch on a framework of bent poles.

Below are two descriptions of boer habitations that Burchell encountered on his travels through the Karoo:

> Arrived at a hut of Gerrit Snyman, veldcornet. "When daylight disclosed the place to our view, we beheld a miserable abode, corresponding exactly with the unfavorable description which had already been given me: a small oblong low hut built of rough bits of stick; rudely thatched with reed and sedge' having no windows, excepting one small opening covered with white linen, instead of glass; and the doorway but half closed with a clumsy panel of reeds (Burchell, 1822: 237).

> Our intention was to have reached Kleine Quagga Fontein this evening, but half-way, unexpectedly find a family of colonists, who had taken up this wandering life for the sake of pasture for their flocks and herds, they earnestly persuaded us to tarry till the next day. The spot, though arid, was agreeable; some scattered bushes of considerable size and low hills on either side, gave it a sheltered and comfortable appearance. They abode was merely their two waggons, and a hemispherical hut made of mats after the Hottentot manner (Burchell, 1822: 273).

The absence of corbelled buildings, especially in Burchell's writings, has been taken as a chronological marker indicating that they did not exist at the time that he passed through the region in 1811. This gives a clear indication that they are products of the 19th century (Fig 2.2).

What are we to make of the lack of mention of corbelled buildings? With his fine descriptions of flora and fauna, the "Hottentos" [sic], "Caffres" and "Bushmen", comments on geology, the weather and rivers or standing water, this silence must indicate that when he travelled through the area corbelled buildings did not yet exist but the references clearly indicate the adoption of indigenous vernacular structures.

In fact, the only mention of corbel-type building to be found in any of the writings of travellers comes from notes of "Anon" around 1870, who describes a corbelled building (Schaefer 2008: 156). Unfortunately, from this point on, Anon's journey takes him northwards, away from the corbelled building areas. This building would have been right on the north western edge of corbelled building distribution (Fig. 1.2).

Lichtenstein traversed the area a few years before Burchell in the early 1800s and made no mention of corbelled-style buildings. However, he does mention other kinds of habitations:

> [at the little Riet River] Van Wyk had quitted his proper habitation, and come hither, where he was more out of the way of these marauders[28], till there should be water at his winter house in the Karroo. We visited his family in a wretched kind of hut, which was built upon the ruins of a larger house (1812: 177).

In another description of a habitation, also close to the Little Riet River, he describes it thus:

> A small uninhabited hut was closed against us by rows of slate stones laid against the door one above the other. According to the custom of the country, this wall, which was only intended as a blockade against the wild beasts and the Bosjesmans, was demolished by us, and we took possession of the mansion, which we found just spacious enough to hold four chairs and a table. There would be ample reason to wonder why, in this country, where, in almost every part, there is plenty of stone at hand, sufficient to build immense palaces, with reeds in the greatest abundance to thatch them — there would be, I say, reason to wonder, this being the case, why the people build such very confined habitations, were it not for the extreme difficulty there is in procuring the wood necessary for making spars to support the roof. Since we quitted the Bokkeveld, we had not seen a single tree; and even the Karroo now appeared to us a cheerful country, since there at least mimosas were growing along the banks of the streams (Lichtenstein, 1812: 180).

Further on he describes "six or eight pandoken, as they are called, a kind of hut made of reeds woven into a wooden frame, which are inhabited by the principal Bastard-Hottentots: the poorer have little low huts in the form of a hemisphere, which consist of a skeleton of wood, with a mat drawn over it (Lichtenstein, 1812: 185). The "pandoken" are no doubt forms of *hartbeeshuis* and the "huts" are *matjieshuise*. What form of building the "mansion" takes is not mentioned, except that it was confined and did not have a roof which used wooden supports.

[28] Bushmen or San

Even earlier, in 1778, Paterson (1790: 48) passed huts which he thought were those of 'Hottentots' but turned out to be the winter home of "Dutch boers", and "as this desert part of the country is inhabited only during a short part of the year, very few houses are to be found in it. Most of the inhabitants live in huts similar to those of the Hottentots, some dwell in the tent that covers their wagon...." (1789: 47). A quarter of a century later Barrow (1801: 403) describes the winter quarters as "temporary dwellings of rushes or straw". These are important observations, for "boers" who built and lived in indigenous vernacular domed structures in the 18th century, and the architectural flow is clearly from the indigenous to the "boer".

The evidence gleaned from the early travellers indicates that corbelled buildings were not the first and only trekboer structures in the Karoo, as was thought at one time. In fact, they appear to be a 19th century built response. Trekboers lived in all types of dwellings – *hartbeeshuise*, *matjieshuisies*, wagons and tents – and there could be a number of these forms of shelter at any one spot. Since there is no mention of corbelled buildings, which one assumes would have stood out from the humble reed houses, we can only assume that these came later when a commitment had been made to one spot which would warrant the labour required to build a stone building.

The Karoo frontier and Bantu-speakers

Although the Karoo was not traditionally a Bantu-speaking area, Africans were known to pass though the district. In 1811 Burchell (1822: 269) reports meeting:

> a party of five Caffres and their wives, were resting here [at the Karee River]. These men were not less than six feet in height, strong and finely proportioned; and, excepting a leather kaross, wore no covering whatever; a circumstance as far as I have since been able to learn, quite peculiar to the Kosas, or Caffres on the eastern side of the colony. Their bodies and cloaks were reddened all over with ochre mixed up with grease. ...These, with seven others left on the Sack [Sak] River, had come from their kraal on the Gariep, for the purpose, as they stated, of bartering in the colony for tobacco....he immediately asked for money to buy some [brandy]; for these people are shrewd enough to understand very well the nature and use of the Cape money. Two of them could speak Dutch readily....

The fact that two of them could speak Dutch shows close contact for some time, possibly as labourers or herders. But even earlier in 1797 in the Roggeveld a certain "Maritz was visited by two Xhosa who complained that Visser had shot and wounded their chief, 'Caapiteyn Danster' with small shot. These Xhosa were presumably part of the group that had entered the colony in May 1797 along with Korana refugees.[29] They had been working with Danster at Visser's farm as the *veldwachtmeester*[30] had hired them for the winter; but Visser was reluctant to release them from service and allow them to return to their own country...." Visser finally asked for advice on how to deal with the presence of groups of Xhosa within his district (Penn, 2005: 229).[31]

In 1808 Lichtenstein (1812: 219-221) also reported that farmers in the Roggeveld were complaining about the presence of roaming Xhosa who were begging for cattle or food – apparently a regular occurrence. The magistrate urged the Xhosa to hire themselves out as servants if they were unable to look after themselves.

Furthermore, three other areas in the Karoo were settled with Xhosa – Schietfontein (outside Carnarvon) was settled by Xhosa who had lived on the borders of Beaufort West in 1830, Pramberg (near Victoria West) was occupied by Xhosa from 1809, and in the far northern Cape a group of Xhosa settled at Prieska in 1795. In 1847 there were 620 Xhosa at Schietfontein, a fairly dry inhospitable area. Here they lived a nomadic lifestyle in easily transportable mat huts, although they did build stone walls and kraals (Anderson, 1987). Pramberg was a desirable upland location with good water and consequently this community was more settled than that at Schietfontein.

Land shortage and land pressure, however, as a result of the merino wool boom from the 1840s, was exerted by the big merino farmers to the east. In 1847, Sir Harry Smith declared that all crown land in the new territory (the boundary having been moved to the Orange River) could be auctioned and Schietfontein and Pramberg now fell within this territory.

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[29] In May 1797 Visser reported that a group of about 300 Korana together with a small number of San and Xhosa had crossed the Orange River and entered the Roggeveld. Penn states that these Korana were refugees without any cattle. (2005: 228).

[30] *Veldwachtmeester*: militia man

[31] CA1/STB 10/65 Maritz to Landrost 23 Sept 1797. (Penn, 2005: 229).

The Xhosa lost their land unfairly and when they moved away to find relief from a drought in 1851, they returned to find their land had been occupied in their absence.

Of further interest is the presence of people called "Mantatees". They came from Sotho-speakers with a stone-building tradition and entered the colony from the north as a result of political and social reconfigurations created by the Difaqane, which raged on the Highveld from about 1822 (Lye, 1967: 107). The word "Mantatees" should correctly refer to followers of the Tlokwa chief Manthatisi, who had a tremendous run of victories during the chaotic period of the Difaqane in what is now the Free State. However, after her defeat in 1823, many of her people drifted southwards "destitute, demoralised, hungry and insecure" (Mashingaidze, 1989: 130). "Mantatees" was also a general term given to any Tswana- or Sotho-speaking refugees from across the Caledon River.

George Thompson (1827: 383) estimated that there were about 1 000 Sotho and Tswana refugees in the Colony by 1826. He also found "the distribution of some hundreds of refugee "Mantatees" among the most reputable families as servants and herdsmen and proved a great advantage especially as Khoekhoe people had, according to [19th century explorer and traveller Andrew] Smith, 'drifted to urban centres or were living under the protection of Christian missions to avoid the humiliation of having to work for the people who had appropriated their ancestral lands'" (Mashingaidze, 1989: 133).

The "Mantatees" are relevant to this project because they came from a South Sotho background which had a tradition of stone-building. Khoekhoe, Xhosa and "Mantatees" all expressed dwellings as a dome shape and Sotho actually build corbelled huts in stone. "Partly built homesteads, kraals and defensive walls had long been used by Africans on the highveld and Mantatee workers brought their skills with them" (Beinart, 2003: 59). Farmers Rubidge of Graaff Reinet and Collett of Cradock had their "Mantatee" labourers build extensive walls, kraals and cottages for farm workers in the 1850s, "although for his own farmhouse Collett, as is the case in most landowners, employed British workers" (Beinart, 2003: 59).

There is no reason to doubt that the "Mantatees" could have moved further south towards the corbelled-building areas of the Karoo, although it does appear that most of them drifted back

across the Caledon River when the chaotic situation settled down again. It is, however, reasonable to suggest that corbelling was also a vernacular that was adopted by trekboers from displaced Sotho in the Difaqane period between the 1820s and late 1830s. These people came from a tradition of corbelling and clearly had the knowledge to make these dwellings.

Evidence for a corbelled building chronology

One of the fascinating issues about these structures is their chronology – fascinating in the sense that they are poorly understood vernacular buildings and from a documentary point of view almost invisible. Although there is some evidence which points to the dates of the later buildings, the date of construction of the earlier buildings can only be assessed by considering all the circumstantial evidence, as there is no actual date linked to the earlier buildings.

The trekboers started moving into the area in the 1750s. Wagons, *matjieshuise*, tents and even *hartebeeshuise* were all probably used initially to provide protection for their possessions from the elements and to provide a sleeping place for the family at night. Thompson (1837:55) confirms this when he writes: "...their dwellings are extremely small and chiefly occupied by their valuables, the people themselves passing most of their time in the open air. Many are even destitute of a hut, and live entirely in their waggons". People were probably loathe to invest the time and labour required to construct a stone building, and, if they were going to build any structure, it would probably be a kraal. By 1811 when Burchell passed through the area which today contains the corbelled buildings, he made no mention of this type of construction. Based on the fact that he was a careful observer and note-taker, we can infer that they did not exist at this time. Further negative evidence can be found in the land tenure laws. Only in 1813 when the Cradock Proclamation was passed could a farm *officially* be sold or given as a bequest (although this had been happening unofficially for years). Other avenues to pursue are surveyors' diagrams and oral sources.

Chronological evidence from surveyors' diagrams

Surveyors' diagrams provide some circumstantial evidence with regard to the dating of the buildings.

In 1813 in an effort to encourage farmers to improve their properties, the Cradock Proclamation was promulgated. This proposed a new form of land tenure which would

replace the old grazing license or *leg plaats*. In other words, "the Cradock Proclamation of 1813 gave the right of Loan Place holders to apply for their lands to be granted to them in Perpetual Quitrent" (Sampson & Sampson, 1994: 2). This perpetual quitrent meant that the owner would be able to officially sell or bequeath the property as he wished in exchange for an annual rent. However, before the property could be granted, it had to be surveyed, and it is these surveyors' diagrams which have become an important source of information for researchers. The applicant for the grant had to pay for a surveyors' diagram to be drawn up before his application would be considered which was an expense not taken lightly unless the farmer was committed to the piece of land he was applying for.

The information recorded on the diagrams is subject to the recording styles of the various surveyors. Obviously all diagrams define the boundaries of the farm and give researchers two important starting points with regard to the dates. These are the date of the survey and the date of the grant. Other information which may have been noted on the diagrams includes terrain, rivers, wagon roads, springs, outspans, dams and houses, but this was at the discretion of the surveyor. Therefore, if the surveyor's style was to record buildings or houses, the diagrams can provide an important clue as to whether the owner waited until he gained title to the land before building, or he took a chance and started working on his *opstal*[32] earlier.

After the Cradock Proclamation of 1813 there was very little activity until 1828 when Colonel Charles Cornwallis Mitchell was appointed Surveyor General of the Cape Colony, with the specific brief to try and sort out the backlog and confusion and improve the training of the field surveyors. This he did as best he could with limited staff. The staff figures show quite clearly why there were problems. During the period 1801-1850 a total of 18 804 surveys were carried out but in 1850, for example, the total complement of surveyors was only seven (Baker, 1958: 14). In addition to being understaffed, the surveyors had to deal with rough travelling conditions and settle boundary disputes between farmers before work could proceed. Progress was also hampered by threats of San attacks which left the land deserted for periods of time. Droughts also forced movement out of a district.

The surveys can be divided into two time periods, the first from the 1830s and the second from 1860 onwards, with a gap in the 1840s-1850s. A spate of surveys took place in the

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[32] *Opstal* - Buildings or other improvements on a farm, excluding the land (Branford, 1978: 172)

1830s, largely as a result of the reorganisation of the surveyors office and good rainfall after a long drought during which the farmers had deserted the area (Sampson & Sampson, 1994: 3). Most of these were translated into grants in 1838. With regard to those farms which are now known to have corbelled buildings, the most prolific surveyor was C.G. Ochse. He indicated springs, rivers, arable land and pasturage, but no dams or other constructions. Most of these farms were still surrounded by "Government Land" or "Waste Land" and one can safely assume that the farms surveyed at this time were on key water sources with the best pasturage.

The fact that arable land is marked seems to indicate that crops were indeed being cultivated, or at least considered, at this time. On a few farms Ochse indicates a habitation spot by means of a small circle or square – whether or not he is referring to buildings, we do not know. The farms Paardegrasvlei, Vischgat, Rietfontein, Leeufontein, Krabfontein, Slingersfontein, Driefontein, De Goede Hoop and Eselfontein are all farms with corbelled buildings and all have these marks. Of interest is the fact that the house site at Driefontein (surveyed 1830) is indicated, but not that at the Hondefontein spring which is on the same diagram. Hondefontein, therefore, must have been inhabited on a permanent basis after 1830. The same is the case for De Goede Hoop, where the habitation at Louw se Plaas is not indicated. Farms with no habitation spot demarcated included: Rietpoort, Vlieefontein (Brandewynsgat), Leyfontein (Hartebeesfontein) and Kiewietsfontein (Welgevonden). Two other surveyors, P. Meiring and J.W. Wentzel, worked in the area at that time and their work follows the same pattern.

In the face of the lack of any other evidence, it can be assumed that probably few permanent buildings were built before 1813. The Cradock Proclamation, however, forced the trekboers to view the availability of the land differently, especially as previously open land would increasingly be taken up by grants to other farmers. On this basis the best spot had to be chosen and applied for, and even though some farmers received grants for a number of farms, their seasonal movement was increasingly limited to their own land as other previously open land became "privately" owned. For reasons already discussed there was a hiatus before surveying began in about 1830. I would suggest that the first corbelled buildings that were built as houses were probably built between 1813 and 1830. If they were built before the surveys, they were not large or significant enough to warrant any notation on the diagram.

The presence of small corbelled *kafhokke*[33] in the Roggeveld and the areas south of Fraserburg possibly presents another dating problem. The area south of Fraserburg would have been amongst the most sought after and earliest settled simply because of its high rainfall compared with the areas towards the east. In addition, the Orphan Chamber inventories mention ploughs, sickles and other wheat growing equipment from an early date (late 1760s). But we have to ask ourselves where the grain was stored. There seems to have been sufficient wood to construct rectangular pitched roof houses, and the possibility exists that small corbelled *kafhokke* were built early in this area and the design was later enlarged to be used as houses when the trekboers settled on farms in treeless areas.

There was a hiatus between 1840 and 1860, during which time the surveying and registration of grants fell because the British government insisted that the quitrent system be abolished and in future land be sold outright. Drought in the late 1840s also played a role. However, settlement had not halted and the trekboers continued to move onto land and settle. Basically they were squatting on Crown land. But "in 1860 the British government backed down and quitrent tenure was restored" (Sampson & Sampson, 1994: 7). This resulted in a surge of applications from those who had effectively been living rent-free on the land, although by now all the "best" land had been allocated and only the drier marginal areas remained. These later surveyors worked mainly towards the north in the Kareeberg area, although a few pieces of unclaimed land in the Nieuweveld were also surveyed. The three surveyors who concern us during this later period were F.L. Doesel, M.P. Auret and Sam Melvill. Of particular interest to this project is that fact that all three marked "rondavels" or "roundables" on a limited number of diagrams for the early 1870s period.

Considering the 20 year hiatus, it is understandable that by the time this batch of surveys was undertaken, certain farms were already quite well developed, unlike those surveyed in the 1830s. For example, in 1871 Melvill noted three building of interest to us: a "rondavel" at Omkeerkolk, a "rondavel" at Blaawbos Puts and a "rondavel ho" (i.e. house) at what appears to be Silvery Holme on the farm Nieuwenhuisvlakte. In 1873, Doesel noted a "roundable house" on De Dam and a "roundable" on Gorras. In 1876 Auret identified a house "rondavel" on two adjacent farms, Tygervlei (Tiervlei) and Roodedam, and finally one of the above surveyors (we are not sure which one) noted two "rondabels" on the farm Spoorkolk. All

[33] *Kafhok*: chaff storage building, not a granary.

these surveyors also noted other infrastructure such as dams and kraals, but interestingly enough, do not comment on the pasture or arable land, which was an important feature of the 1830 diagrams.

It is not known when the word 'rondawel' or 'rondavel' first appeared in writing. In 1837 the word 'rundtafel' appeared in a book called *Sudafrikanshe Skizzen* and in 1884 the word 'ronddawel' was published in a book called *Practical Dutch Grammer*. The word 'rondavel' seems to have appeared in print for the first time in 1813 in a book called *Africanderisms* (Nienaber 1968: 1). In these cases the reference was to what today would be called "cone on cylinder" huts which were built on Boer farms, sometimes for accommodation, but also with loop holes all around to protect the family when under attack. Sellick writes in *Uitenhage Past and Present* (1905) that: "To protect themselves from these raids the farmer used to build a little cylindrical shaped tower between the house and kraals, loop holed all round and commanding views of home and fold. Here he would spend night after night with his grown-up sons watching and awaiting the attacks of Bushmen. These roundables (round towers) as they were called are still be be seen on the oldest farms in the Longkloof and in other parts of the country" (1905: viii). The threat of San attack was long over before the corbelled buildings in the Karoo were constructed and they do not have loop holes. The windows are small for practical reasons. It seems that when the surveyors were using words such as "rondawel", "rondabel" and "roundable" they were probably referring to round houses with stone roofs.

Tables 2.1 and 2.2 below provide records in which corbelled buildings are noted on a diagram and yet these same surveyors made diagrams of other farms which we now know have corbelled buildings but did not mention them at the time of the survey.

Table 2.1 Farms with corbelled buildings identified by surveyors.

Farm	Surveyor	Note on diagram	Survey date
Omkeerkolk	Melvill	Rondavel	1871
Blaaubos Puts	Melvill	Rondavel	1871
Silvery Holme	Melvill	Rondavel House	1871
De Dam	Doesel	Roundable	1873
Gorras	Doesel	Roundable	1873

Farm	Surveyor	Note on diagram	Survey date
Tygervlei	Auret	Rondavel house	1876
Roodedam	Auret	Rondavel house	1876
Spoorkolk	Unknown	Two rondabels	1877

Table 2.2 Roundables not noted on these farms of the same period, although all have substantial corbelled buildings today.

Farm	Surveyor	Notes on diagram	Date of survey
Grootfontein	Melvill	House	1869
Droogeputs	Melvill	no building noted	1869
Klipkolk	Melvill	no building noted	1869
Leeuwkrantz	Melvill	House	1870
Van Reenensplaats	Melvill	House	1870
De Hoek	Melvill	No building noted	1870
Voorste vanZylsplaas	Doesel	No building noted	1869
Brownslaagte	Doesel	No building noted	1871
Banksfontein	Doesel	houses	1871
Spionberg	Doesel	House	1873
Schuinshoogte	Doesel	House	1873
Rietbraack	Doesel	No building noted (this is a *kafhok*)	1873
Arbeidersfontein	Doesel	No building noted	1873
Osfontein	Auret	House	1873
Stuurmansfontein	Auret	Houses	1874
Vryelaagte	Auret	House	1874
T'kokoboos	Auret	Houses	1874
Krugerskolk	Auret	No building noted	1876

On the basis of this data, the following points can be made.

It is clear that the large square-based buildings with pitched roofs, such as Arbeidersfontein, Konka, Droogeputs and Klipkolk, were not built at the time the farm was surveyed or they would have been noted on the diagram. Furthermore, by the early 1870s, the really large cone-shaped round-based corbelled buildings, for example, Stuurmansfontein and T'kokoboos. had been constructed and were substantial enough to prompt the surveyor to call them "houses" as opposed to "rondavels".

What were the elements that caused the surveyors to note rondavels? I am reasonably certain that they did not mark outbuildings, since these are never commented on or noted. The only other conclusion I can draw is that the rondavels were actually being used as houses. They had doors, windows, niches and shelves, all the attributes of a house, but were not of substantial size and therefore demanded a title other than 'house'.

The fact that only eight of these rondavels or rondabels are mentioned on diagrams, despite that the fact that nearly all the diagrams for the districts have been examined (those that could be found) can only mean that other large buildings were not built, or were considered to be lowly outbuildings or the habitations of "others" on the farm, for example, *bywoners*[34], herders, and so on.

The later diagrams give a date at which time corbelled buildings existed, they also give clues as to how people were thinking and differentiating between different types of building at the time. What is the value of these later survey dates? At this point they do suggest a time frame for the later period of grants and they do coincide with our knowledge of the history of the settlement of the area, that is, the northern, drier areas were settled later than the southern areas that have more water. But they still do not tell us when the corbelled buildings were actually constructed. Additional hints are provided by oral histories.

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[34] *Bywoner*: "An authorised squatter or sharecropper working part of another man's land, giving either a share in his profits or labour or both in exchange (Branford, 1978: 41).

Oral histories

Corbelled buildings are an excellent example of how quickly information about vernacular buildings can disappear. Of the over 60 farms that I have visited (over 100 corbelled buildings), only eight have any oral information relating to dates. This is even more remarkable when one considers that there are still a few present-day farmers, who are direct descendants of the original grant holder, and some even lived in the larger corbelled buildings as children, before the 1950s wool boom enabled everyone to built a "smart" house.

An aggravating factor is the fact that many of the farms are deserted, some without even an "overseer" to keep an eye on the property. Apart from the few "family" farms, the area has a history of migration and movement as a result of drought, bankruptcy, the attraction of the diamond fields of Kimberley from the 1870s and later the gold mines of Johannesburg, and many farms have changed hands repeatedly over the years. However, I was able to collect some oral histories relating to dates.

Krabfontein

The earliest anecdotal date is 1815, and comes from Krabfontein, which has four corbelled buildings on the farm *werf*. Two are similar and the other two are quite different in design. Walton states: "Mr J. J. le Roux, the owner of Krabfontein [in 1960s] in the Fraserburg district, informed me that the inside of a large circular corbelled building on his farm was painted and decorated by a man named Te Boer in 1815 and that the name 'Te Boer' and the date '1815' were painted on the wall, but that these were covered over by later coats of paint. Mr Le Roux further stated that his grandfather was born there c.1850" (Walton, 1989: 123).

Based on my experience of building styles gathered over the the course of this research, I suggest that the 1815 date is incorrect because this structure is a shape and size more in keeping with the buildings constructed between the 1860s and 1880s. What is more, the surveyor, Ochse, who surveyed the farm in 1830 (early for this area where the surrounding farms were only surveyed in the 1860s), gave no indication of an existing building on his diagram. Although it was not his style to name houses as such, he seems to have indicated the presence of structures by means of a dot on the map and my assumption is that there was no structure worthy of being noted on the farm.

T'Kokoboos

A large circular building on this farm has the date 1851 in plaster over the entrance. There are, in fact, three large round-based cone-shaped buildings here. This farm was surveyed by Auret in 1874 and he clearly marks on the diagram that "houses" existed at this spot. Walton (1989: 127) was told "this hut (the largest of the three) was built by the original owner and a coloured labourer in fifteen days".

Gorras

The present owner, Gys van Wyk, states that his great grandfather built the original corbelled building as a family home in the 1870s or 1880s. This ties in with the diagram of Gorras which was drawn up in 1870 by Doesel on which he marks a "roundable" at this spot. Gorras actually has three additional corbel buildings scattered across the farm. A wagon road passed right through the farmyard or *werf*.

Konka

When James Walton visited Konka in 1960, the owner stated that the the square-based building was on the farm when his father bought it in 1885. The second corbelled building with a round-base was built during his father's time. The square-based building was built by a man named Winkus. An old man named Redelinges related that when he was a young boy he helped to build the round-based corbelled building (Walton, 1989: 126). The farm was originally surveyed in 1849 by J.A. de Villiers (one of the few surveyed in the 1840s). His diagram indicated a road and two springs but he gave no indication of any building, and a large building such as the square-based corbelled building would certainly have been noted.

Schuinshoogte

The owner, Mr Esterhuyse, told Walton in 1960 that he estimated that the corbelled building was about 100 years old, that is, an estimated date of 1860 (Walton, 1960: 13). Surveyor Doessel marked it as a house in 1870. Another report states that the owners of Arbeidersfontein said that Schuinshoogte was built between 1860 and 1872 by two coloured men named Tiensjielings and Gedaanwerk (Ferreira, 1986: 78).

Arbeidersfontein

According to Walton (1960: 14), the original corbelled building was built by Hendrik Esterhuyse in 1872, although he does not mention where he obtained this information. The farm was surveyed in 1870, by Doesel, although the grant was only made in 1892! As Doesel's diagram makes no mention of a building on the site, we can assume that the huge corbelled building did not exist in 1870. In *Die Noordweste* the authors state that Arbeidersfontein was sold in 1875 by T.J.J. Buckle to A.J. Esterhuyse and mention is made of a corbelled building in the "pagkontrak" (Ferreira, 1986: 78).

Vlieëfontein (Krugel's Claim, Brandewynsgat)

According to Dr Taffy Shearing, who for many years lived on the nearby farm Layton, the small corbelled building was built in about 1855 by Gabriel Gerhardus Krugel (Shearing, 1977) to be used as a stopover when moving sheep great distances. The building was still occupied by a family in 1916. The farm was surveyed in 1833 and granted in 1838. At the time of the survey, no buildings were noted.

Leyfontein

When the present owner's family bought the farm in 1911, the settlement at the Leyfontein fountain was already deserted, but the owner's father remembered attending school in one of the corbelled buildings (Willie Nolte, pers.comm.). Leyfontein was surveyed (as part of the farm Hartbeesfontein) in 1830 by Ochse, who made mention of two springs, but no buildings or other features. This farm is surrounded by farms which were only surveyed late (1870s) and formed a self-sufficient settlement with gardens, *kafhokke*, kraals and at least four corbelled buildings that are all positioned around the Leyfontein spring. This area has substantially more rain than the drier west and this may be a reason for its early settlement. The permanent spring would also have been an attraction.

Silvery Holme

Silvery Holme is on a triangle of land which has changed hands repeatedly. It is likely that the "rondavel" and "Ho" (house) referred to on the diagram is Silvery Holme. This was noted by Mellvill in 1871 when this section was annexed by the neighbouring farm, Nieuwenhuisvlakte. This is an area in which most of the surveys were carried out in 1830.

Grootfontein

The date "5/7/1885" is scratched on a pane of glass in the corbelled building on this property. On Melvill's diagram, the survey date is given as 1869, at which time there was a house marked and this must refer to the huge cone-shaped corbelled building.

In summary, these oral histories do provide us with confirmation of the approximate dates of construction of the larger, more northerly buildings. All the oral evidence points dates in the 1860s and 1870s. All the corbelled buildings noted on diagrams are from surveys carried out in the 1870s, except for the two in the south. The land on which Omkeerkolk stands remained "Government Land" until it was finally surveyed, and Silvery Holme was resurveyed when it was purchased by the neighbouring farmer.

Other assumptions

The link between the increasing size of corbelled buildings and the later 19th century dates as suggested by the date of the survey for the perpetual quitrent grant is tenuous but worth investigating. If we assume that the dates of the perpetual quitrent grants are significant in the development of the farm, then it is an interesting exercise to compare the dates of the grants with the size of the corbelled buildings. To explore this I have used a simple index of building heights compared with the two major periods of surveys in the area (Fig. 2.4)

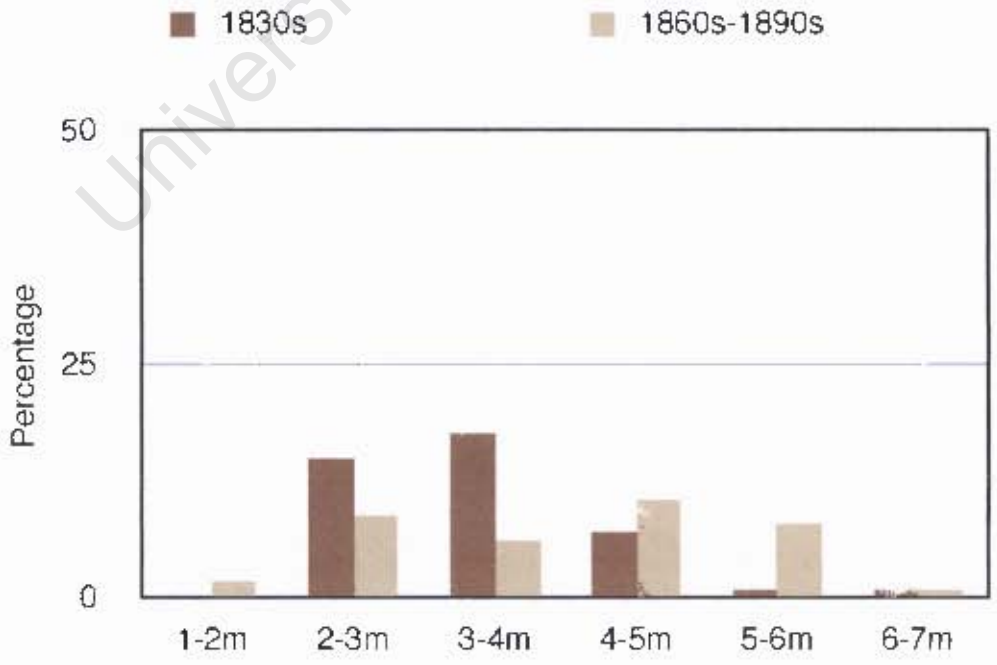

Figure 2.4 The relationship between the date of perpetual quitrent grant and height of corbelled buildings, based on a total of 88 buildings for which roof heights exist.

Figure 2.4 clearly illustrates that there is some relationship between date of grant and the height of the building. The evidence is even stronger if one removes Slingersfontein, the single building in the 1830 group which has a roof height between 6 and 7 metres, for although the grant for Slingersfontein is dated 1838, the style and size of the building point to it being built at a much later date. This is particularly clear because a comparison between Stuurmansfontein 1A, (granted in 1874) and Slingersfontein, shows that they are stylistically identical (Fig. 2.5) and they could have been built by the same person.

Figure 2.5 Stuurmansfontein 1A *(left)* and Slingersfontein *(right)*. (Photograph of Stuurmansfontein: Walton, n.d.).

In the Typology which was created for the corbelled buildings, one level was created that was based on size – either height or floor diameter – one of which had to be more than 5 metres, which I decided moved the building in a category which could only serve the function of a house, and not some form of outbuilding. The anomalies are the two large buildings on farms with 1838 grants, Slingersfontein and Krabfontein.

Although trekboers were in the area as early as the 1750s, it is almost certain that corbelled buildings built as habitations were not constructed before 1813 – in all probability closer to the 1830s. Oral histories point to the fact that the larger, more northerly corbelled buildings were constructed in the 1870s. This gives us a time period for the construction of these buildings of 30-50 years which was a period when housing was required and before the arrival of corrugated iron which made roofing easier. Improved roads, the maturation of poplar groves and possibly more available money from the sale of wool, would provide the timber beams needed for a pitched roof house.

Conclusion

The early travellers in the area are important more for what they do not say, than what they do. An observant traveller like Burchell travelled right through the middle of the corbelled building area and failed to mention this type of building at all, despite his comments on other types of "humble dwellings" (1822: 237). The latest buildings in our study were built around the 1870s according to information gathered from individuals in the area about 50 years ago (Walton, 1960).

The trekboers, with whom the corbelled buildings are associated, moved into the Nieuweveld area from the 1750s onwards. Therefore, we appear to be looking at a period covering about 120 years. But, if we accept Burchell's failure to mention corbelled buildings as an indication that they did not exist in 1811, then the time period we are looking at is reduced to about 60 years from about the 1830s to about the 1880s. This chronology for the corbelled buildings is srengthened by the survey diagrams and the bits and pieces of oral evidence. This means that corbelled buildings were built over a period of little more than half a century.

Important factors in the 19th century focus on changes to the conditions under which land was held. The legal situation with regard to land ownership was complicated and confused until the Caledon Proclamation in 1813 declared that all loan farms should be converted to perpetual quitrent farms and that future grants would be given on this basis. Grant holders were given legal rights which they had not had before. Applicants had to pay to have their piece of land surveyed and lodge this survey with the government, so even though the farm was still held on a loan basis it created a *feeling of permanency.* In addition, farms could now be sold and bequeathed legally. This feeling of permanence and ownership probably contributed to the investment in labour necessary to build permanent stone buildings.

What human influences would have come to play in the construction of corbelled buildings? The growing population of the Karoo certainly presented a mix of many people, some of whom could have played a role in the cultural template and the practical know-how of building the corbelled structures. Among the white trekboers, *smouse*, hunters, butchers' agents, land surveyers and other government officials, many of whom had been born in Europe, were people who may have known about corbelling. Indeed, Walton (1960) saw these

people of European descent as key in the origins of the evolution of corbelled buildings in the Karoo.

But corbelled structures were integral to the 17th to 18th century Sotho homesteads on the Highveld. Add to this the presence of San, Khoekhoe and Xhosa peoples, and the cultural template of the dome and the know-how of how to build it in stone were all in place. This entanglement, where indigenous people shared knowledge about dwelling in a demanding environment took place over some time. The Boers who were living in this landscape by the late 18th century adopted indigenous forms of dwelling as a logical solution to providing shelter. In this way formerly clear cultural groupings gradually become less distinct but ultimately the colonisers prevailed in the second half of the 19th century and took possession of the land. To maintain that there were sharply separate cultural values between European and indigenous does not fit the evidence present so far.

Over the past 15 years historians and archaeologists have given some thought to the concept of borders, boundaries and frontiers. This represents a shift from lines on a map to zones of interaction, cross cultural exchange, cultural innovation and the melding of new identities. There is no doubt that what the trekboers and all the other groups in the area in the 18th and 19th centuries represent a classic frontier situation, where "Frontiers are areas between. They are places at the edge of cultural spheres and therefore embody the loci within which culture contact takes place. .... frontiers can be influenced by a variety of geographic, political, demographic, cultural and economic factors, frontiers are extremely dynamic and often unstable zones that exhibit a marked degree of variability through space and time" (Parker, 2006: 77). This description fits the situation on the Karoo frontier perfectly. Frontiers are areas where people of different cultures come into contact with one another with resultant adaptations of behaviour on all sides. The indigenous people had, of course, had contact over the years with hunters and others who explored the area before the main thrust of the trekboers arrived.

But the trekboers represented a more sustained presence and it was inevitable that different groups would become "entangled", especially considering the trekboer practice of taking indigenous people as labourers and servants and a very close relationship developed between the groups (Fig. 2.6). The net result of this "culture contact" (Lightfoot, 1995: 199), was a

situation in which "new cultural traits were adopted.....interaction, exchange and creativity took place within multi-ethnic social environments, resulting in multiple cultural configurations ...(Lightfoot 1995: 206). In this way trekboers adopted the *matjieshuis* of the Khoekhoe (Fig. 2.6), the Khoekhoe learnt to ride horses and the San developed a taste for tobacco. What does this mean in terms of corbelled buildings? I suggest that the simplest explanation for the Karoo corbelled structures is that they too were a skill and a dwelling form adopted by trekboers for their own habitation.

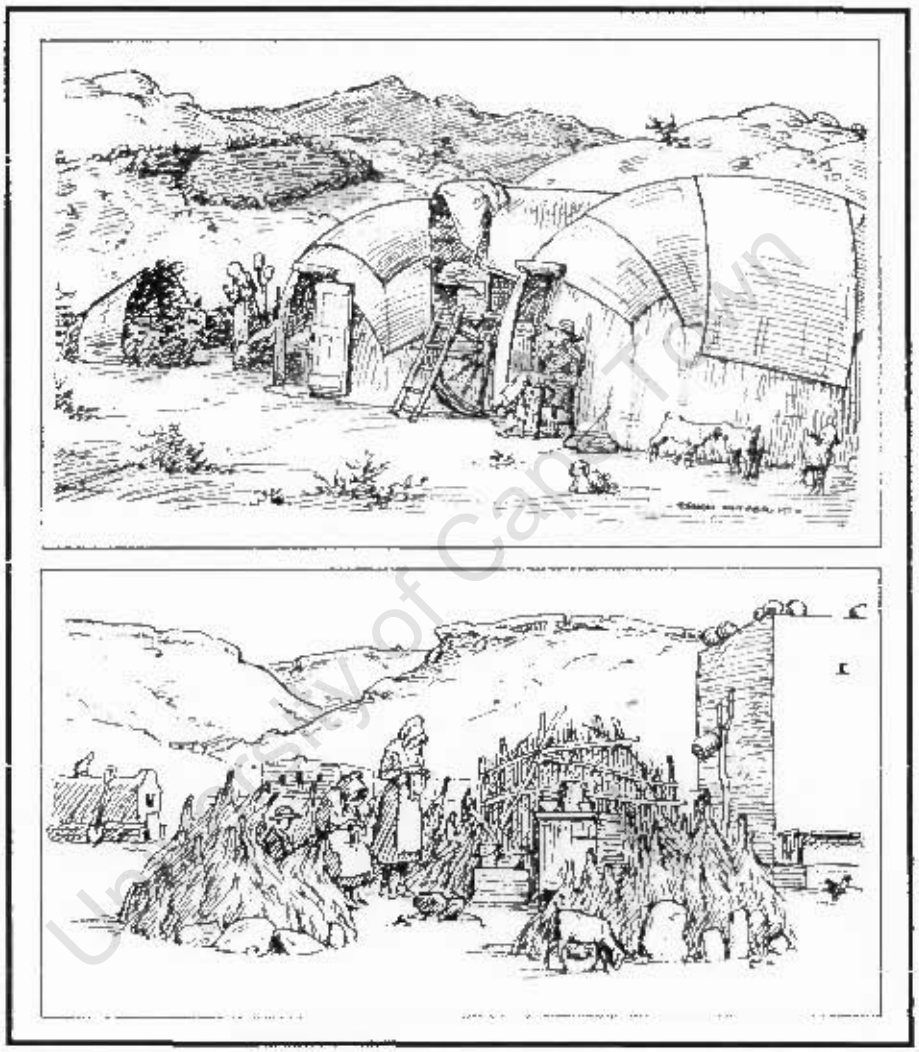

Figure 2.6 Sketches made by Erich Mayer in the 1920s illustrates cross-pollination: the adoption of the indigenous *matjieshut* by trekboers. Webley (2009: 34) contends that the Khoekhoe adopted the *kookskerm* from the trekboers. (Pictures from *Die Boerevrou Boek*, 1950.)

This chapter attempts to describe the background out of which and against which the corbelled buildings were developed and constructed. It is a period when a number of factors which contribute towards the construction of corbelled buildings come together at the same

time and place. The physical environment was in place as there was plentiful suitable stone but no wood; land title conditions changed giving rise to a feeling of ownership and permanence; the Boers were already adopting indigenous forms of shelter and were used to living in small round structures, and the "Mantatees" with a stone building tradition arrived in the area in the 1820s.

I have suggested that a concept of frontier as one of interaction, entanglement and cross cultural exchange is critical for the understanding of the corbelled house as a vernacular form. Historical influences in the Karoo are not compartmentalised and in this study of corbelled buildings I am attempting to dismantle some of the cultural barriers that emphasised differences and instead look at the corbelled buildings as products of the general pool of knowledge available in the area at the time.

I now go on to consider briefly the environmental conditions in the Great Karoo before going on to describe the actual form of the corbelled structures.

CHAPTER THREE

THE ENVIRONMENT

The Great Karoo is regarded as a marginal region with a reputation for having a harsh climate and a limited range of fauna and flora. Although natural scientists have been studying the geology, agriculture and other sciences in the Karoo for years, usually in relation to improving farming techniques in the region, the social history of this vast area has, until recently, been neglected. Malan's letter to Walton (see Page 1) epitomises the attitude that there is no reason for anyone to visit the Karoo. But the area *was* inhabited by indigenous people and the trekboers *did* enter the Karoo. This chapter discusses the environmental conditions with which they had to deal on a day-to day-basis.

Vegetation

The majority of the corbelled buildings lie in the Nama Karoo Fig. (3.1) where the main vegetation is "grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soil, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs" (National Biodiversity Institute, n.d.). The soil is generally considered to be poor and the combined effects of drought, overgrazing, kraaling and tramping have resulted in an increase in unpalatable shrubs over the years. Although vast herds of springbok probably caused some environmental damage, on the whole the original fauna of the Karoo tended to feed differentially on the veld (Judy Maguire, pers.comm.). However the arrival of thousands of sheep and the intensive grazing, which the trekboers allowed, resulted in the plants most favoured by the sheep being eaten almost to the point at which the veld could not recover.

Other farming techniques such as kraaling led to parts of the veld being trampled on a daily basis and resulted in seeds not being naturally dispersed on the veld.

One of the characteristics of the Nama Karoo is the lack of substantial trees. The hardwood trees are very slow growing, and an *Acacia karoo* growing on a river bank takes over 20 years to reach its maximum height (Milton *et al.*, 1999: 191).

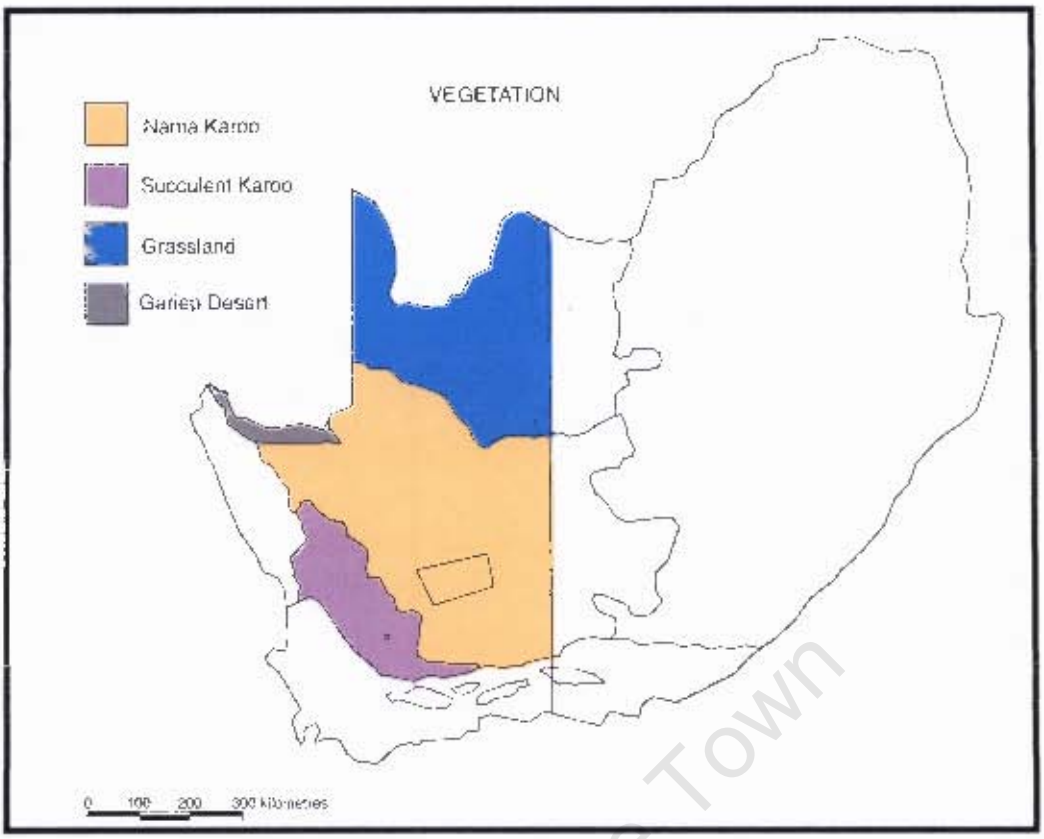

Figure 3.1 This vegetation map shows that the majority of the corbelled buildings lie in the Nama Karoo. The outlying buildings in the Sutherland district (represented by a dot), fall in the Succulent Karoo. (Adapted from map produced by National Botanical Institute, 2004.)

Rainfall

Nama Karoo vegetation is supported by summer rainfall (Fig 3.2), with the heaviest rainfall in March and the least in July. The rain typically occurs in short, sporadic cloudbursts over the summer months which produce an annual rainfall range between 146 and 200 millimetres (Fig. 3.3), although the reliability and intensity of the rainfall varies within this area (Desmet & Cowling, 1999: 4).

The climate of the Nama Karoo is harsh and described by Dean and Milton (1999: 16) thus: "The combination of low and unpredictable rainfall, and extremely high summer temperatures, makes these some of the harshest environments in the Karoo". Exactly how much rain falls and how often is very regionalised due to effects of weather patterns and topography. An example of this is the fact that the group of corbelled buildings which lie south of Fraserburg in the foothills of the Nieuweveld, receive substantially more rain than other areas of the Nama Karoo – over 200 millimetres per annum.

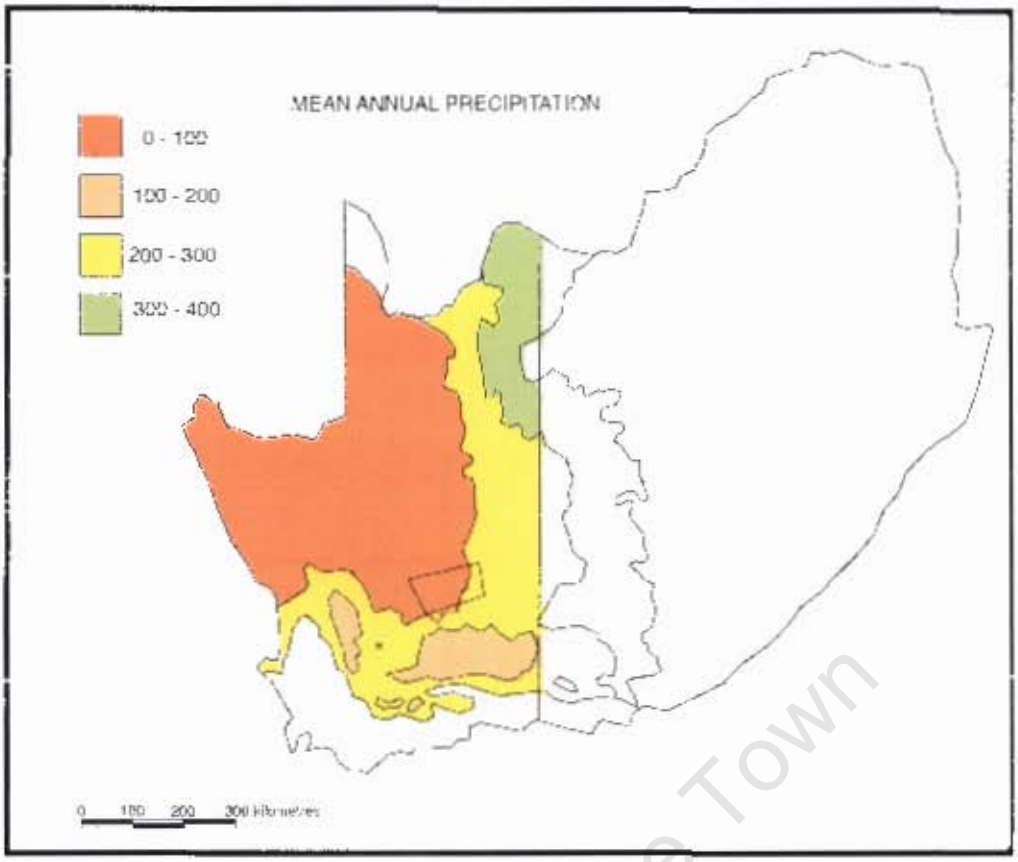

Figure 3.2 Map illustrating annual rainfall. (Adapted from Department of Water Affairs and Forestry map.)

It is because it can rain heavily in one area and not another a short distance away, that determined transhumance and the trekking movements, first of the Khoekhoe and later of the trekboers, who lived in the more central Karoo, and no longer had the option of a winter return to the Roggeveld. Their livelihood depended on following the rain.

In contrast, the succulent Karoo of the Roggeveld receives regular winter rainfall which is substantially higher than that of the Nama Karoo – as high as 290 millimetres per annum and the rainfall is also more reliable. "On average the rainfall in the winter rainfall Karoo is 1.15 times more reliable than corresponding rainfall in the summer-rainfall Karoo. This difference has important implications for the type of plant life-history strategies and plant community structure and dynamics prevalent in the different regions of the Karoo" (Desmet & Cowling, 1999: 8). It is this fairly regular winter rainfall upon which the trekboers of the Roggeveld based their seasonal movement from the Karoo escarpment in summer, down to the lower Karoo in winter. This pattern is still followed. This rainfall pattern affected the builders of the corbelled buildings in the Sutherland area.

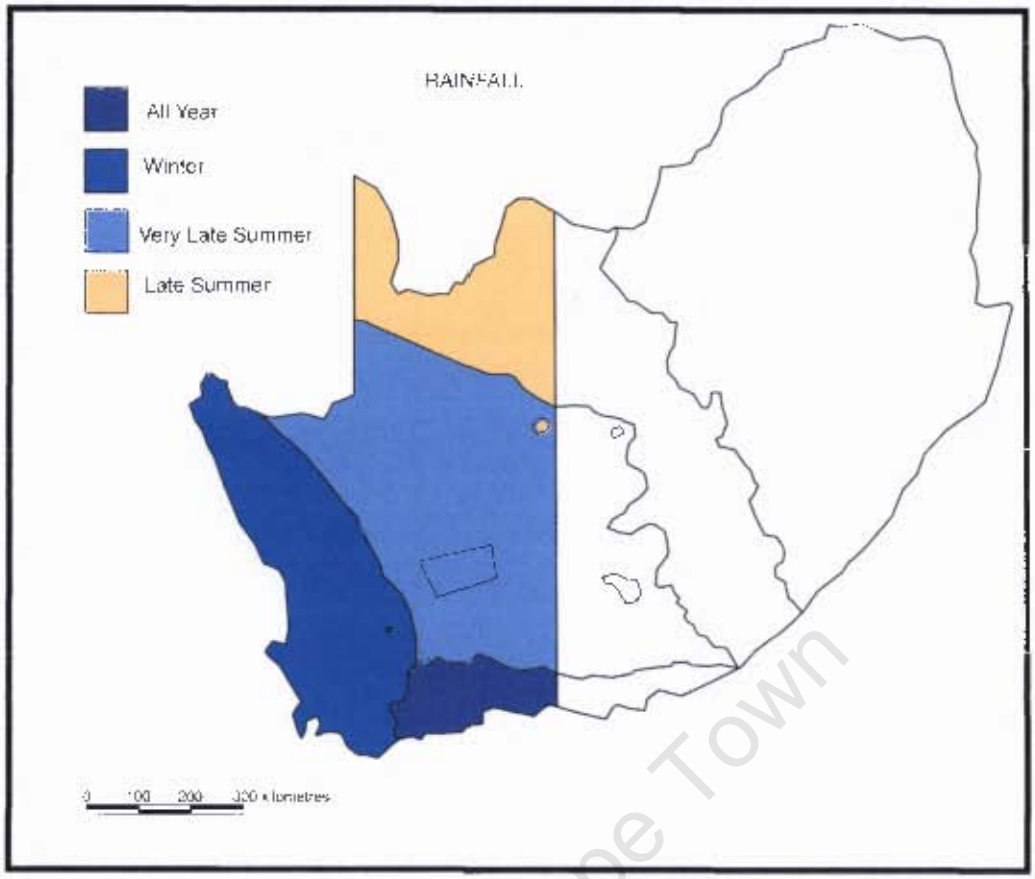

Figure 3.3 Map illustrating rainfall seasonality. (Adapted from Department of Water Affairs and Forestry map.)

On the eastern side of the Karoo summer rainfall becomes heavier and more regular, and supports good veld and sufficient water to build large dams. The result is larger farms and wealthier farmers. This makes the Sneeuberge/Middelburg areas to the east of Carnarvon more desirable for stock farmers compared to areas such as Fraserburg and Carnarvon which have comparatively lower rainfall figures. While rainfall did dominate the lives, not only of the trekboers, but all the inhabitants of the region, access to a supply of predictable underground water was also critical.

Geology and building materials

The geology of the area provided appropriate building materials and is important in this regard. The geology underlying the area is part of the flat, largely horizontal Karoo Supergroup and plays a key role in the distribution of the corbelled buildings as it provides stone of an ideal type for breaking into building blocks – mudstones, siltstones and finely grained sandstones (Visser, 1986: 7,10). The Karoo Supergroup is divided into three parts,

the Ecca Subgroup, the Beaufort Subgroup and the Dolerite intrusions in the form of volcanic sills and dykes (Fig. 3.4).

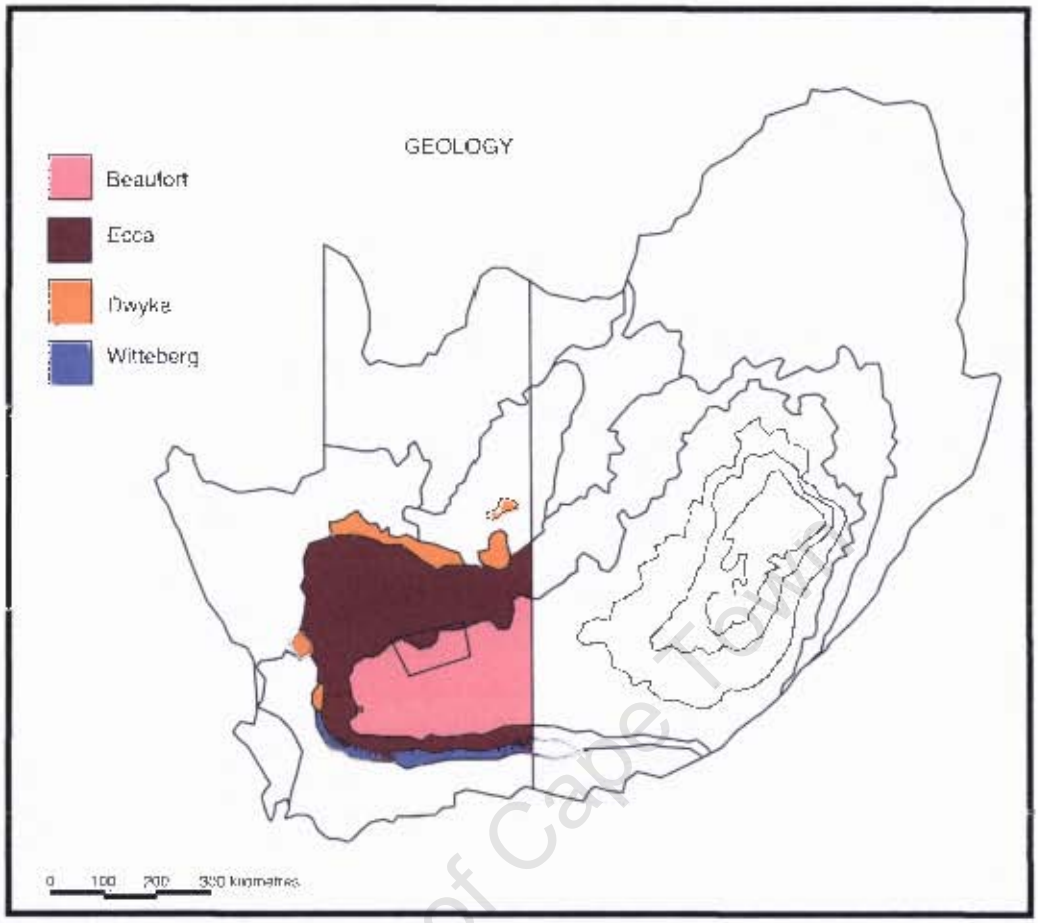

Figure 3.4 Map illustrating the geology. (Adapted from a Department of Water Affairs and Forestry map.)

The sediments which form the earlier Ecca Subgroup, which are exposed on the surface towards the north of the area, as well as in low lying areas as far south as Loxton (Judy Maguire, pers.comm.), were laid down under deltaic conditions. The finer sediments of the Beaufort Subgroup were laid down in low energy riverine and stream conditions. Volcanic intrusions of dolerite were also formed during this period and these are largely responsible for the hills and outcrops of stone boulders. The most suitable stone for corbelled hut construction comes from the Beaufort Subgroup, and while stone from the Ecca Subgroup is widely used in the areas north of Loxton, this stone can be fissile, prone to cracking and does not provide large slabs of stone such as found in the Beaufort Subgroup (Judy Maguire, pers. comm.).

Geology and Water

The geology in the Karoo determines the availability and quality of ground water. In the summer months many trekboers moved north towards the pans which formed on the edges of Bushmanland, but if not, they were reliant on underground water, rain or temporary standing pools in riverbeds (Fig 3.5).

Figure 3.5 Pools of water in the Sak River. This photograph was taken from the Sak River bridge at the end of March 2009. Within a few weeks these pools had evaporated.

In the southern areas of the Nieuweveld, "groundwater is generally found in joints in Karoo sandstone. It is also often associated with dolerite intrusions such as dolerite dykes and, to a lesser extent, dolerite sills" (Hodgson, 1986: 84). Where the sandstone cracks or joints meet dolerite at or near the surface, a spring is formed. According to Hodgson, underground water can only be obtained from these cracks. This gives rise to the many springs in the area as evidenced by farm names such as Springfontein, Rietfontein, Elandsfontein, Witfontein and Modderfontein. Other names such as Gansvlei and Brakvlei are also indications of the presence of water.

North of Loxton locating water becomes more of a challenge as there are no dolerite intrusions to dam up underground water and the gradient of the water table is low as the landscape is flat. Hence names such as Gorras (Khoe word for a hole dug in the riverbed), Droogeputs (dry *put*), Klipkolk (stone pan) and De Puts (the *puts*). Water could be obtained by digging down into the river bed, the so-called "gorra", which was often lined with stones to prevent the sides from caving in when it got too deep. However, in the northerly mountainous areas around the Kareeberge, the geology once again gives rise to springs.

In extreme cases the strategy used to get water was to dig through solid rock using the crude tools available at the time, to find the water table and create a *put*, hopefully with water that was not "brak" or mineralised (Fig 3.6). The quality of the water depends on the concentrations of soluble salts in the rock and in this way the geology determines whether the water is usable or not. Some *puts* were up to four metres deep and getting the water to the surface was a labour intensive and time-consuming problem. Various devices from the simple bucket and rope, to *wipput* (shaduf) to the later donkey-driven *bakkiespomp* (bucket pump) were used. The *bakkiespomp* was introduced in the late 1880s and made raising water from the *put* much easier with the result that vegetable gardens could be established more easily (Ferreira, 1986: 66).

Figure 3.6 *Put* dug through solid rock at Aasvoelsvlei.

When suitable machinery became available in the late 1890s, boreholes were sunk, but in order for boreholes and windpumps to be successful, they too had to tap into water trapped in cracks in the Karoo sandstone and along dolerite intrusions (Beinart, 2003: 86). Finding this spot was important because "little storage of water takes place in Karoo shale and pumping will soon exhaust this resource which can only be replenished by rainfall" (Hodgson, 1986: 86). Windpumps changed the depths and ease with which water could be obtained, but until the windpump arrived, some areas, for example south of Williston, which were flat and away from rivers, were extremely difficult to farm through lack of water or technology to access it.

In all efforts to access underground water, rainfall was still critical because it determined the level of the water table, the amount of water available and the quality of the water. Soil

compaction by the tramping of millions of sheep feet could reduce absorbency and rain, rather than uniformly soaking in, ran off with decreased effect into larger drainages.

Geology and arable land

The geology, apart from influencing the availability of water, also affected the planting of crops. The problem for Karoo agriculture is thin soil and bedrock that lies close to the surface, if not actually on the surface. Most arable soil is alluvial and found adjacent to riverbeds. This soil, however, soon became depleted or rendered unusable due to the buildup of alkaline salts present in the water used for irrigation and arable soil soon became "verbrak" or mineralised (Fig 3.7). One farm near Prince Albert became "verbrak" within 30 years (Judy Maguire, pers.comm.).

Figure 3.7 Old crop lands on the aptly named farm Bitterwater. The buildup of salts from the water used for irrigation has rendered the soil unusable.

Dams

In order to capture and store what little water there was, riverbeds which were usually dry, but flowed after summer rainfall, were dammed from a very early period (Fig 3.8). There is no sign of dams on the 1830 diagrams, but as soon as they were settled on their farm, the farmer would have started to make provision for water by the easiest means possible, that is, by blocking a riverbed. The surveyors' diagrams of the 1860s clearly indicate dams. But dam failure, especially in larger earth dams (Fig 3.9), had dire consequences as the resultant flood of water could wash away alluvial soils next to the river. Thus in one stroke a farmer could lose all his alluvial land. In this way ploughing land in the Karoo to plant crops has "changed the structure and composition of the soil of Karoo habitats and biota" and been a "largely unsuccessful experiment during the first 150 years of occupation" (Dean & Milton, 1999: xxi).

Figure 3.8 The riverbed at Hondefontein was blocked by a low wall made of flat pieces of stone.

Figure 3.9 Large earth dam clad with stone built to block the river on Hondefontein.

An early technique for harnessing scarce water to produce wheat and other grain crops was the use of a *saaidam*. This involved either creating a shallow hollow in the arable soil next to a riverbed, or using a natural hollow next to the riverbed. When the river flowed, the soil became thoroughly saturated and seed was planted in the still-damp soil, which retained sufficient moisture long enough to produce a crop.

> After floods, there are extensive alluvial bottoms on each side of it [Sak River] where agriculture products of every kind might be raised. These are now commonly used by the squatters as sowing-lands, but without any labour or trouble beyond scratching in the seed. One overflowing of the soil is sufficient to ensure a crop even although no rain should fall afterwards. The returns are something marvellous. Wheat usually gives one hundred and fifty fold, and Mr. J. Auret, the surveyor, in one of this official reports mentions an instance where on the Zak River 800 muids were raised from thirty-to muids of seed (Noble, 1875: 92).

Many saaidams suffered eventual "verbrakking".

A later development was the construction of reservoirs to contain rainwater for example, at the bottom of a slope. Noble (1875: 130) comments on dams he saw in the the Beaufort West district: "Several enterprising proprietors, however, set to work to remedy this [water shortage], and constructed large reservoirs capable of retaining the rainfall, which has no stated season here and is dependent chiefly on the thunderstorms in summer. By such means, places which were formerly useless, or at best only available for a month or six weeks, are now become valuable farms, with permanent stations and comfortable homesteads surrounded by trees and gardens". Capturing rainwater in dams gradually contributed to the end of livestock trekking among those farmers who could afford to build dams which could store enough water to tide them over normal dry winters, although droughts were another matter completely.

Environment and land values

The differences in the environment across the Great Karoo, and the effect of this on farming is clearly reflected in the prices of land noted by Noble (1875). Eastwards of the Sak River and near the Salt River prices ranged from a low two shillings and sixpence to 10 shillings per morgen. A top price of 20 shillings per morgen, could be asked if the farm had a secure water supply. West of the Sak River land prices varied from 2 to 15 shillings a morgen. However, the best farms in the Karoo were in the area around Graaff Reinet. Here farms which received higher rainfall and had good vegetation, could demand prices of 30 shillings a morgen.(Noble, 1875: 149). Hodgson (1986: 91) confirms this perception of the value of land: "Thus groundwater of a better quality and higher yield is generally found in the eastern part of the Karoo biome, which is characterized by higher rainfall. It is found that a drastic deterioration of the quality of the water takes place from east to west", which is where the corbelled buildings are found.

The low average rainfall, the tree-less vegetation of low Karoo scrub, the poor shallow soils and geology all come together to create a situation where farming took place in challenging conditions. Initially, trekboers coped by migrating and following the water and fresh pastures with their flocks of sheep. Eventually technology enabled them to overcome these challenges to a certain degree and settle down to live on a "permanent spot" and build more "permanent" buildings such as corbelled buildings.

I now turn in the following chapter to a discussion of the construction of corbelled buildings.

CHAPTER FOUR

THE CONSTRUCTION OF CORBELLED BUILDINGS

Introduction

The historical evidence discussed in Chapter Two indicates that these are 19th century buildings and were probably built between the 1830s and the 1870s. I also address the question why vernacular corbelled buildings appeared in the 1830s and endured only for the remainder of the 19th century.

Several factors encouraged the specific chronological appearance of these buildings from the 1830s. These include changes to the land law and interaction with people after the Difaqane, who had a knowledge and history of building in this way. This chapter outlines the skill and engineering required to build a corbelled building.

Other earlier forms of vernacular buildings were built and it is likely that in the 19th century these buildings existed alongside the corbelled buildings. *Fluitjiesriet*[35] buildings, *hartebeeshuise, matjieshuise*, or even mud-walled buildings may have been built, but of these there is no longer any trace. In addition, many families lived in tents for years (Van der Merwe, 1995: 146). In 1803 a farm in the Sneeuberge consisted of "various buildings, some as storage, for this and that and some as dwellings for servants and others" (Van der Merwe, 1995: 167).

A good deal of evidence indicates that many vernacular adopted-techniques, materials and forms were in part derived from indigenous knowledge. The same can be said for corbelled buildings. The form (dome) is indigenous and, furthermore, indigenous people had a prior history and skill of building this form. While European settlers may also have had some knowledge of corbelled buildings, the indigenous option is the simplest explanation.

The early trekboers in this area built several forms of vernacular buildings. They were living in an area which was far from towns and building supplies, transport was difficult and they were poor in cash terms, although not necessarily livestock. Raw materials to construct

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[35] *Fluitjiesriet (Pliragmites australis)* reed found in riverbeds used to build huts.

dwellings had to be found locally – and the buildings adapted to suit the available raw material.

The settlers who built structures to house themselves, their families, farm workers and *bywoners*, as well as for various farming activities, came from areas in the Cape and from Europe, where houses, barns and walls were built with bricks, mortar, timber and paint, and roofs thatched and dung floors laid down. It is fair, therefore, to assume that they had their own building traditions and knowledge of building techniques as well as traditional recipes for mixing raw materials in use at the Cape at that time (Gribble, 1987).

What they did not have in the Karoo was wood – and without wood, the normal pitched roof, or even *brakdak* (flat clay roof) both of which needed timber supports, were out of the question, as indicated in Chapter Three. To solve this problem they turned to the one raw material which was freely available, stone, and stone was used to create complete buildings from floor to roof.

The trekboers might have been aware of corbelling as a construction technique. Corbelled charcoal kilns were present at the Cape in the 18th century. One such example of a corbelled kiln occurs on the farm Voorhuis in the Swellendam District (Fig 4.1). A replica has been built at the Drosdty Museum in Swellendam (Fig. 4.2), the interior of which clearly shows brick corbelling similar to that in the corbelled building at Rietfontein in the Karoo (Fig. 4.3).

Figure 4.1 Old photograph of the charcoal kiln on the farm Voorhuis in the Swellendam district. (From: Tomlinson, 1943: 33.)

Figure 4.2 Replica of the Voorhuis charcoal kiln built at the Drostdy Museum, Swellendam, and the corbelled clay brick roof.

Figure 4.3 Rietfontein I. The same shape as the charcoal kiln and the same Dutch Bond style of brick corbelling with mud mortar in this building south of Carnarvon.

Trekboers knew about the so-called rondavel, or "cone on cylinder" (Frescura, 1981: 53, Burchell, 1822: 237), but building an entire building from stone would be taking the rondavel to another level. This vernacular architectural style of corbelled building was used as long as there was no wood and the mindset of the trekboers accepted living in a round stone building.

The desire for a sizable house with a good roof was noted by Lichtenstein (1812: 106) while travelling in the Roggeveld in the early 19th century: "I have heard those among the inhabitants of the country, who are in good circumstances, assert that if they had but better timbers, they would build as handsome houses as could be seen. But they are not able to afford the enormous sums that must be expended to bring timber over the steep and rugged

mountain roads by which it must be transported from the parts where it can be procured". Van der Merwe (1995: 173) also refers to these aspirations: "Farmers who settled on permanent dwelling sites in new pioneer areas also often had to make do initially with huts that could be erected in haste. They were often poor and therefore could not afford to build good houses immediately. Accordingly, in areas of more recent settlement, the wattle-and-daub hut was generally the forerunner of the "walled house". The latter appeared only after conditions were more settled, farmers enjoyed greater prosperity, or moneyed farmers from areas of older settlement had begun to move in". As Van der Merwe (1995: 174) describes it: "Housing in a specific region was therefore also directly dependent on the stage of economic development that that area had reached".

This chapter describes the construction methods used in the building of corbelled buildings – the principles which would make for a successful structure and the raw materials used in corbelled buildings.

The architecture of a dome

True round-based corbelled buildings form a continuous dome from top to bottom. Other round-based buildings have a corbelled dome on vertical walls. The corbelled roof uses the same structural principles as that of a dome. The engineering of a dome is based on mathematical principles. The Karoo builders could not explain these, but implicitly knew the engineering involved.

The construction of a dome is an "architecture of gravity" (Raymond Smith, pers.comm.) in which the "balance of tension and compression forces" which keep a dome standing will only work if the ratio of the floor diameter to roof height is correct (Angelfire, n.d.: para 3). Ideally, these measurements should be an equal sided triangle, and there is a direct link between the diameter of the floor and the height of the roof. The greater the floor diameter, the higher the roof must be and vice versa. While a roof height to diameter ratio of 0.5 would give a perfect semi-circle, this is a very unstable shape for a corbelled building. "In a dome with a [perfect] semicircular section, the resultant forces act inside the centre line, thus creating tensile ring forces which can easily lead to collapse" (Minke, 2001: 44).

Juvanec (2004: 1) describes the equal-sided triangle as "the characteristic of a uniform internal load bearing construction, which emerges from the circular ground plan and triangular section". He goes on: "The baseline equals the internal diameter of the space plus two halves of the walls thickness and is measured from the entrance as the walls' thickness plus the internal depth of useful space" (Juvanec 2004: 5). The height would obviously be taken from floor level to the highest point in the roof (usually the roofstone, if present) (Fig. 4.4). To create this, a circle is drawn around a central point to establish the floor diameter. If the builder knew the relationship between the floor diameter and the height, this would determine his initial ground plan (Juvanec, 2004: 3) (Fig 4.4).

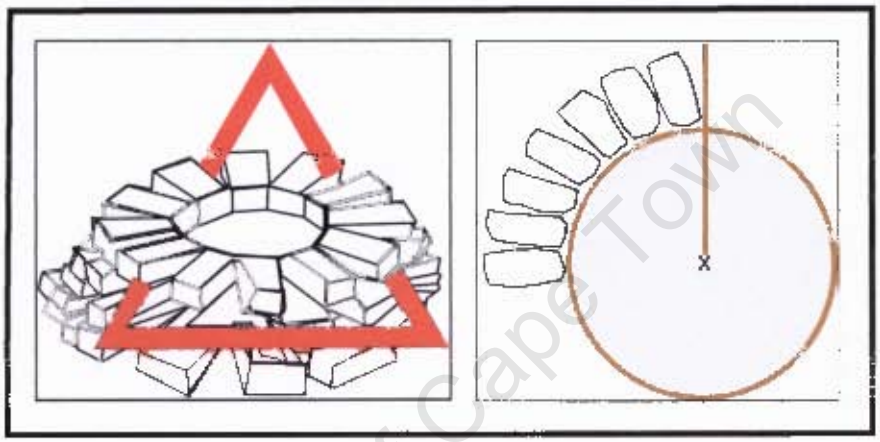

Figure 4.4 The triangular proportions of the corbelled dome *(left)*, and the starting point for any corbelled building, the ground floor plan *(right)*. (From: Juvanec, 2003: 3.)

Mr Gert Maritz, a retired farmer from Hondefontein, south of Fraserburg, has built his own corbelled building and explained his method. First he placed a stick on the centre point of the proposed building, then he tied string to the stick and marked a circle out in the ground. He bent a long piece of metal pole to form the outline of the shape of building that he wanted and the builder simply followed the profile, keeping the base of the pole on the line on the ground and working from the inside, that is, placing the stones **against** the profile created by the pole (Gert Maritz, pers. comm). Ironically, Minke (2001: 44), in his construction manual for earthquake-proof earthen houses, suggests the use of just such a device, which he calls a "rotational guide" (Fig. 4.5). The mason lays the bricks up against the angle of the rotating arm.

Figure 4.5 Rotational guide – a more advanced version of Mr Maritz's simple, but effective, bent pole. (Photograph: Minke 2001: 44.)

The corbelled buildings of the Karoo, however, do not form equal-sided triangles, but there is definitely a correlation between the height and diameter of the buildings. I measured both the internal diameter and the roof height diameter of all structures that were complete (that is, to include half the thickness of the front and half the thickness of the rear wall) and calculated the ratios (Table 4.1). The difference varied marginally.

TABLE 4.1 Comparison of roof height to floor diameter measurements in round roof on round base buildings, with the diameter taken between the two inside walls and the diameter taken to include the thickness of the walls. (A selected sample).

Farm	Height	Diameter (inside door to rear)	Ratio height to diameter	Diameter (inside door to rear plus thickness of the wall	Ratio height to diameter
Vanreenens-plaas	4.54m	4.37m	1.03	4.8m	0.94
Skerpioensdrif	3.47m	3.4m	1.02	3.85m	0.90
Vastrap	3.08m	3.26m	0.92	3.79m	0.81
Spioenberg	5.08m	5.61m	0.92	6.28m	0.80
Kareekloof	3.25m	3.45m	0.94	4.1m	0.79
Bitterwater I	4.63m	4.93m	0.88	5.48	0.84
Bitterwater II	2.6m	3.27m	0.79	3.76m	0.69
Mooskloof I	2.16m	2.86	0.75	3.42m	0.63

Mooskloof I, with a height to floor diameter ratio of 0.63, has the lowest ratio of all the round roof buildings on a round base (Fig 4.6). It has a very wide roof hole as the builder did not have enough height to narrow the roof sufficiently. As a result he had to use five roof stones to close the roof hole. Cone roof buildings obviously have a ratio of more than 1 as the floor diameter is smaller than the roof height but again the ratio does not vary too far from the central point.

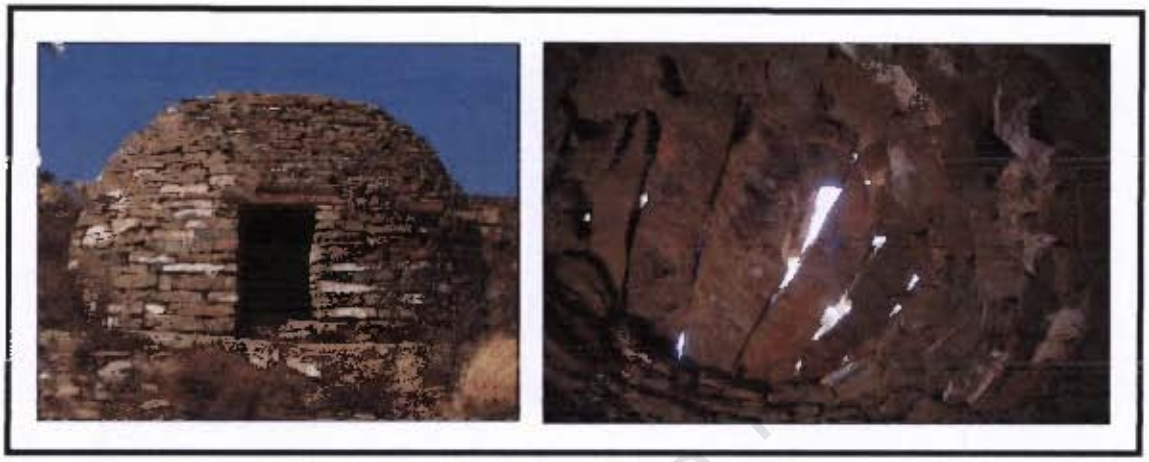

Figure 4.6 Mooskloof. The height to floor diameter ratio of 0.63 verges on an unstable semi-circle shape. The builder had to use five roof stones to close the roof hole.

Stuurmansfontein I has the highest ratio of 1.36, except for the unusual buildings at Onderplaas in the Roggeveld (Fig. 4.7). They have a ratio of 1.5, the result of a small base diameter (2.56m) which left the builder with two options – a low, impractical building or a very high narrow building – he chose the latter option. This building has a small roof hole, an indication that the building could not go much higher because a ratio of 1.5 or more would also be unstable.

Figure 4.7 Onderplaas. The height to floor diameter is 1.5, resulting in a narrow, pointed building with a small roof hole.

This variability defines vernacular – it is not construction according to design or exact formulae: the builder has to solve problems as he encounters them (Fig. 4.8).

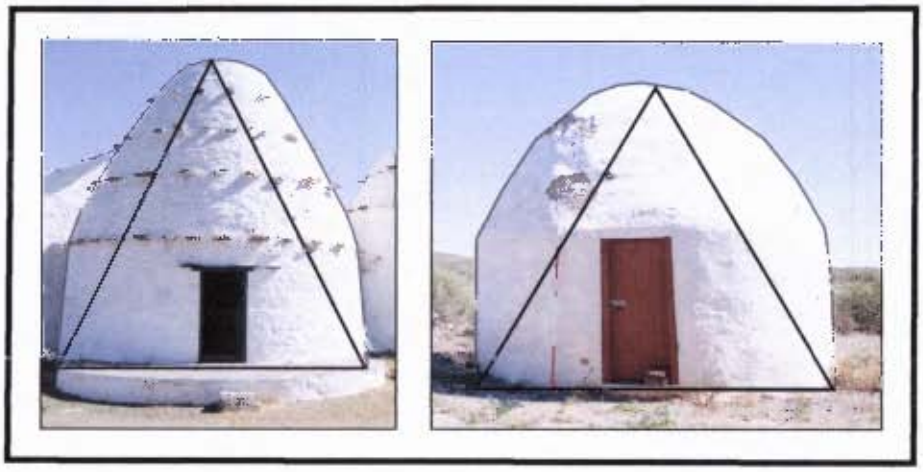

Figure 4.8 Illustrates the variability within the basic triangular shape of the round base corbelled buildings – Stuurmansfontein *(left)* and Dawidskolk *(right)*.

Table 4.2 shows the height to floor diameter ratio in square base corbelled buildings. In square base buildings, the base of the triangle should be measured from the point at which the roof begins and the height taken from that point as well, as the square base is not part of the dome. Despite this, the ratio still stays well within the "safe" ratio, above 0.5.

TABLE 4.2 Roof height to floor diameter ratios of square base buildings

Farm	Height	Length x breadth	Ratio height to floor diameter
Arbeidersfontein	5.34m	5.87 x 5.7m	0.79
Droogeputs IA	4.0m	3.6 x 3.7m	0.77
Droogeputs IB	4.07m	3.32 x 2.72m	0.94
Droogeputs II	1.88m	2.06 x 2.89m	0.83
Janklaasleegte I	4.55m	4.94 x 4.97m	0.65
Janklaasleegte II	2.8m	2.41 x 2.1m	0.85
Klipkolk	5.58m	5.54 x 5.54m	0.71
Leeuwkrantz	4.7m	4.57 x 4.63m	0.71
Leyfontein IV	3.45m	4.14 x 4.46m	0.56
Rietvlei	3.2m	3.16 x 3.1m	0.72

Within this ratio, forces in a corbelled building act in a specific way. This is explained by Angelfire (n.d.: para 3):

> The vertical lines of the dome are called meridians. At the top of the dome, the meridians push together under the dome's weight, creating compression forces. Towards the bottom of the dome, the meridians are pushing outwards, stretching the dome apart with horizontal tension forces. At a certain level on all domes (indicated by the dotted line) [Fig. 4.9], there is an area that is neither in tension or compression. The tension and compression forces must both be dealt with to enable the dome to stand. To deal with the massive tension forces, the Roman architects poured several layer of concrete around the base of the dome. ...they provided the normal force to push inward against the tension forces that push out.

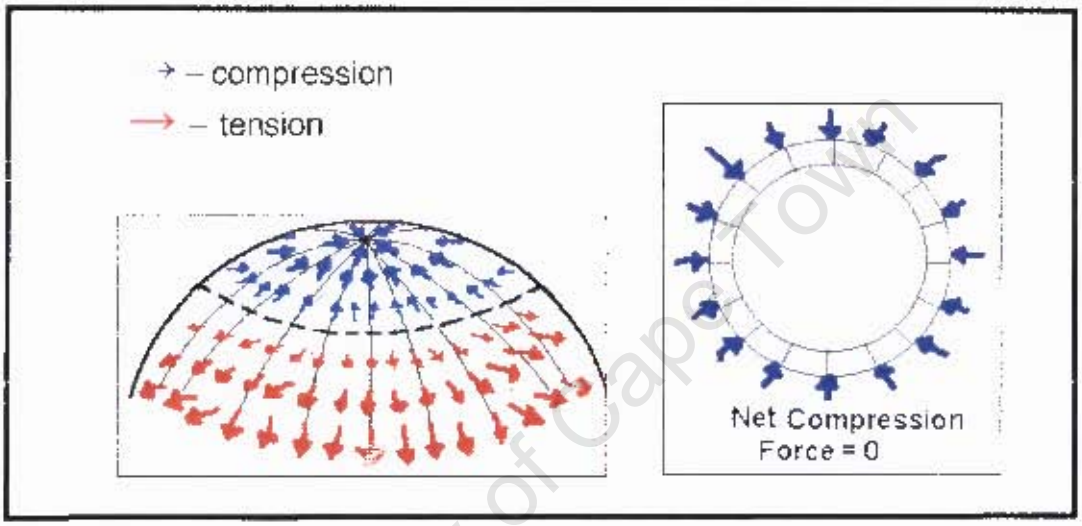

Figure 4.9 The compression and tension forces lock the entire roof into place *(left)*, while the forces at the top of the building result in a stable roof opening *(right)*. (From: Angelfire, n.d.)

> Surprisingly, right where the compression forces are the greatest on the dome (the top), the Roman architects chose to have nothing but air [in corbelled buildings this "occulus" is covered with roof stones].....The ring acts like an arch, except that its ends are joined together. Compressive forces are redirected along the ring's body. The only difference between the ring and the arch is that the compression forces come from all directions. These forces wedge the ring stones tightly together. The compression forces cancel each other and the top of the dome is left in a state of horizontal equilibrium (Angelfire, n.d.: para 4) (Fig. 4.9).

If Romans used concrete rings to contain the tension forces, what controls this pressures in corbelled buildings? As Minke (2001: 42) puts it: "The problem with the structural design of domes is the stress transfer to the foundation", especially when considering the weight bearing down on it. According to Dr Brian Rademeyer, an environmental engineer, one cubic

metre could weigh 1.2-1.8 metric tonnes, depending on the type of stone and other factors (Brian Rademeyer, pers. comm).

The problem is addressed by a double skin. The outer layer works against the inner layer to provide a measure of stability. In addition, the angle of the lower walls must be correct in order to direct the forces down into the ground and not sideways, which will cause the wall to burst (Fig. 4.10). In other words, "the central load should always remain in the middle third of the arch [or dome]" (Auroville Earth Institute, n.d.: 2) so that the walls do not splay out sideways. If they do splay out, a thicker wall will be required to contain them.

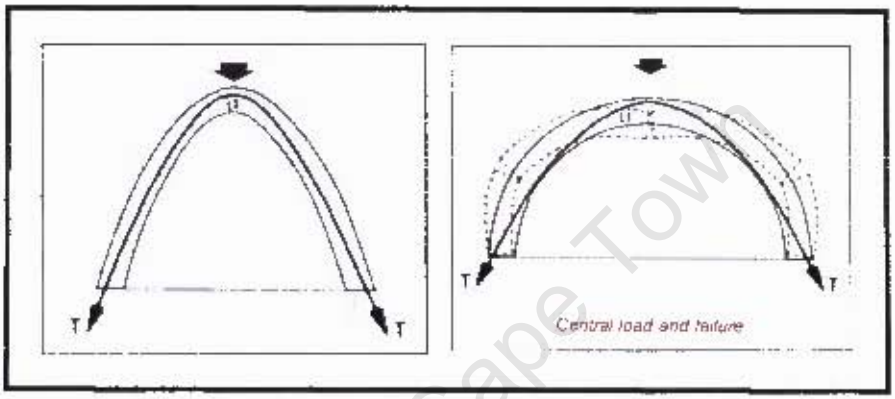

Figure 4.10 These diagrams illustrate the relationship between weight and wall angle. The angle of the thrust must not breach the edges of the wall, or the wall will burst outwards *(right)*. The thrust approaches the ground at a better angle *(left)* and stays within the middle of the wall. In this way the thrust of the heavy load is directed downwards, and not sideways. (From: Auroville Earth Institute, n.d.: 2.)

In the corbelled (curved) section of the building, the wall is made of two layers - "the internal construction and the outer revetment, the latter serves as a counterweight and roofing material" (Juvanec, 2004: 1) (Fig. 4.11).

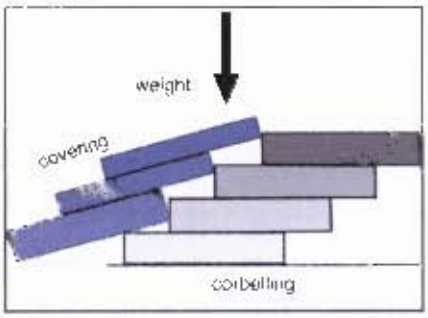

Figure 4.11 The relationship between the inner and outer stone layers in a corbelled structure. (From: Juvanec, 2003: 2.)

The internal construction involves balancing each stone on the centre of gravity of the stone below it. But these stones need a counterweight, or revetment, to keep the roof structure steady and act as a counterweight (Fig. 4.12).

Figure 4.12 Boplaas. Section through the wall of a collapsed corbelled building shows the vertical double-skinned lower wall and the curved roof with its inward tilting layer of stones and outer revetment (Fig. 4.11).

In many European and Middle Eastern corbelled buildings, the inner layer of stones follows the dome shape, but the outer layer can take on many forms, often with a gap between the two layers filled with stone or rubble. In the corbelled buildings of the Karoo, however, the two layers of stone lie tight up against each other and are even joined by means of linking or throughstones (Fig. 4.13).

Figure 4.13 Spoorkolk. The linking stone can be seen spanning the width of the wall.

The linking or throughstones, also called key stones, are used intermittently and run right through the two layers of stone, thus linking them together. (Fig. 4.13). Crossband stones, that

is, large stones which run right through the wall and cover two or three stones to the side at the same time also help to stabilize the wall and prevent vertical cracking. The outer layer of stones gives stability and strength to the inner layer. The same method is used for both the round-based and square-based corbelled buildings, except that in the case of the square-based buildings, the builder has a little more leeway in the shape of stone that he chooses for the lower vertical walls.

The most basic difference between corbelled buildings is the fact that some have a round base and others a square base. The result is that the the base of a square building does not have to be constructed as carefully as the round base buildings, and bigger, even irregular, stones can be used until the roof turn is reached.

One major problem occurs when placing a round corbelled roof onto a square-base. In the old buildings of Europe stone devices called a squinch, and later, pendentive, were used to solve the problem, of fit and weight distribution (Essential Humanities, 2008, para 3 & 4). These help distribute the weight of the dome on the corners of a square base. Karoo corbelled buildings used a series of large stones placed onto the corners of a square base, each stacked slightly inwards to enable the builder to start shaping the roof inwards and to help to distribute the weight (Fig. 4.14).

Figure 4.14 Brownslaagte. Large corner stones enable the square base to carry the round roof.

FUNDAMENTAL RULES FOR CONSTRUCTING A CORBELLED BUILDING

Having discussed the basic principles, I now summarise other important factors in the construction of Karoo corbelled structures.

Sturdy, level site. It is quite common to find Karoo corbelled buildings constructed on sheets of level bedrock (Fig. 4.15). If necessary, the soil was excavated down to bedrock where the first layer of stones was placed. This prevents sagging and the gradual displacement of stones (Fig. 4.16). I have only seen three corbelled buildings built on a slope. At Vinkfontein this problem was overcome by levelling with rows of stone on the downslope slope to provide a level base. The other buildings with an uneven base occurred at Middelpos and Gorras IV and in both the base was levelled before building commenced.

Figure 4.15 Driefontein. The ideal bedrock foundation for this soap house.

Figure 4.16 Rietpoort. Poor foundations have resulted in this building leaning to one side.

Shape of the stone. The stones used should be flat and more or less the same thickness. The stones forming the curved roof should be as uniform as possible. One or two buildings which used less tabular stones are still standing, but suffer from structural stresses (Fig. 4.17).

Figure 4.17 Krabfontein III. The use of uneven blocks of stone has led to collapse.

Linking stones. Karoo buildings are made of up two layers of stone packed close together. In order to prevent the outer layer from peeling off (Fig. 4.18), linking stones, or throughstones, are used. These run right through the wall, effectively tying the two layers together.

Figure 4.18 De Wilg. The outer layer of the wall has not been tied to the inner layer and is consequently peeling away.

Sturdy lintels to span the door and window openings. Because the lintel bends under the weight of the roof bearing down on it, it is subject to both tension and compression. Stone can handle compression well (upper surface of the lintel) but does not handle tension, or stretching well (lower half of the lintel). This means that a slab of stone cannot span an opening which is too wide for its relative size. Cracked or broken lintels cause the collapse of the building (Fig. 4.19). In cases where a new door has been opened up, usually because another room has been attached to the corbelled building, the tricky task of pushing a lintel into the existing stonework was done using wooden logs or pieces of metal.

Figure 4.19 Aasvoelsvlei II. Broken stone window lintel.

Lintels made of wood are found in the northern area around Carnarvon, mainly because the available stone is from the Ecca formation and is much more friable than the Beaufort stone. Wood deals with compression and tension in the opposite way to stone. Wood is not as strong

in compression, but handles tension (or stretching) better than stone. Nevertheless, wooden lintels are weak points in corbelled buildings and are a common cause of structural failure (Fig. 4.20).

Figure 4.20 Stuurmansfontein III. The wooden lintel is beginning to bend.

Staggering of joints. The laying of stones should resemble the laying of bricks where one join is not placed directly above the one below. Lines of joins, if too close together, can lead to cracking. Linking stones help avoid this (Fig. 4.21).

Figure 4.21 De Brak. Cracking, unstable wall caused by running joins.

Careful balancing of the stones which make up the roof . Each stone has to be carefully balanced on the centre of gravity of the stone below it. Roof collapse is often due to this failure (Fig. 4.22).

Figure 4.22 De Kolke. The centre of the roof has collapsed.

Making the roof hole small enough to support the roof stones. If the top hole is too big, that is, the dome has not been brought to a point which could be closed easily, various design devices have been employed to strengthen the top and hold the roof stones. (Figs. 4.23 & 4.24).

Figure 4.23 Brakvlei. Perfectly built roof with a small roof hole.

Figure 4.24 De Val. The roof hole is large and timber supports have been used to support the roof stones.

Height of door openings. Because of the vast forces pushing down on any opening, the doorway cannot be too high or too wide. The top of a door should not straddle the inflection or curve of the roof. Should this occur, an arch would be needed to distribute the weight.

Round roof on square base requires special attention at the corners where all the pressure of the weight of the roof converges, unlike a round base where the forces would be evenly distributed over the entire building. The corners of a square base must be reinforced with a large cornerstone where the roof meets the wall. This will help to spread the weight it is supporting (Fig. 4.14).

BUILDING A CORBELLED BUILDING: RAW MATERIALS

Primary materials used in the initial construction:

Stone

The most important raw material for corbelled buildings is stone. Stone was used for the entire structure – from the roof to the floor, including the projections, shelves, niches and door and window lintels. Apart from the obvious fact that there must be a good supply of stone, in the light of the engineering principles outline above, the type of stone must be suited to the rather delicate process of building a stone dome. Stone that is fissile and prone to breaking will not work.

Stone has to be:

1. freely available, and
2. it has to conform to certain qualities:
   a. it must be finely grained,
   b. it must be soft enough to shape easily, and
   c. it must break naturally into flat slabs.

Corbelled buildings are located in exactly the area where the geology yields stone with these qualities. The southern area in which corbelled buildings are found rests on the Beaufort Subgroup, a formation which covers the bulk of the Karoo and is relatively unaffected by folding, except south of the Great Escarpment towards the mountains in the south (Maguire 2008: 24). Interspersed in the mudstone are some layers of very finely grained sandstones. The more northerly corbelled buildings in the vicinity of Carnarvon lie on the edges of the Ecca Subgroup: "North of the line running between Williston and Carnarvon – the older Ecca formations actually appear with fine grained sandstones" (Maguire, 2008: 26). However, the Ecca formation actually makes an appearance further south in low-lying areas above an imaginary line which runs from Loxton to Williston (Judy Maguire, pers.comm.).

Dolerite intrusions which are found in some areas, such as De Rante on the Fraserburg-Sutherland Road, were not used for constructing buildings as the round and uneven stones are

unsuitable, although there are cases of farm walls and kraals being built of this material, for example at Renoster Valley, south of Fraserburg (Fig. 4.25).

Figure 4.25 Renoster Valley. Dolerite kraal walls.

Ferreira (1986: 78) points out that big, established stone quarries do not exist because the stone is obtainable all over the countryside. Most of the stone used in building the corbelled buildings is not just picked up on the surface, it had to be chiselled out of bedrock and cut into blocks. Riverbeds are a good source of stone (Fig. 4.26), although a few land-based quarries where the stone has been mined from an outcrop have been located.

Figure 4.26 Gorras. A "quarry" in the Gorras riverbed.

The hard labour of breaking the blocks of stone, then lifting them onto a wagon and transporting the load to the building site for off loading again would determine that the source would have to be as close as possible to the building site. James Walton (1960: 14) was told that 1 200 wagon loads of stone was required to the build Arbeidersfontein (Fig. 4.27), although he gives no indication as to how far the load was transported. Also at

Arbeidersfontein, Hennie Esterhuyse recalls that the stone was brought to the site dragged on cattle skins (*beesvelle*) and on a *bokwa* (Ferreira, 1986: 78). The *bokwa* was a vast improvement on the old *kakebeenwa*, as it had an iron axle, was bigger and could carry a heavier load. With a team of 16 to 20 oxen this large transport wagon could move 4 500 kilograms at one time (Ross, 1998: 108). The *kakabeenwa* was a covered wagon used by the trekboers originally for travel and accommodation and it could only handle a load of 1 800 kilograms (Burman, 1988: 137).

Figure 4.27 Arbeidersfontein.

Whatever the source of the stone, the fact remains that each stone was carefully chosen for its shape and thickness at the original site, since moving heavy blocks of stone which would not be used would be a waste of time and labour. Once at the building site, the stones would have been carefully sorted and arranged in order of use (Lassure n.d.: 1). There are signs of dressing on the stone in some of the corbelled buildings, but on the whole, apart from breaking the stone into suitably-sized pieces, little other work was done, except perhaps to neaten the doorway.

Leonard Flemming (1927: 153) described the hard labour involved in procuring stone for his house in the Victoria West district:

> "....at the same time I commenced to quarry out the stone for the foundations and verandah. The best stone on the farm was up the side of a hill over a mile from where I was going to build my house. With picks, spades and crowbars, we began to open up the quarry and lay bare the mass of beautiful grey stone, strata upon strata underneath, and then break it up into large square or oblong blocks with cold chisels, crowbars and heavy hammers. "Stones – piles of them – great heavy blocks of stone that required 4 or 5 men to move them ... Half an hour spent loading up one at a time, half an hour spent loading up 4 stones, 20 minutes dragging them in a

> sledge to the house, 5 minutes loading them off, 15 minutes going back with the empty sledge" (1927: 162).

The sizes and shape of stones used in walls up to the start of the dome vary from building to building. Some buildings have fairly uniform-sized and shaped stone from the bottom to the top (Fig. 4.28), while others have big boulders along the base (Fig. 4.29) and *in situ* rocks have even been incorporated into the wall on occasion to create an outside seat (Fig. 4.30). Some have both large and small stones intricately fitted together, while two buildings on the farm Koppiesfontein have a very distinctive "crazy paving" or uncoursed style on the lower level of the corbelled buildings (Fig. 4.31). Two corbelled buildings on the Krabfontein *werf* (III and IV) have been built with square-shaped blocks of sandstone (with resultant deterioration), possibly indicating a lack of knowledge for selecting suitable stone (Fig. 4.17). In the "better built" buildings, the stones have been selected to run in fairly obvious concentric circles around the building.

Figure 4.28 Leyfontein II. A finely built corbelled building.

Figure 4.29 Aasvoelsvlei I. Large rocks incorporated into the base.

Figure 4.30 Leyfontein IV. Large rocks incorporated into the wall to form outside seats.

Figure 4.31 Koppiesfontein I. The wall of the *kalhok* has a distinctive "crazy-paving" style.

The shape of the stones for the base of square-based corbelled buildings is not as crucial as that for round-based buildings. As long as the walls are strong and sturdy, have good lintels and substantial corner stones, they will carry the roof weight. But once the turn for the curving roof begins, the stone had to be chosen very carefully because each course shifts

inwards by about a third of its width, balancing on the centre of gravity of the stone below. Similarly sized and shaped stone were used in order to lock the stones together under compression (Fig. 4.32).

Figure 4.32 Silvery Holme. Consistently selected stone resulted in this fine roof.

The thickness of the walls is difficult to measure with precision as the stones are not all laid evenly. However, it soon became clear that wall thickness is relative to the size and height of the building, whether round or square-based. I measured the thickest walls at 0.94m at Stuurmansfontein, where the structure is 7m high. At Slingersfontein (6m high), the wall is 0.7m thick. The thinnest wall I measured was Modderfontein I (0.36m). This small structure had an internal height of 2.2m. On the whole, smaller buildings have a wall thickness of between 0.4-0.6m while the large buildings have a wall thickness exceeding 0.6 metres.

Traditionally, the roof hole was closed with one or more very large slabs of stone called capstones or roofstones. Modern replacements include pieces of corrugated iron, flattened drums and pieces of plank.

Large stone slabs are also used for the window and door lintels and stone built shelves inside the building. As examples, the size of the door lintel at De Wilg was 1.0m x 0.7m, while that at Gorras III (Vanwykswerwe) was a huge 1.5m x 0.96 metres.

Although it was almost impossible to determine the type of floor in many of the buildings, two floors were laid with stone flagging (Fig. 4.33).

Figure 4.33 Vastrap. Floor made out of stone slabs.

A structural puzzle is the purpose of the projecting stones which occurs on some of the corbelled buildings (Fig 3.34). This feature is not uniquely South African, and also occurs on corbelled buildings in Ireland and Portugal. The most frequent interpretation is that they helped in the construction of the building and subsequently could be used in the maintenance of the exterior of the buildings – perhaps to rest scaffolding. According to Walton (1989: 124), "These stones serve as steps and as anchors for scaffolding and were no doubt used by the builder when building the hut, but they are still useful when repairs are being carried out or when the building is being whitewashed". Ferreira (1986: 81) also states that the protrusions or "stellasies" were used for resting planks or standing on when building or repairing.

Figure 4.34 Bieslesdam. James Walton's photograph of Gawie Fagan demonstrates how the projecting stones could have been used. (Photograph: Walton, 1960.)

This is a convincing argument. Walton's image (Fig. 4.34) suggests that these projecting stones would certainly be helpful in maintaining the building, particularly for the roof. However, it is unlikely that they were steps when the roof was being built as the structure is unstable until the dome has been completed. Furthermore, I am convinced that the roofs were built from the inside. This would be the only way in which the neat interior rows of stone in the dome could be achieved.

The use of these external projections for maintenance makes sense because they are found mainly on tall buildings though they were placed so far apart as to make it difficult to step from one level to the next. Very few buildings have projecting stones which start at the bottom of the building and form a ladder to the projections. Most of the rows of projecting stones only occur on the roof area, so the building would still need some form of ladder to reach the first row. The rows are often so far apart that it is impossible to step up from one row to the next (Fig. 4.35).

Figure 4.35 Stuurmansfontein I. The rows of projecting stones are too far apart to allow the builder or repairer to easily step up from one level to the next.

Another suggestion is that they act as a counterbalance to the inward sloping stones forming the curved roof. If the roof feels slightly unstable and might tip inwards, these projecting stones would act as an additional counter weight.

Some buildings have a continuous line of stones which encircles the whole building at door height (Fig. 4.36), but it is unlikely that they were for maintenance. In this case they may have served the purpose of deflecting rainwater from the walls.

Figure 4.36 Krabfontein *(left)* and Modderfontein *(right.)* Both have a stone ledge all around the building.

Mortar

The corbelled buildings of the Karoo differ from those in Europe in that they are not drystone buildings. These Karoo buildings all have a clay mortar between the stones, not only to help hold the stones in place, but from a practical (and comfort) point of view, to block holes and cracks which let in cold draughts, as well as unwelcome insects. At first glance it often appears that there is no mortar due to the fact that rain or abrasion has eroded it from the surface, but closer inspection reveals that deep within the wall remnants of the mortar still exists. This is best seen in walls where part of the building has collapsed, leaving a section through the wall exposed (Fig. 4.37).

Figure 4.37 De Kolke. Mortar "hidden" in the wall.

The source of the clay is important as different clays have differing adhesive qualities. Clay from termite mounds is often quoted as being the best as it has a stabilizing effect, the result of the mounds being cemented with a cellulosic binder produced by the insects (Practical Answers, 2008: 5). Another popular source of clay is scraped from the top of a dry pan, possibly because of the alkaline salts which have dried on the surface (Willie Olivier, pers.comm.).

The following quotations describe the mortar making process:
"A hole is made in the ground as near as possible to the intended site, and, after throwing the upper soil aside, a quantity of clay is mixed with water and well trodden by the feet of oxen until it is of the proper consistency: that is to say stiff as they can work it" (Moodie, 1835: 104). The process for making *gebreide klei*[36]: "clay and fine *kaf*[37] is mixed together on a clean, hard piece of ground. When the dry materials are well mixed, a well is made in the centre and water is added. This wet mixture is then trampled by animal hooves until the right texture is obtained" (Ferreira, 1986: 78). In the journal of the Vernacular Architectural Society of South Africa the process is described as follows: "...this building material was prepared in raised heaps or in pits where it would be trampled together with straw, manure and water by human feet or cattle hooves until it was soft and plastic. A new heap would be made daily and when each lot had been trampled and had fermented for seven days, it would be ready for building" (VASSA, 2004: 10). The purpose of all this effort was to make a clay which would not crack when dry. The preparation of the clay mortar depended very much on the type of raw material available to make the clay and on the individual builder's preferences (Raath, 2001: 163).

Organic material such as chaff or other plant material, even plant roots, can be added to the mix. The organic material "acts to increase the tensile strength, reduce density accelerate drying and reduce cracking by dispersing stresses" (Practical Answers, 2008: 3). However, I saw little evidence of chaff in the mortar of corbelled buildings, and this may mean that chaff was not available because wheat cultivation had not yet been established. Instead of chaff, the mortar in many corbelled buildings is often quite rough and contains small pebbles which were used as an aggregate, which served the same purpose as the chaff.

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[36] *Gebuide klei:* clay that has been worked into a consistency suitable for using as mortar or plaster.

[37] *Kaf.* chaff, dried straw.

Cow dung can also be used and has the advantage of containing plant material (Beinart 2003: 42), however, cow manure has not been observed in the original mortar to date, even though the builders had cattle. The inventory of Willem Grobbler and Maria van Rooyen (11 January 1815) at the loan farm Blaauwe Heuvel (a farm in the area under study) indicates that they had 87 cattle of various sorts.[38]

Plaster

The plaster on the walls, although it was made in the same way, has a finer texture than the mortar laid between the stones, with fewer and smaller pebbles. The passage of time and the use of some of the buildings as shelter for animals has eroded the internal plaster. A close examination indicates that most interiors were plastered up to the height of the roof turn, although the plaster survives only in patches (Fig. 4.38). There are a few examples of plastering all the way to the top of the corbelled roof. The plaster is about 0.1m to 0.2m thick and is often patched to repair a damaged section. There is no evidence that the entire inside of the building was replastered annually. The patches often have a slightly different composition to the original plaster. Chaff or fibre from manure occurs in some patches, indicating a change in circumstances from the time of the original construction.

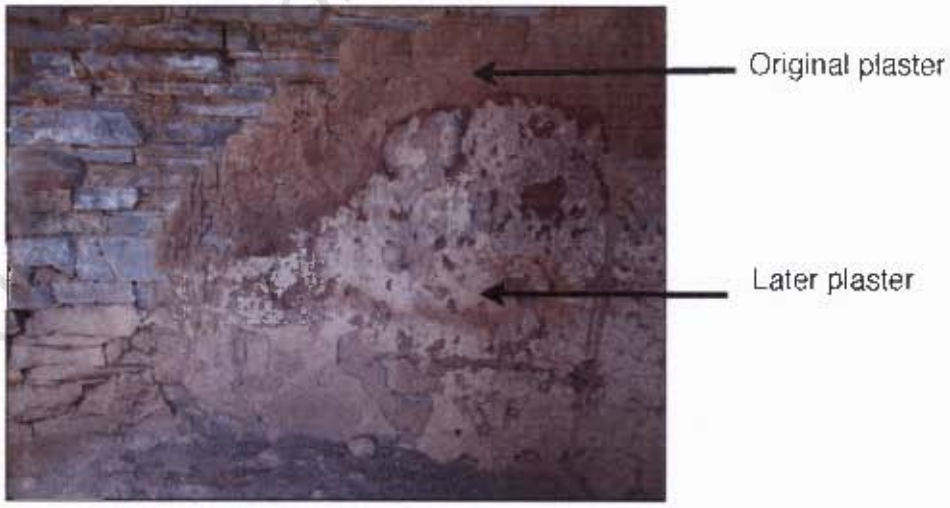

Figure 4.38 Karelsgraf II. Example of original plaster and later replastering.

Patches are common around the door where structural changes were made when more modern door frames were inserted. Some of these later patches do contain manure. The latest plaster patches are hard and rough and probably the result of the availability of lime, and later

[38] CA MOOC 8/13.44

cement, from traders in the new villages. Nowhere has hard lime-based plaster been identified as part of the original structure.

It is difficult to tell whether corbelled buildings were plastered on the outside, due to the effects of weather and the well-intentioned actions of some farmers, who have either chipped off all the plaster or replastered using modern materials. One farmer, Dirk Mans of Modderfontein, said that when he arrived on the farm the buildings were in a bad state so he covered them with a thin concrete layer and paint to preserve them (Dirk Mans, pers.comm.).

Photographs taken by James Walton in 1960 show some buildings with traces of external plaster but now there is no longer any trace of this plaster (Fig. 4.39). Those that were plastered would have required constant upkeep and replastering to repair rain damage. Slingersfontein (Fig. 4.41) still has traces of both external plaster and paint.

Figure 4.39 Aasvoelsvlei I. Walton's photograph taken in 1960 with vestiges of plaster still present. (Photograph: Walton, 1960.)

Lime plaster was certainly a desirable element. Lichtenstein (1812: 106) pointed out that in the Middle Roggeveld, houses were plastered inside and out with lime plaster and "it is only when there is a want of lime to make the plaster, or of money to buy it, that a surface of clay is substituted". Based on this, it would appear that lime plaster was not only a desirable building material, but had some status attached to it. However, it does seem to have been in use later in the central Karoo. "Lime was also scarce in the interior. It could not be burned everywhere and there was not always money to buy it. As a result the smart, lime-plastered houses that were generally to be found in the Cape environs gradually became less frequent as a person travelled north from the coast" (Van der Merwe, 1995: 169). The traditional source

of lime in the south-western Cape was seashells, but in the interior lime was made from calcrete, a useful substitute.

Paint

The interior layer of clay plaster was often sealed and protected with paint. This survives as a greyish colour, probably due to age and smoke (Fig. 4.40), although at Leeuwkranz, traces of blue paint are still discernable under a ledge. The paint is a lime wash, obtained from the same source as the lime plaster. It is unknown whether all exteriors were painted. Slingersfontein appears to preserve remnants of original paintwork (Fig. 4.41), but in most cases the exterior paint (and plaster) has worn off. The distinctive white lime-washed corbelled buildings have all been painted recently by the present-day farmers.

Figure 4.40 Omkeerkolk. Traces of paint.

Figure 4.41 Slingersfontein. Remnants of exterior plaster and paint are still present.

Lime wash is eminently suitable for these buildings as it is a "breathing paint" and allows any dampness in the wall to pass through to the surface and evaporate (Touwen, 2007: para 5). Traditionally, unslaked lime is mixed with an oil or fat. Originally tallow was added during the slaking process. This produced great heat and the fat melted into the wash. This type of limewash is slightly less porous and good for outdoor purposes as it helps to prevent water from penetrating the walls (Hirst, 2010: para 2). Tallow was plentiful as all farmers had herds of fat-tailed sheep. Exterior paint, where used, would have been this same lime wash mixture.

Wood

Early travellers to the Karoo noted that the region had little wood (Burchell, 1822: 280) and consequently, wood was not used often as part of corbelled hut construction. An indigenous wood that was available was the karee *(Rhus lancea,* now renamed *Searsia lancia)* which grew in kloofs, river beds or around springs. The karee is a tough, hardy, drought resistant tree, but "hardwood trees in the Karoo are extremely slow growing" (Milton *et al,* 1999: 191), and it is unlikely to have reached any great height in the Karoo. *Doringboomhout* (*Acacia karroo*) was another possible wood that could have been used (Scholtz, 1976:15). This is also a slow-growing, hardy tree.

It is possible that on the trek to and from the Roggeveld, wood could have been obtained from the kloofs en route (Judy Maguire, pers.comm.). Burchell (1822: 207) mentions the presence of karee trees on his travels through the Roggeveld and at Karoopoort he wrote, "We unyoked the oxen and took up our station under the shelter of two large, bushy trees of Karee-hout near a small stream of water. On the banks of this rivulet grow some large trees of the same kind". He later "halted at Goudsbloem's Hoogte (Marygold Heights) at an 'outspan place' called Tys-kraal by a dry river course, abounding in acacias and karee-trees. Under the spreading branches we kindled a large fire" (Burchell, 1822: 229). But once in the Great Karoo, Burchell (1822: 280) noted that although there were freshwater pools along the Sak River, there was not a tree in sight.

The scarce supply of wood was probably exacerbated by early use for fire by hunters and other early travellers, and to build the first rudimentary shelters in the area.

When available, wood was used in corbelled hut construction in a variety of ways. Roughly trimmed tree branches were used as cross beams in many of the smaller buildings. These were inserted into the opposing walls at the time of construction (Fig. 4.42). Where the beams have been removed, probably for reuse elsewhere on the farm once the corbelled building fell into disuse, the original sockets remain in the walls. Most buildings had two of these beams that were used for hanging clothes, herbs or even drying meat. Wire hooks still hang from many of the beams to this day. It is also possible that where two or more beams were inserted at the same height, boards might have been placed across them to form an upper loft or storage area.

Figure 4.42 Stuurmansfontein II. Karee wood cross beams.

The larger corbelled buildings further north in the Kareeberge area have timber beams which are straight and substantial. These were either imported, or date from later in the 19th century when fast-growing wood matured. The 1823 inventory of the late Anna Maria Petronella Jansen and her surviving husband, Johannes Jacobus Oosthuizen of the farm Rietfontein, notes that the estate owed 12 rix-dollars to one Barnard Louis Bantjies of the village Beaufort for the purchase of poplar beams.[39] At Karelsgraf II, for example, I have identified the cross beams as poplar (Figure 4.43).

Stands of fast-growing poplars (*Populus alba*) were planted by farmers in the Karoo as early as the mid-19th century, possibly as early as 1830, when they were also introduced to New Zealand. These trees were planted to provide wood for the future and huge stands of mature poplars on many farms today are testimony to this. Although the intense poplar-planting period was prompted by the need for fence posts by the 1890s, by the 1860s travellers mentioned that many farmsteads already had tall gum trees, so it is likely that poplars could

[39] CA MOOC8/38.53

have been fully grown by then as well (Beinart, 2003: 87). In 1863 John Croumbie-Brown, the Cape Government botanist, noted huge blue gums on all the Karoo farms he visited (Beinart, 2003: 97).

Figure 4.43 Karelsgraf II. Poplar beams at Karelsgraf, north of Carnarvon.

In a clear indication of improving transport, and possibly the emergence of more prosperous farmers, some of the big corbelled buildings in the north have machine-planed beams spanning the room, some with an enclosed loft above, also made of machine-planed planks (Fig. 4.44).

Figure 4.44 Konka. Machine-cut beams form the base of the loft

The different types of corbelled buildings at Stuurmansfontein show the variable use of rough and planed wood. The *kafhok* at Stuurmansfontein has rough beams (Fig. 4.42) in contrast to the purchased and highly valued machined beams of yellowwood used in the large corbelled buildings on the *werf* (Fig. 4.45).

Figure 4.45 Stuurmansfontein I. Machine-planed yellowwood beams.

At Grootfontein, however, despite its size and late 19th century date, rough karee wood beams were still used (Fig. 4.46) when machined wood would have been expected, based on the situation at Stuurmansfontein (Fig. 4.45) and Konka (Fig. 4.44). The use of rough wood does not, therefore, indicate an earlier 19th century date. It might have been the builder's preference to use locally available wood at no expense, or he might not have been able to afford to "import" yellowwood beams.

Figure 4.46 Grootfontein. Rough karee cross beams in a late 19th century building.

Because of the shortage of wood, it was often recycled when the building was no longer used or its function changed. Many buildings have empty beam holes where the poles have been removed to be used elsewhere (Fig.4.47).

Figure 4.47 Kareeklool. Remains of a beam sawn off for reuse.

In addition to beams installed as hanging devices or to support a loft, the large corbelled buildings have beams which slotted in even higher up in the dome. At Slingersfontein, the beams are 5m from the ground and must have been put in for structural reasons (Fig. 4.48). These are roughly worked branches in contrast to beams on two lower levels, which are machine-cut and might have been used to support lofts.

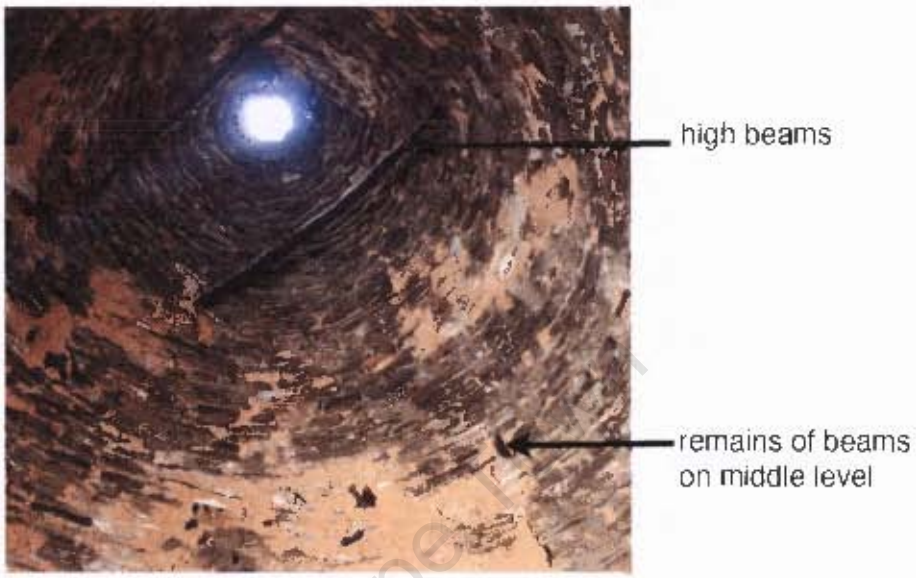

Figure 4.48 Slingersfontein. Two high beams and the remains of two lower machine-cut beams, since sawn off. The lowest level of beams is not in the picture and has also been removed and recycled.

In a few cases, high beams served a clear structural purpose. Where the builder had trouble closing a roof hole, he gave the roof extra support with wooden beams (Fig. 4.49).

Figure 4.49 Krugerskolk. A miscalculation at Krugerskolk required a timber structure to support the roof stones.

BUILDING A CORBELLED BUILDING: APERTURES/PIERCINGS

Most corbelled huts have a single doorway that served a single room. Some have a single window while other may have two or even three windows. These are integral to the original construction. Despite the adaptation of corbelled houses to the Karoo, once the structure is up it is somewhat inflexible in terms of modifications. Each stone in a sense is critically keyed in to all the others and modifications have to be done with caution in order to maintain the balance between compression and tension.

Door openings and doors

Most of the original door openings are straddled by one large lintel, or in a few cases, two narrower lintels placed side by side (Fig. 4.50).

Figure 4.50 Onderplaas *(left)* and Arbeidersfontein *(right)*. Onderplaas has a single large stone lintel, while Arbeidersfontein has two stone lintels.

Further north in the Ecca area, slabs of stone large enough to span a doorway are no longer available to the builder and wooden beams are used instead (Fig. 4.51). This may reflect a later 19th century date when large beams of poplar and gum trees were now available as well as the improvement of the road network and the construction of a railway line from Hutchinson to Carnarvon.

Figure 4.51 Stuurmansfontein III. Logs used for a lintel.

The pieces of railway track at Janklaasleegte (Fig. 4.52) are interesting because the construction of the railway in the area can be dated. The line to Kimberley reached Beaufort West in 1890 – a fair distance from Janklaasleegte (about 180 kms). However, a branch line reached Victoria West Road (later renamed Hutchinson) by 1881 and the line to Carnarvon was opened in 1906 (Burman, 1984: 162). These dates do tend to correlate with the idea that the buildings at Janklaasleegte were constructed quite late in the corbelled building period.

Figure 4.52 Janklaasleegte II. A piece of railway track has been used for a lintel.

Two types of doorway were constructed – the full door opening and the half-door opening, the latter being a feature of *kafhokke*. *Kafhok* doors were frequently altered to make a full door entry into the building, and new doorways were opened and others blocked, depending on the function of the building. (See Tables A1, A2 and A3 in Appendix I for all door aperture measurements.)

Doorway modifications combine various materials and frequently compromise the structural integrity of the building. The location and sizes of doorways have been altered in many buildings over the years as the use of the building has changed. Doorways fall into two categories – those that were part of the original building and those that are later additions. When a new door was opened, metal was often used as additional support for the door lintel.

Figure 4.53 Omkeerkolk. Metal in the doorway used to attach a form of door.

Metal was also used in modified doorways for hinges or brackets. The insertion is limited by the stone and the metal could only be inserted between stones (Fig. 4.53).

New piercings are also finished off with bricks, for example if the doorway was adapted to take new fittings or a new doorway was opened up. These mud or clay bricks are only sunbaked and as a result very friable and on exposure to the elements they disintegrate very quickly. Brick in corbelled buildings usually indicates later changes or extensions to the original stone building and were not part of the original construction. At Aasvoelsvlei I a later brick extension was added and a new doorway made to connect the old and the new buildings, and this doorway has some brick edging (Fig. 4.54).

Figure 4.54 Aasvoelsvlei I. Brick-lined doorway which led into the later brick extension building

Extensions made of mud bricks have not fared well over time in some cases only the stone foundations remain and in others the brick walls have deteriorated badly (Fig. 4.55).

Figure 4.55. Krabfontein. Badly deteriorated brick walls of the extension buildings.

There may be only one example of a corbelled building that incorporated bricks into the original construction (Rietfontein I, Fig. 4.3). The base up to the turn of the roof is built conventionally of stone, but the curve of the roof is built of brick. This was done by moving every second row of bricks (that is, the narrow edge) inwards. The use of bricks indicates a later date and the bricks have been made with a dung/clay mix, whereas the mortar between the stones has no vegetable material. The roof is possibly a later adaptation.

Windows

Windows are generally quite small in comparison with the size of the building. This may be due to one of three reasons:

(a.) the window opening is kept small to maintain the structural integrity of the building

(b.) to offer less exposure when under attack from the San

(c.) to control the temperature within the building.

See Table A14 in Appendix I for window measurements.

Windows always have lintels and a flat stone is often used to line the bottom of the window forming a flat surface on which to place items. Sometimes the window is lined on the sides with a solid slab of stone, but if not, then the stonework around the window is very neat.

It has been noted that the windows of smaller ("earlier") buildings have the same width on both the outer and inner wall surface (Fig. 4.56). In contrast, the thicker walls of the big ("later") corbelled buildings, such as Stuurmansfontien, Grootfontein and Janklaasleegte require that the windows are embrasured, that is, they widen in the inner wall – an architectural trick to let more light into the room while still presenting a small opening to the outside (Fig. 4.57).

Figure 4.56 Tiervlei. Small, simple square window.

Figure 4.57 Janklaasleegte I. Embrasured window with the deep windowsill used for storage.

Not all corbelled buildings have windows. *Kafhokke*, for example, do not have windows in order to keep vermin and insects out. I have learnt, however, to recognise modifications to corbelled buildings and identify when there is a structural change. Consequently, a closer inspection of the "window" in the Eendefontein *kafhok* revealed that it did not have a lintel and it was probably made at the same time that the door was lowered to make the building suitable for domestic habitation. In fact, if a corbelled building does not have windows, a determined search will probably turn up traces of an old threshing floor in the vicinity.

The absence of a window also suggests that if the building was not a *kafhok*, it was built as some form of storeroom, for example, a meat room where the meat was hung both to dry out and for protection from predators and insects, such as that found at Driefontein. The products of the fat tailed sheep, such as tallow, candles and soap also needed to be stored in a cool place.

Window openings were initially closed with perishable materials such as skin or fabric, but many wooden shutters still remain (Fig. 4.58).

Figure 4.58 Silvery Holme. Wooden shutters were used to close windows.

Although they have not survived, it is said that farmers used skins to close doors and windows (Scholtz, 1976: 15). Raath (2001: 167), in his thesis on the *hartbeeshut*, quotes F. T. Schonken who stated that the doors of the *hartbeeshuise* of the trekboers [in the Transvaal] were made of a framework over which an ox hide was stretched. He also quotes the Reverend Backhouse as having seen a door covered with a quagga skin in the Sneeuberge district.

The only contemporary piece of skin located to date was wrapped around a wooden pole and lodged above the door at Aasvoelsvlei I (Fig. 4.59).

Figure 4.59 Aasvoelsvlei I. Strips of antelope hide wrapped around a wooden pole.

Wood used for doors and window shutters was all machine-cut and was brought by wagon from other areas, probably already in the form of planks (Ferreira, 1986: 82). However, these were probably installed at a later date and not at the time of the original construction. While visiting many old *werfs*, I notice old wagons lying in the veld. It is also possible that the wood from these derelict wagons was recycled for shutters and doors. For example, the inventory of Isaak van Heere's possessions taken on his death in 1776 (By this date Van Heere had already secured for himself a loan farm in the Sneeuberg), lists "een wagen met sijn toebehoor, nog een wagen die ontbruijkbaar is".[40]

Earlier in the 19th century window glass would have been a rare and expensive commodity and difficult to transport to the Karoo unbroken. However, the larger, and by implication later, corbelled buildings do have small glass panes set into window frames, though they might not have had these when the building was first constructed (Fig 4.60).

Figure 4.60 Konka. Old glass in the window frame.

[40] CA MOOC 8/16.55. One wagon with its equipment, another wagon which is unusable (broken).

BUILDING A CORBELLED BUILDING: BUILT-IN ELEMENTS/STORAGE

Shelves and wall niches were not post-construction additions. They had to be pre-thought, planned and built in at the same time as the overall construction of the building.

Shelves

Stone shelves which protrude from the inner walls in domestic corbelled buildings are usually found in association with windows and wall niches (Fig. 4.61). Shelves are never found in buildings which are obviously *kafhokke*. Additionally, shelves are not common in the later large buildings, probably an indication that furniture was available, from shops in local towns or via transport on improved roads, and also because there was money to buy furniture. The shelves were not inserted and anchored through the entire thickness of the wall as there is no sign of shelf stones on the outside wall. The shelf stones are flat and the arrangement of shelves in the various buildings does not follow any discernible pattern – except that they are always (obviously) within reach. A large projecting window lintel could also serve as a shelf.

Figure 4.61 Brakvlei. Shelves, niches and a blocked window with a lintel which also served as a shelf.

Wall niches

Wall niches, or "keeping holes" are another attribute of domestic corbelled buildings. They are the answer-in-stone to the old wood-lined *muurkas* of the Cape. Niches are found in corbelled buildings of all ages, large and small, and are a more consistent feature in the home than stone shelves (Fig. 4.62). Walton (1989: 124) asserts that niches are built into the wall on the left hand side of the front door, but my observations show that this is not so in all cases. Additionally, some buildings have more than one niche (Fig. 4.61).

Since walls of corbelled building are made of two layers of stone, the niche is made by omitting the inner layer. Niches may be simple with no shelves (Fig. 4.62), or have two or even three shelves (Fig 4.63). At Stuurmansfontein, the niche has a door and has evolved into a *muurkas* or wall cupboard (Fig. 4.64).

Figure 4.62 Aasvoelsvlei I. A simple wall niche (0.6m x 0.32m).

Figure 4.63. Brakwater *(left)* and Janklaasleegte I *(right)*. Double wall niches with a shelf.

Figure 4.64 Stuurmansfontein I. The niche has a door and has become a *muurkas*.

Hooks

Hooks or hanging devices are common in corbelled buildings, both houses and *kafhokke*. Ox, ram and springbok horns are found in many corbelled buildings. It would appear that these were slotted into the wall at the time of the construction of the building and were used as hanging devices (Figs. 4.65).

Figure 4.65 Bitterwater *(left)* and Tiervlei *(right)*. Horns used as hooks.

Metal hooks are old farm equipment, fencing or metal from wagons that have been stuck into the wall to act as hooks or hanging devices (Figs 4.66 & 4.67). Most were inserted into the wall mortar after the building was constructed, probably when occupied at a later date by farm workers. Fence droppers, particularly, are often found, but would only have become available after fencing of farms began in the late 1890s when fencing as a measure to restrict the movement of animals and the spread of rinderpest began to be enforced. Fencing only began on a large scale in 1910 and the first Fencing Act was passed in 1912 (Talbot, 1961: 324).

Figure 4.66 Aasvoelsvlei I *(left)* and Omkeerkolk *(right)*. Old nails used as hooks.

Figure 4.67 Eendefontein II. Fencing used as hanging devices.

Finally, small pieces of wood were inserted into the walls of some of the corbelled buildings to form hooks, such as this one at Vinkfontein (Fig. 4.68).

Figure 4.68 Vinkfontein. Piece of wood used as a hanging device.

Floors

According to Ferreira: "Die korbeelhuise het sonder uitsondering grondvloere gehad wat met 'n mengsel van klei en beesmis gesmeer was" (2000: 82).[41] It is difficult to see the original floor in the corbelled buildings as they are either full of farming equipment or had a deep layer of *kaf,* soil or sheep droppings. In those cases where the farmer still used the building, the floor often had a layer of modern cement. In two corbelled buildings (Langbaken and Vastrap) the farmer has cleaned out the building to reveal a floor of stone slabs (Fig. 4.69).

[41] The corbelled houses had, without exception, dirt floors which were smeared with a mixture of clay and manure.

Figure 4.69 Vastrap. Floor laid with stone slabs.

Hearths

It is rare to find a purpose-built hearth in a corbelled building as most of the cooking activities took place outdoors in a *kookskerm*, or in a later extension to the original building. The settlers lived their daily lives outdoors, and only used the building for sleeping or storage. The *werf* was divided into designated activity areas, the *kookskerm* being one of these. Therefore, the corbelled building represented only a small part in the domestic activities on the *werf*. In the later and larger corbelled buildings there is a shift to the inside of more domestic activity.

So far only three (Figs. 4.70 & 4.71) hearths, or signs of a hearth, have been found. One of these is at De Val, where the farmer relates that the corbelled building on his farm was built for the schoolteacher – a lady from England (Pieter le Roux, pers comm.) (Fig. 4.71). The building itself is neatly built with dressed stone, indicating that special effort was made in the construction, which included an interior hearth.

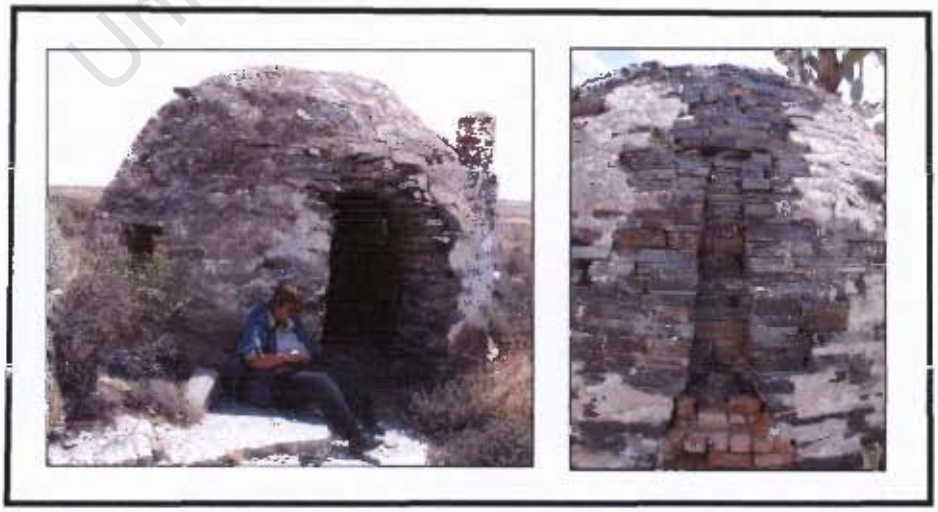

Figure 4.70 Bitterwater II *(left)* and Karelsgraf II *(right)*. Judy Maguire at Bitterwater II with its stove chimney, and signs of a stove at Karelsgraf II.

Figure 4.71 De Val. This space was previously occupied by the hearth.

These examples indicate that there were no building restrictions against building an interior hearth or stove, and the fact that in most buildings this choice was not taken, is highly significant. This shows that the preference for outside cooking was just as much a cultural choice and this choice was commensurate with the nature of the vernacular architecture itself. I return to this issue below in Chapter Six.

Conclusion

The construction of corbelled buildings in the Karoo displays a combination of ancient construction principles combined with the use of raw materials found in the surrounding countryside. This pattern is repeated throughout the world where corbelled buildings exist. In the case of the Karoo buildings, although the mechanics of the constructions are the same, every building is different on the superficial level over which the builder had control. Therefore, on the surface, each building is unique.

This description of corbelled houses has highlighted the principles under which they were built. Modification is not easy – they were built as a vernacular concept and the engineering is very specific to this concept. This engineering in terms of implicit principles, was part of indigenous technology, and they are a very singular and specific adaptation to stone as a raw material.

The overall concept of the corbelled house suggests an indigenous influence. But interior features such as shelves and niches indicate that in the detail there is significant trekboer or

settler influence. This chapter has highlighted some patterns but considerable variability in the construction of corbelled buildings. The next chapter seeks to reduce that variability to a typology, that is, general categories that provide a basis for searching for geographic and temporal patterning in the corbelled building tradition.

CHAPTER FIVE

A PROPOSED TYPOLOGY FOR CORBELLED BUILDINGS

Introduction

As discussed in the previous chapter, the corbelled buildings are archetypal vernacular buildings in that they are built entirely from materials found locally as a solution to the problem of lack of wood in combination with fortuitous geology. Also mentioned is the fact that in order to be successful a corbelled building must follow certain basic rules of physics – rules that will prevent the collapse of the building. In vernacular buildings these basic rules are implicit and not part of an architect's plans. But within the boundaries of the availability of building material and the implicit laws of physics, the builder was free to make decisions about the construction to suit his needs (the intended function of the building), that is, he had some leeway in the building process and was free to add his own style. As a result, every corbelled building has a distinct "personality" of its own. Some are small and humble, others are tall and awe-inspiring. Each building has its own quirks and idiosyncrasies – the mark of the hand of the builder, and possibly his level of competence.

This basic corbelled form represents a physical expression of how Karoo trekboer society 'thought' about the functions of the buildings, the purpose of extensions and alterations, and the way structures act as nodes in a wider domestic domain and connect to their surroundings. All these attributes give some understanding of the occupants who were written about only in official records, but who wrote nothing about their own daily lives.

As noted, the difference between vernacular architecture and the so-called "polite" or designed, buildings is that vernacular buildings were not formally designed by an architect, that is, they were built by rule of thumb. They are usually built by the end user to serve a particular function using materials at hand. As Upton and Vlach (1986, as cited in Gribble, 1987: 57) put it :"People do not, after all, construct buildings or create landscapes primarily as sculptural forms, or as signposts of cultural diffusion, or to impress their descendants with their ancestors cleverness, but to use in their day to day activities".

In devising a classification or typology, the approach has been to identify variations that captured basic differences and not small scale variability, otherwise each structure will itself become a unique type as a result of the individual builder's style preferences, needs and quirks.

In my fieldwork I have tried to isolate the original corbelled structure from all its later stratigraphic layers, such as the blocking of doors and windows, the opening of new doors and windows, changes in door size and building of extensions. This work is non-invasive and non-destructive and is based on careful observation, the collection of data and the organisation of that data in order to isolate the original form. Once the typology is in place, the types then provide a basis for exploring their distribution in space that may also have chronological implications.

In order to create the typology, four main objectives have been kept in mind:

1. That the very essence or most basic level of the typology would be the base form of the buildings
2. To note the variation in detail
3. To note which variations in detail actually play a functional role
4. To note the way in which the corbelled base structure has been added onto by later new structures

However, if the building is heavily plastered or painted inside and out, the stratigraphy can be obscured, if not totally invisible. This stratigraphy is obviously important when tracing the subsequent uses to which the building was put, but for the purposes of the initial classification, this was not taken into account, except when changes to the original building are relevant. (See Chapter Six). As indicated, it is the original corbelled building that is at the core of the present discussion.

In order to isolate the original corbelled building from later extensions or additions, the exterior was inspected for any signs of alteration, usually represented by uneven patches on the surface. The interior may show signs of blocked windows and doors which can often be seen quite clearly and often tie in with the information gleaned from the exterior of the building. Door alterations are often indicated by changes in the way the stones around the door opening were laid and by the use of different stone or brick. I have been able to identify

later additions to the building through the different colour or shape of stone used, different patterns in laying and dressing the stone.

The organisation of the corbelled buildings into groups which exhibit similar physical attributes should enable us to create some order out of a large, varied group of buildings, which as a single collection do not really provide us with any information, except that they are all corbelled. The types also provide a base for explaining the geographical distribution of types, and with the historical background in mind, to investigate change through time and sequence. This resultant typology, even though it is based on my view and imposed on historic buildings, should help to expose similarities and differences between the buildings and, from a structuralist point of view, will become the basis for understanding the "grammar" of the buildings.

CORBELLED BUILDING TYPES

In the construction of the basic typology, I focus on the combination of two basic attributes. The first is the shape of the base. The buildings have either a round or square base form (although few are exact squares). The second attribute is the roof shape. Furthermore, if all the buildings with a round base are viewed together, it is clear that there is a gradient from squat round roofed buildings to tall cone shaped buildings. A gradient is also present with the roofs of square-base buildings. I also created an index that further subdivided the roof types by size. The types are created from a combination of their attributes.

LEVEL I - BASE FORM

The floor plan reduces the building to its most fundamental level. Three base form shapes have been identified:

A Round

B Square

C Oval

Keeping in mind that these are vernacular buildings, the round base forms are not perfectly round, just as the square base forms my not be exact squares. Base forms also vary in size. Only one building with an oval base form was found.

LEVEL II - ROOF SHAPES

Roof shapes have three forms:

1 Round

2 Cone

3 Pitched

The round and cone shaped roofs are two extremes of round roof shapes on a round base form. While round roofs do also occur on square base forms, pitched roofs are more common. Pitched roofs are corbelled roofs which have corners, that is, they are not round. Many of the round and cone shaped roofs can be differentiated with the naked eye, but a comparison of all the measurements of corbelled building served to confirm the "visual" typology, as well as classify those buildings which did not fall easily into one category or the other.

TYPES BASED ON LEVEL I AND LEVEL II ATTRIBUTES

A1 Round roof on round base form (n=59)

The analysis of height vs diameter measurements underpins an important ratio: all the buildings identified as having a round roof have floor diameter measurements which are greater than the floor to roof measurements, that is, the ratio of height to diameter is always less than 1. With this ratio, the roof has to fall into the round category, even if there is some variation in the incline or height of the roof.

Out of a total sample of 91 buildings, 47 fall into this category, or 51 % of the sample. In Table 5.1 height vs diameter sizes are expressed as the ratio of height to base diameter.

However, it became clear that some buildings in Type A1 were much larger. Therefore, I divided Type A1 into two sub types – A1a and A1b (Table 5.1). Type A1b is a large round roof building with a floor diameter of over five metres. This would appear to move these buildings from the round roof shaped buildings into another bigger and bulkier category of building. Type A1b is simply a larger form of Type A1a. The buildings that have been moved into this category are highlighted in yellow on the table below (Table 5.1).

TABLE 5.1 Dimensions of round roof buildings on a round base form **Type A1**

Farm	Height	Diameter	Ratio height to diameter	Type
Aasvoelsvlei IA	3.1m	3.39m	0.91	A1a
Aasvoelsvlei II	2.62m	3.23m	0.81	A1a
Bitterwater I	4.36m	4.93m	0.88	A1a
Bitterwater II	2.6m	3.37m	0.79	A1a
Brakvlei	4.33m	4.42m	0.97	A1a
Daggafontein	3.00m	3.87m	0.77	A1a
Dawidskolk I	4.29m	5.00m	0.85	A1b
De Brak	1.9m	2.25m	0.84	A1a
De Kolke	2.55m	3.36m	0.75	A1a
De Val	2.78m	3.38m	0.82	A1a
De Wilg I	2.52m	2.8m	0.90	A1a
Driefontein	3.19m	3.24m	0.98	A1a
Droogeputs III	1.88m	2.00m	0.94	A1a
Eendefontein II	4.26m	4.61m	0.92	A1a
Gansvlei	3.00m	3.3m	0.90	A1a
Gorras I	4.83m	5.21m	0.92	A1b
Gorras II	2.7m	3.42m	0.78	A1a
Gorras IV	2.73m	2.72m	0.98	A1a
Karreekloof	3.25m	3.45m	0.94	A1a
Kiewietsfontein	4.33m	4.42m	0.97	A1a
Koppiesfontein I	3.00m	3.41m	0.87	A1a
Krabfontein I	4.1m	5.66m	0.72	A1b
Krabfontein II	2.96m	3.81m	0.77	A1a
Krabfontein III	2.54m	3.66m	0.69	A1a
Krabfontein IV	2.55m	2.83m	0.90	A1a
Krugerskolk	3.27m	4.3m	0.76	A1a

Farm	Height	Diameter	Ratio height to diameter	Type
Leyfontein I	2.87m	3.26m	0.88	A1a
Leyfontein II	3.36m	4.32m	0.77	A1a
Louw se Plaas I	2.33m	3.15m	0.75	A1a
Louw se Plaas II	2.69m	3.00m	0.89	A1a
Modderfontein I	2.2m	2.66m	0.82	A1a
Mooskloof I	2.16m	2.86m	0.75	A1a
Mooskloof II	2.7m	3.4m	0.79	A1a
Ongeluksfontein	3.18m	3.9m	0.81	A1a
Rietfontein II	5.00m	5.18m	0.96	A1b
Riethuisies	2.87m	3.81m	0.86	A1a
Schuinshoogte	5.00m	5.82	0.85	A1b
Silvery Holme I	4.02m	5.00m	0.80	A1b
Silvery Holme II	2.32m	3.03m	0.76	A1a
Spioenberg	5.00m	5.39m	0.92	A1b
Stuurmansfontein II	2.85m	3.45m	0.82	A1a
Stuurmansfontein III	4.27m	4.4m	0.97	A1a
Swaelkrans	3.34m	4.27m	0.78	A1a
Vastrap	3.08m	3.26m	0.92	A1a
Vlieefontein	3.34m	3.42m	0.98	A1a
Vlinkskolk	2.73m	3.34m	0.81	A1a
Witfontein I	2.58m	3.2m	0.80	A1a

As can be seen from Table 5.1, there is some variation in the ratio of Type A1, but it is always less than 1. If described visually, they all tend to be rather squat buildings. Notice, however, that the ratio is always within the acceptable limits of the dome shape, that is, height and floor diameter should be roughly the same and 0.69 is the lowest ratio (Table 5.1; Fig. 5.2 & 5.4).

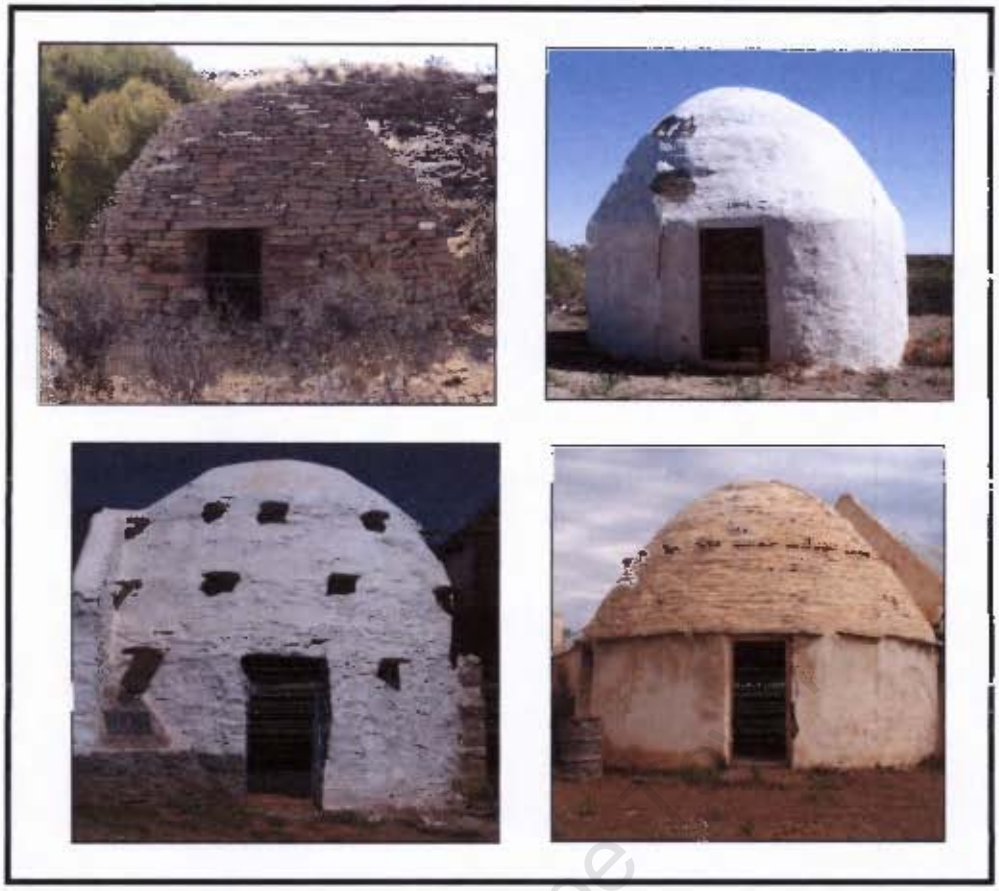

Figure 5.1 Type A1a buildings: Mooskloof II *(top left)*, Dawidskolk *(top right)*. Type A1b buildings: Gorras I (bottom *left)*, Krabfontein I *(bottom right)*.

A2 Cone roof on a round base form (n=24)

In Table 5.2 I have used the same calculation to identify cone shape roofs. In these cases, the ratio is greater than 1, that is, the roof height is greater than the diameter. There are 23 A2 Types and this is 25% of my sample. Type A2a includes those buildings with a roof height less than 5 metres, while Type A2b has roofs higher than 5 metres. This subdivision merely serves to split the large group of buildings in the cone roof shape group. Type A2b buildings are highlighted in green in Table 5.2. (Fig. 5.4). Examples are shown in Figure 5.3.

TABLE 5.2 Dimensions of cone roof buildings on round base form **Type A2**

Farm	Height	Diameter	Ratio height to diameter	Type
De Postjes	3.64m	3.42m	1.06	A2a
De Wilg II	3.12m	2.8m	1.1	A2a
Eensaamheid I	3.96m	3.56m	1.1	A2a
Gorras III	4.51m	4.18m	1.07	A2a
Grootfontein	5.96m	5.66m	1.05	A2b
Gunstfontein	3.82m	3.72m	1.02	A2a
Karelsgraf I	3.61m	3.52m	1.02	A2a
Karelsgraf II	4.32m	4.29m	1	A2a
Knegstbank	2.96m	2.83m	1.04	A2a
Konka	5.76m	4.26m	1.35	A2b
Langbaken	5.27m	4.76m	1.1	A2a
Middelpos	2.32m	2.2m	1.05	A2a
Onderplaas I	4.21m	2.79m	1.5	A2a
Onderplaas II	3.95m	2.56m	1.5	A2a
Perdegrasvlei	3.64m	3.61m	1	A2a
Rietfontein I	3.31m	2.66m	1.2	A2a
Skerpioensdrif	3.47m	3.4m	1.02	A2a
Slingersfontein	6.17m	5.87m	1.2	A2b
Spoorkolk I	5.58m	4.83m	1.15	A2b
Stuurmansfontein IA	7.04m	5.49m	1.28	A2b
Stuurmansfontein IB	5.94m	4.34m	1.36	A2b
Vanreenensplaas	4.54m	4.37m	1.03	A2a
Vinkfontein	4.34m	3.3m	1.3	A2a

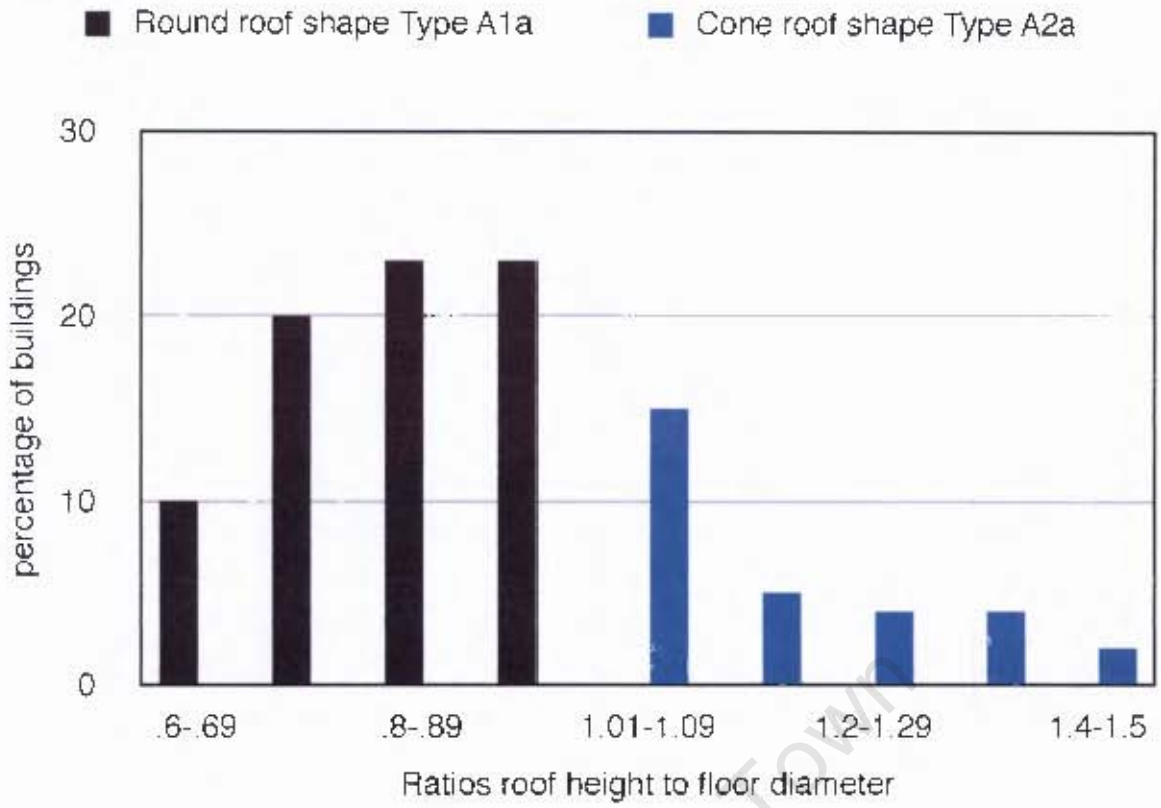

Figure 5.2 A comparison of roof height to floor diameter ratios in round roof buildings and cone roof buildings (percentage based on total of 70 buildings).

Figure 5.3 Type A2a buildings: Vanreenensplaas *(top left)*, Onderplaas I *(top right)*. Type A2b buildings: Stuurmansfontein I *(bottom left)*, Langbaken *(bottom right)*.

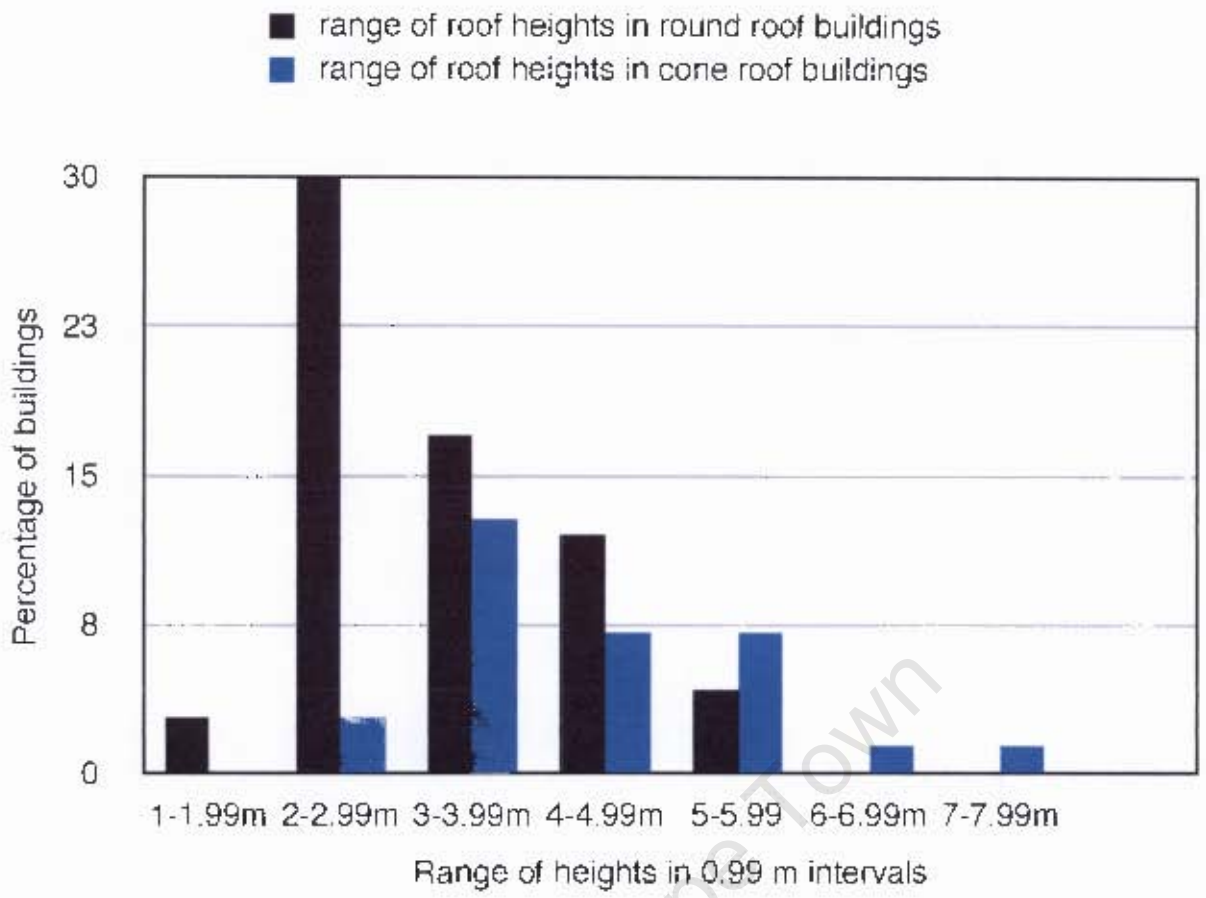

Figure 5.4 The range of roof heights in the round and cone roof categories (n=70).

B1 Round roof on a square base form (n=8)

There are 8 square based buildings with a round roof, and these tend to be small (Table 5.3). Roofs tend to be low and squat with low height to floor diameter ratios (Fig. 5.5). The reasons for this are practical. First, it is technically more difficult to build a round roof onto a rectangular base form. Second, should the builder decide to build a round roof, the square or rectangular base form means that the bigger the building, the more unstable the roof because the walls would burst out sideways from the forces being applied to it (Fig. 5.6).

To calculate ratio in rectangular base buildings, the hypotenuse of the building ($L^2 \cdot B^2 - x^2$) was divided by the height ($X^2 \div H =$ ratio).

TABLE 5.3 Round roof on a square base form **Type B1**

Farm	Height	Length x breadth	Ratio height to floor diameter
Aasvoelsvlei IB	2.88m	2.37 x 2.9m	0.70
Aasvoelsvlei IC	3.23m	3.41 x 3.37m	0.67
Blouhoogte	3.9m	3.8 x 3.8m	0.73
Brownslaagte	4.1m	3.67 x 3.67m	0.79
Koppiesfontein II	2.28m	3.16 x 3.11m	0.79
Rondom	3.77m	3.86 x 4.76m	0.61
Tiervlei I	3m	3.22 x 2.94m	0.68
Witfontein II	2.45m	2.55 x 2.55m	0.68

The height to floor diameter ratios for these small buildings all fall within a limited range.

Figure 5.5 Type B1: Square base with round roof. Rondom B1 *(left)* and Witfontein B1 *(right)*.

B3 Pitched roof on a square base form (n=12)

As in the case of the small round roof and large round roof buildings, there are large and small pitched roof buildings that belong in a single type. The sheer size and bulk of some of the pitched roof buildings, however, demand separation from the smaller pitched roof buildings (Type B3a) and become Type B3b (Fig. 5.6). Type B3a is highlighted in orange in Table 5.4.

TABLE 5.4 Pitched roof on a square base form **Type B3**

Farm	Height	Length x breadth	Ratio height to floor diameter	Type
Arbeidersfontein	5.34m	5.87 x 5.7m	0.79	B3b
Droogeputs IA	4.0m	3.6 x 3.7m	0.77	B3B
Droogeputs IB	4.07m	3.32 x 2.72m	0.94	B3b
Droogeputs II	1.88m	2.06 x 2.89m	0.83	B3a
Janklaasleegte I	4.55m	4.94 x 4.97m	0.65	B3b
Janklaasleegte II	2.8m	2.41 x 2.1m	0.85	B3a
Klipkolk	5.58m	5.54 x 5.54m	0.71	B3b
Leeuwkrantz	4.7m	4.57 x 4.63m	0.71	B3b
Leyfontein IV	3.45m	4.14 x 4.46m	0.56	B3a
Rietvlei	3.2m	3.16 x 3.1m	0.72	B3a
Vaalhoek	4.35m	4.4 x 4.14m	1.05	B3b
Voorstevanzylsplaas	4.17m	3.13 x 3.11m	0.94	B3b

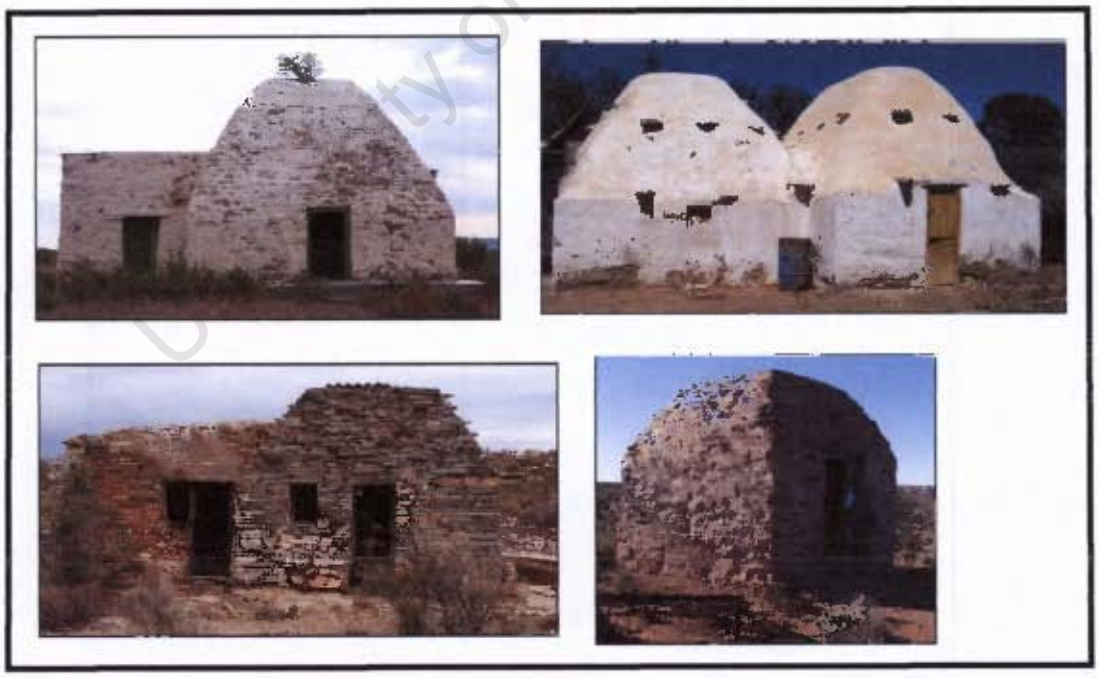

Figure 5.6 Large square base building with pitched roof (B3b): Vaalhoek *(top left)*, Droogeputs *(top right)*. Small square base building with pitched roof (B3a): Leyfontein IV *(bottom left)*, Janklaasleegte II *(bottom right)*.

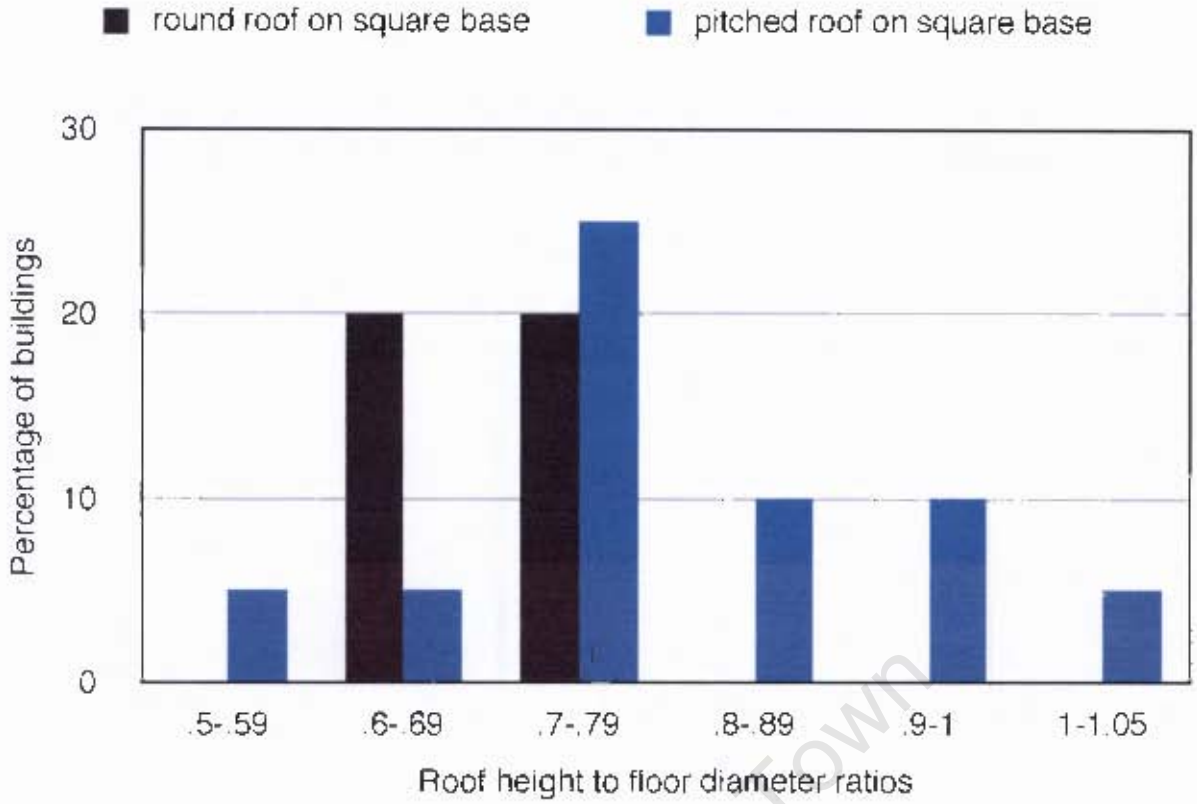

Figure 5.7 Comparison between round roof height on a square base and pitched roof height on a square base.

C1 Round roof on an oval base form (n=1)

Only one building with an oval base form has been found and it forms its own Type (Fig. 5.8).

TABLE 5.5 Round roof form on an oval base form **Type C1**

Farm	Height	Diameter	Ratio height to floor diameter
Omkeerkolk	3.56m	4.46 x 3.21m	0.93

Figure 5.8. Omkeerkolk. The only oval base building located to date.

Due to obvious construction restraints, no round base forms with pitch roof shapes were found.

Vernacular buildings are subject to the competence and even whims of the builder, and there are examples of corbelled buildings which have unusual exterior features and are marginal to the types defined, although they do still obey the rules of construction of a corbelled building. There are not many of these, in fact, fewer than might be expected. One is at Rietfontein I (A2a), where the roof from the ledge upwards is corbelled, but built of mud bricks laid in the Dutch bond style. A second is from Knegsbank (A2a) which has a very low door and seven niches at floor level in the interior wall and is a chicken coop. A third is from Voorstevanzylsplaas (B3a) which has a stepped exterior (Fig. 5.9).

Figure 5.9 Unusual buildings: Rietfontein I (A2a) *(left)*, Knegsbank (A2a) *(middle)* and Voorstevanzylsplaas (B3a) *(right)*.

PIERCINGS: DOOR AND WINDOW OPENINGS - LEVEL IV

I now discuss other attributes of the corbelled buildings, which I classify as smaller scale and consequently, do not define new types at the scale of the basic categories defined by the combination of base form and roof shape.

Doors

Two types of door opening are present in corbelled buildings. One is a full-door opening and the other is a half-door opening. This latter door is more like a window because it is raised off the ground by as much as 0.5 metres (Fig. 5.10). While the base form and roof shape are the foundations of the typology, I argue that door type should form part of the typology as they are integral to the construction of the building and also identify buildings which were

constructed to perform a specific function. These buildings are called *kafhokke* in the local classification and are chaff stores where the half-door serves to protect the chaff stored within (Fig. 5.10). Furthermore, the door type is an indication of other specific elements which may be found in the interior of the buildings. In my typology, full-door openings are identified with "i" and half-door openings with "ii".

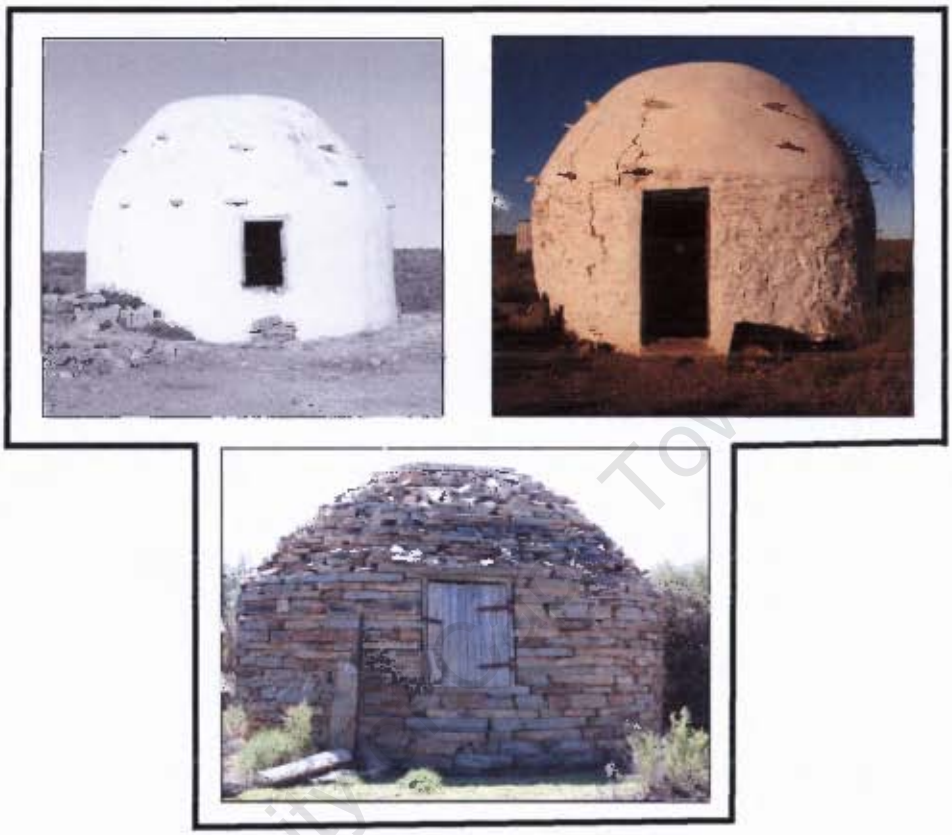

Figure 5.10 Eendefontein with a half-door before alteration *(top left)* and after alteration *(top right)*. Witfontein with its original half-door opening *(bottom)*. (Early photograph: Walton, n.d.)

I briefly describe the half-doors first. Half-door openings which had been altered at a later date to make a full doorway were identified by the following indicators:

1. The lower part of the door is rough and uneven where the *drumpel*, or raised doorstep, was removed.
2. Windows do not occur in the building.
3. Niches and shelves do not occur in the building.
4. Remnants of an associated threshing floor (*trapvloer)* can often be located opposite the half-door.

The size of half-doors is fairly consistent, the average height being 0.96 metres. The height of most of the expanded half-doors is obviously higher after removing the *drumpel*. Additionally,

the top of the door was probably raised to accommodate a wooden commercial door frame. In expanded openings with lower heights, for example, Leyfontein I and Vlinkskolk, only the *drumpel* has been removed. The widths of both half-doors and full-doors fall within a narrow range. (See Appendix I, Tables A1, A2 and A3 for dimensions of half-door and full-door openings.)

The full-door opening heights for Type A1bi (large round roof on round base form) are understandably higher as the buildings are all over five metres in height. The door widths, however, remain consistent with those of Type A1ai. In Type A2bi (cone roof on round base form) buildings doorway heights are consistently higher than those of the Type A2ai, although the widths of the doorways again conform to the same range of measurements as the other Types.

To summarise, the door widths of all types are fairly consistent, while the heights do vary, depending whether the doorway has been tampered with at a later date to fit a modern door frame. All full-doors are high enough to enable an adult to enter easily, or at most, bend their head.

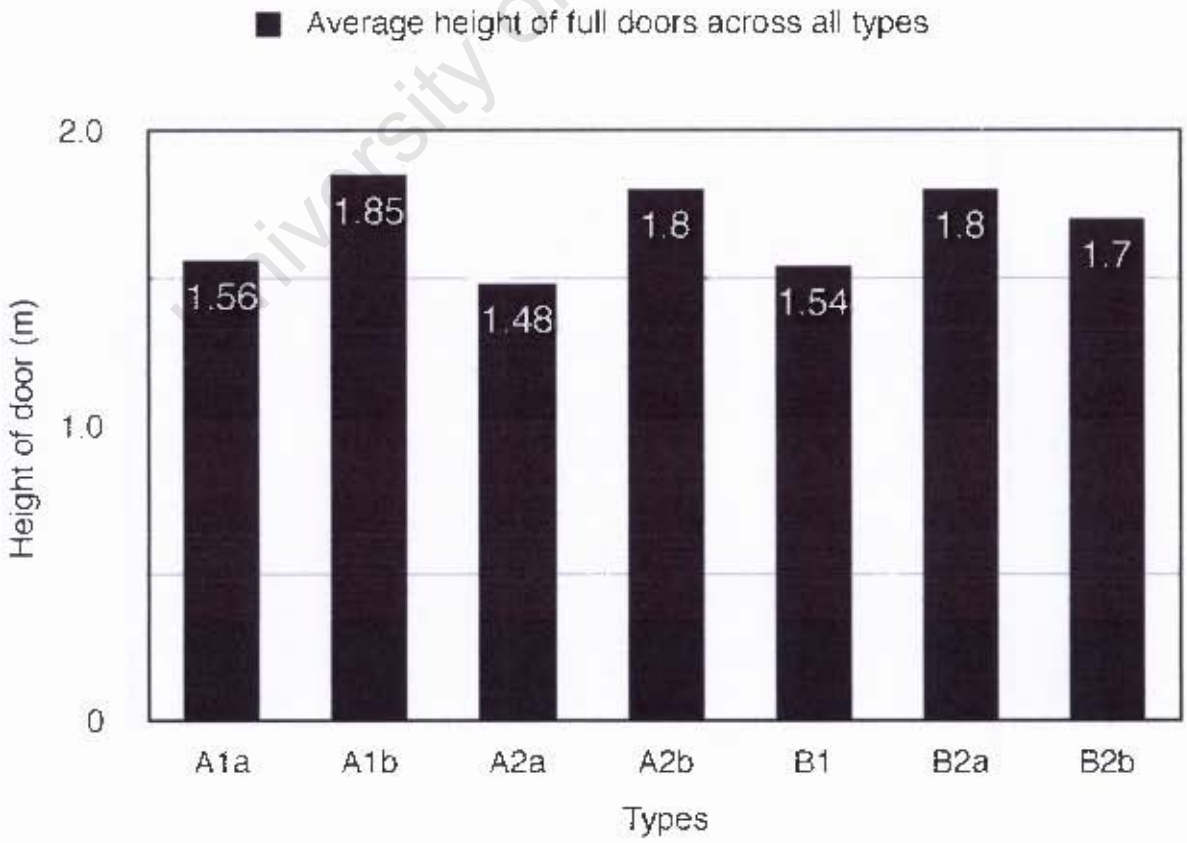

Figure 5.11 The average height of full-door openings across all Types.

The average door height for each of the types indicates that the door size does not vary greatly from the smaller to the larger buildings, although overall the doors to the smaller buildings are slightly lower (1.48 to 1.85 metres) (Fig. 5.11).

Of most interest with regard to doors is the direction which they faced. In all except two examples, half-door openings faced west or south-west (Fig. 5.12). This is entirely consistent with the prevailing winds in the area as the threshing floor and *kafhok* were positioned to take full advantage of the wind for winnowing grain. Two exceptions to this are *kafhokke* which face east on Onderplaas in the Roggeveld on the western edge of the corbelled building area. The door of a third *kafhok* on this farm faced south, but could not be measured due to the presence of a ceiling.

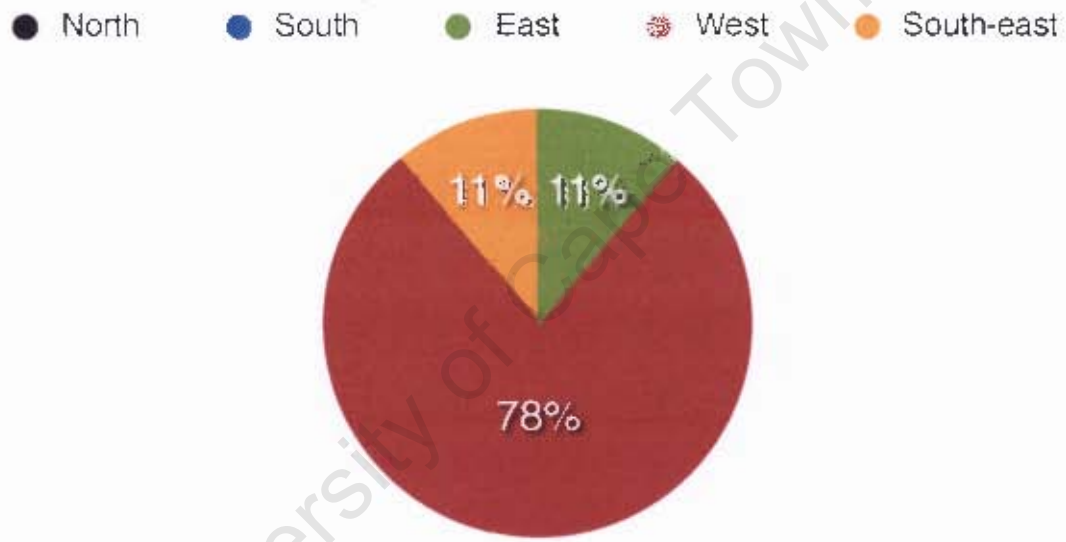

Figure 5.12 Half-door directions (n=24).

The direction of the full-door openings are quite clearly different to the half-door openings (Fig. 5.13). The majority of the full doors face east, to avoid the hot afternoon sun shining into the doorway so keeping the building cool. These full doors also face away from the prevailing west winds, into which the *kafhokke* face. Additionally the buildings which face either north or east also have a reason for doing so. Droogeputs III, for example is a *kookhuis* or kitchen building and the door faces the back door of the main building, thus making it easier to move between buildings.

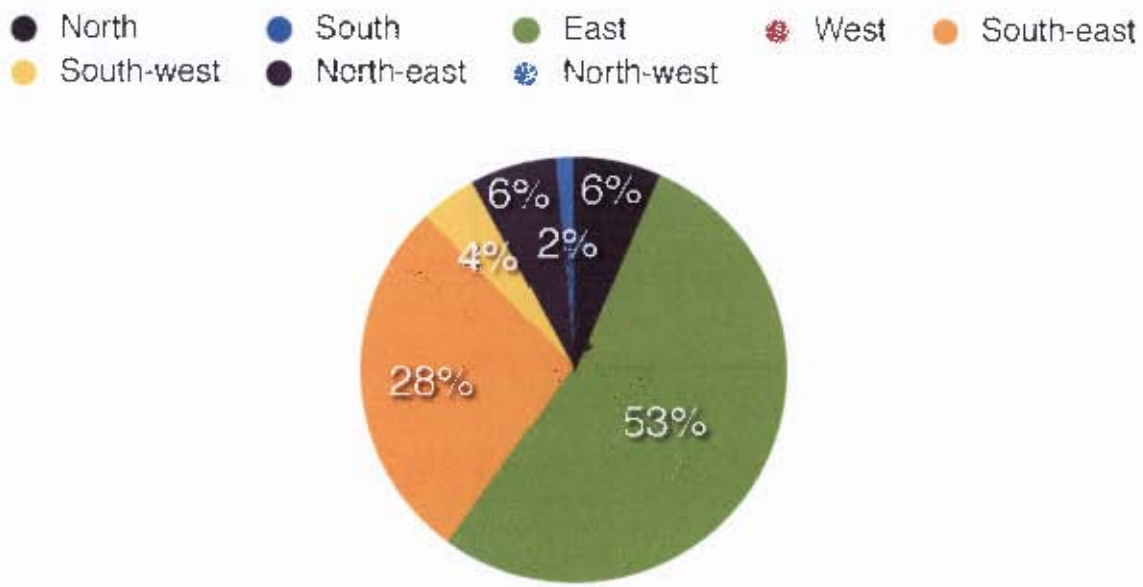

Figure 5.13 Full-door directions (n=67).

Windows

In order to assess variability and potential pattern in the position of windows relative to the building type, I constructed four quadrants for both round and square base forms (Fig 5.14) and counted the number of windows in each quadrant. Walton (1989: 124) observed that "facing the entrance is normally a narrow window opening...". The following discussion assesses this statement.

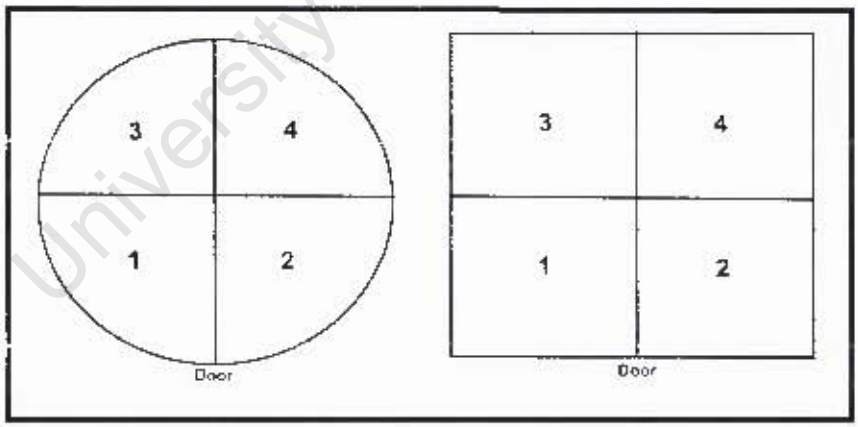

Figure 5.14 Window positions in round and square base buildings.

Corbelled houses, despite their relatively small size, frequently had more than one window. The Type A1ai sample size was 26 buildings. (Table 5.9)

0 windows = n=5 (19.2%)
1 window = n=9 (34.6%)
2 windows = n=9 (34.6%
3 windows = n=3 (11.5%

The windows of Type A1ai are found in all the quadrants, although quadrant 2 does not seem to have been a popular location for a window (Table 5.6).

TABLE 5.6 Type A1ai Window frequency and position.

Type A1ai	1 n=11 43%	2 n=1 3.8%	3 n=3 11.5%	4 n=4 15.4%	1/3 n=4 15.4%	3/4 (opposite the door) n=8 30.8%	4/2 n=5 19.2%	Total 36
Aasvoelsvlei IA	X							1
Aasvoelsvlei II						X	X	2
Bitterwater I	X			X		X		3
Bitterwater II	X							1
Brakvlei	X						X	2
Dawidskolk II								0
De Brak								0
De Val					X		X	2
De Wilg I								0
Droogeputs III	X							1
Gansvlei	X					X		2
Gorras III						X		1
Gorras IV				X				1
Kareekloof						X		1
Krabfontein II					X			1
Krabfontein III	X			X		X		3
Krabfontein IV	X		X		X			3
Krugerskolk			X					1
Leyfontein II					X		X	2
Modderfontein II	X						X	2
Mooskloof I								0
Mooskloof II								0

Type A1ai	1 n=11 43%	2 n=1 3.8%	3 n=3 11.5%	4 n=4 15.4%	1/3 n=4 15.4%	3/4 (opposite the door) n=8 30.8%	4/2 n=5 19.2%	Total 36
Silvery Holme II	X		X					2
Stuurmansfontein III	X					X		2
Vastrap						X		1
Vlieefontein		X		X				2

Eleven of the 26 buildings (47%) had more than one window. If we take the presence of windows as a sign that the building was built for habitation, then only 5 (19%) of these buildings have no windows. This must have been a matter of choice, or because the building was not built with occupation in mind, but as a storeroom, for example. A search for signs that these buildings could have been *kaffiokke*, failed to reveal any evidence.

There is a clear preference for windows to the left of the door - 42.3% in quadrant 1, 15.4% in quadrant 3/4 and 11.5% in quadrant 3 (Table 5.6). It is apparent that builders did not favour windows in the quadrant on the right of the door as there is only 1 (3.8%). It is also clear that more than one window was not reserved for larger buildings. In this type 46.1% had 2 or 3 windows.

All structures (A1aii, n=14) with half-doors, or which originally had half-doors, did not have any windows. This confirms my observation that *kaffiokke* did not have windows.

The Type A1bi sample was small and consisted of 6 buildings. These buildings are all large and were built for occupation, therefore they all have windows, but interestingly, considering their size, only 25% have 2 windows, and none have 3 windows. It is impossible to say that there is a clear preference for window placement (Table 5.7).

TABLE 5.7 Type A1bi Window frequency and position.

Type A1bi	1 n=1 16.6%	2 n=0 0%	3 n=0 0%	4 n=4 16.6%	1/3	3/4 (opposite the door) n=2 33.3%	4/2 n=2 33.3%	Total 8
Dawidskolk I							X	1
Gorras I						X		1
Krabfontein I	X			X				2
Schuinshoogte						X		1
Silvery Holme I					X		X	2
Spioenberg					X			1

Two buildings fall into Type A1bii - Rietfontein II and Swaelkrans. Both were half-door buildings and although Swaelkrans has been converted, no provision was made for windows.

The number of buildings in Type A2ai without any windows is notable. Out of a sample of 12 buildings, 8 (66.6%) have no windows (Table 5.8). Knegsbank was a chicken coop, so understandably did not have windows. I suspect that Langbaken might have been a *kafhok*, but I was unable to detect any of the identifiable signs. Vinkfontein and Middelpos are both roughly built structures which were probably storerooms, and this would also explain the absence of windows.

TABLE 5.8 Type A2ai Window frequency and position.

Type A2ai	1 n=1 8.3%	2 n=0 0%	3 n=0 0%	4 n=1 8.3%	1/3 n=2 16.6%	3/4 (opposite the door) n=1 8.3%	4/2 n=1 8.3%	Total 6
De Postjes								0
De Wilg II								0
Eensaamheid							X	1
Karelsgraf I					X			1

Type A2ai	1 n=1 8.3%	2 n=0 0%	3 n=0 0%	4 n=1 8.3%	1/3 n=2 16.6%	3/4 (oppo-site the door) n=1 8.3%	4/2 n=1 8.3%	Total 6
Karelsgraf II				X	X	X		3
Knegsbank (chicken coop)								0
Langbaken								0
Middelpos								0
Paardegrasvlei	X							1
Rietfontein I								0
Vanreenensplaas								0
Vinkfontein								0

As expected, Type A2aii buildings were all *kaffiokke* and did not have windows.

The buildings of Type A2b were built as large houses and all have windows. The popular location is opposite the door (66%). Although these are large buildings, each has only a single window. Although the sample size is small, it might be significant that there are no windows on the left hand side of the building as you enter (Table 5.9).

TABLE 5.9 Type A2bi Window frequency and position

Type A2bi	1 n=0 0%	2 n=0 0%	3 n-0 0%	4 n=1 16.6%	1/3 n=0 0%	3/4 (oppo-site the door) n=4 66.6%	4/2 n=1 16.6%	Total 6
Grootfontein						X		1
Konka						X		1
Slingersfontein						X		1
Spoorkolk						X		1

Type A2bi	1 n=0 0%	2 n=0 0%	3 n=0 0%	4 n=1 16.6%	1/3 n=0 0%	3/4 (oppo-site the door) n=4 66.6%	4/2 n=1 16.6%	Total 6
Stuurmansfontein IA				X				1
Stuurmansfontein IB							X	1

All Type B1i buildings have a window facing the door Table 5.10). The only windows in quadrant 4, that is, on the right side of the door as you enter, are found in this group of buildings. In an admittedly small sample, four buildings (40%) have two windows – a marked contrast to the large A2b buildings, all of which only have one window.

TABLE 5.10 Type B1i Window frequency and position

Type B1i	1 n=0 0%	2 n=2 33.3%	3 n=0 0%	4 n=0 0%	1/3 n=0 0%	3/4 (oppo-site the door) n=6 100%	4/2 n=2 33.3%	Total 10
Aasvoelvlei IB		X				X		2
Aasvoelvlei IC		X				X		2
Blouhoogte						X		1
Brownslaagte						X	X	2
Tiervlei IA						X		1
Tiervlei IB						X	X	2

The square base buildings (Type B3) have been combined in Table 5.11. (Type B3ai has been highlighted.) Quadrant 1, that is next to the door on the left facing the front, was a popular window position (30.7%), as was the position opposite the door (38.4%). Type B3ai are large purpose-built houses and the presence of windows in all but Voorstevanzylsplaas confirms this. Quadrant 2 (next to the front door on the right) is again an unpopular position.

TABLE 5.11 Type B3ai and B3bi Window frequency and position.

Types B3ai B3bi	1 n=4 30.7%	2 n=0 0%	3 n=0 0%	4 n=1 7.6%	1/3 n=2 15.3%	3/4 (oppo-site the door) n= 38.4%	4/2 n=2 15.3%	Total 14
Arbeidersfontein	X					X		2
Droogeputs IA					X		X	2
Droogeputs IB				X		X		2
Droogeputs II		air vent						0
Janklaasleegte I						X		1
Janklaasleegte II						X		1
Klipkolk	X				X			2
Konka						X		1
Leeuwkraniz	X							1
Leyfontein IV	X							1
Vaalhoek							X	1
Voorstevanzylsplaas	could not be seen							0
Witfontein								0

All three half-door buildings of Type B3aii follow the trend established above and do not have windows.

TABLE 5.12 Type C1i Window frequency and position.

Type C1i	1 n=0 0%	2 n=0 0%	3 n=0 0%	4 n=0 0%	1/3 n=1 100%	3/4 (oppo-site the door) n=1 100%	4/2 n=1 100%	Total 3
Omkeerkolk					X	X	X	3

The only building with an oval base form has three windows.

The window openings all appear to be consistently small in comparison with the size of the building. I have compiled a table of a selection of corbelled buildings over all the Types to see if there is any relationship between the size of the building (taken as the floor area) and the area of the window openings. The key question is whether the window sizes vary across Types and in buildings of different sizes (Table 5.13). (See Appendix I Table A14 for full list of window dimensions of all buildings.)

TABLE 5.13 A sample of windows across all the Types and their relation to the floor diameter, or size, of the building.

Farm	Type	Window size (bxh)	Window area	Floor area	Height of building
Grootfontein	A2b	0.63 x 0.79m	0.49m²	25.7m²	5.96m
Schuinshoogte	A1b	0.58 x 0.9m	0.52m²	24.3m²	5.0m
Krabfontein I	A1b	0.69 x 0.84m	0.57m²	21.73m²	4,1m
Gorras I	A1b	0.58 x 0.76m	0.44m²	21.7m²	4.0m
Silvery Holme I	A1b	0.53 x 0.51m	0.27m²	20m²	4.0m
Bitterwater I	A1a	0.67 x 0.43m	0.28m²	19m²	4.36m
Vaalhoek	B3b	0.55 x 0.77m	0.42m²	18.21m²	4.35m
Modderfontein II	A1a	0.45 x 0.4m	0.18m²	15.4m²	4.35m
Konka	A2b	0.78 x 0.65m	0.5m²	15.20m²	5.67m
Perdegrasvlei	A2a	0.47 x 0.3m	0.14m²	14.45m²	3.64m
Leyfontein II	A1a	0.43 x 0.47m	0.2m²	14.3m²	3.36m
Brownslaagte	B1	0.54 x 0.43m	0.23m²	13.4m²	4.10m
Droogeputs IA	B3b	0.47 x 0.4m	0.18m²	12.96m²	4.0m
Janklaasleegte I	B3b	0.49 x 0.49m	0.24m²	12.96m²	4.55m
Vastrap	A1a	0.56 x 0.52m	0.29m²	10.14m²	3.08m
Koppiesfontein	B1	0.3 x 0.42m	0.12m²	9.82m²	2.86m
Karelsgraf II	A2a	0.56 x 0.53m	0.29m²	9.78m²	3.61m
Aasvoelsvlei IA	A1a	0.48 x 0.33m	0.15m²	9.0m²	3.09m
Silvery Holme II	A1a	0.57 x 0.44m	0.25m²	7.3m²	2.32m

There appears to be a correlation between the floor diameter (size) of the building and the area or size of the window. Although smaller buildings do not necessarily mean smaller windows, there is a trend in this direction. Window size, however, remains small, even in the larger buildings. This is to prevent weakening of the structure and to insulate the building from the harsh natural elements.

Projecting stones

The projecting stones are a feature of many Karoo corbelled buildings. Their purpose and function, however, remains obscure. There are buildings with and without projecting stones (Table 5.14).

TABLE 5.14 Projecting stones according to building Type

Type	With Projections	Without Projections	Total
A1a	15 (29%)	37 (71%)	52
A1b	4 (57%)	3 (42%)	7
A2a	5 (29.4%)	12 (70.5%)	17
A2b	7 (100%)	0	7
B1	2 (25%)	6 (75%)	8
B3a	3 (75%)	1 (25%)	4
B3b	5 (62.5%)	3 (37.5%) (one has steps)	8
C1	1 (100%)	0	1
Total	42	62	104

Based on the data in Table 5.14, projections occur across the whole spectrum of corbelled building Types, but there is a tendency for them to be present in the taller buildings (Fig. 5.15), such as Type A2b, the high cone roofed buildings, all of which have projections, as do the majority of Type B3b (large pitched roof buildings) (Fig. 5.15). A discussed, the projections may have helped with the maintenance of these buildings. This may be relevant because Type A1a buildings have low roof heights and the majority of the buildings (71%) in this group do not have projections. The projections in these smaller Types tend to be distributed around the dome more randomly and not in fixed lines, as they are in the large buildings (Fig. 5.16).

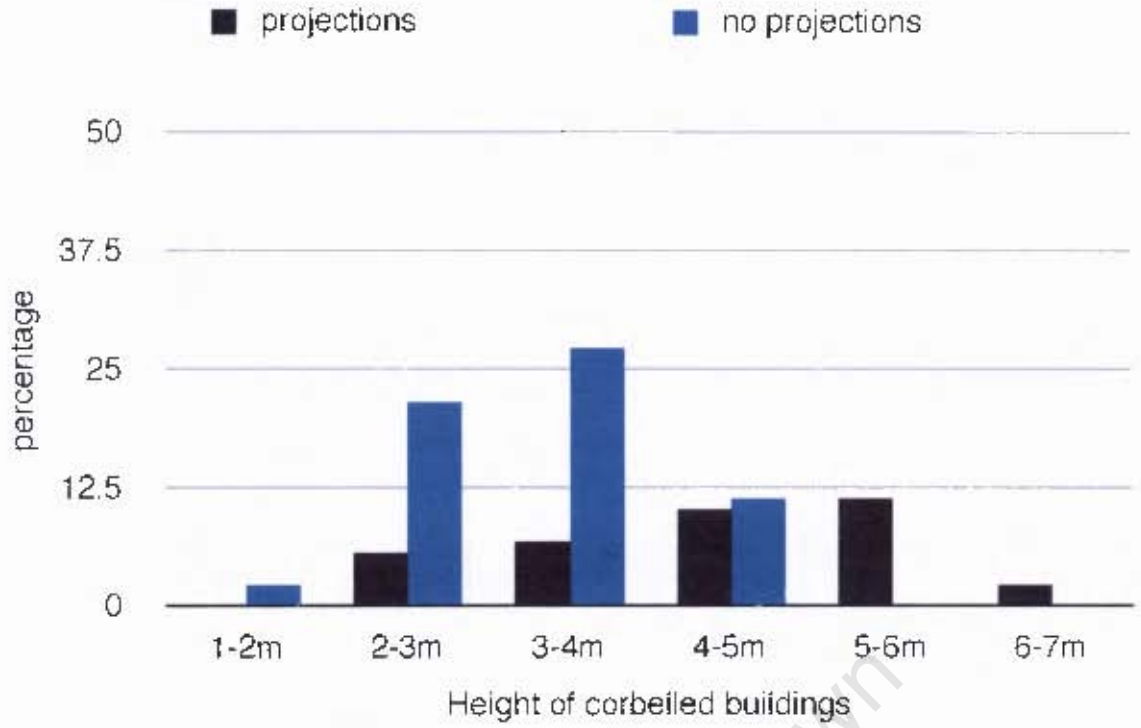

Figure 5.15 The percentage frequency of projections by building height.

Projections appear to have been optional and are not considered to be attributes that define a Type, and are not critical structural features for any particular Type.

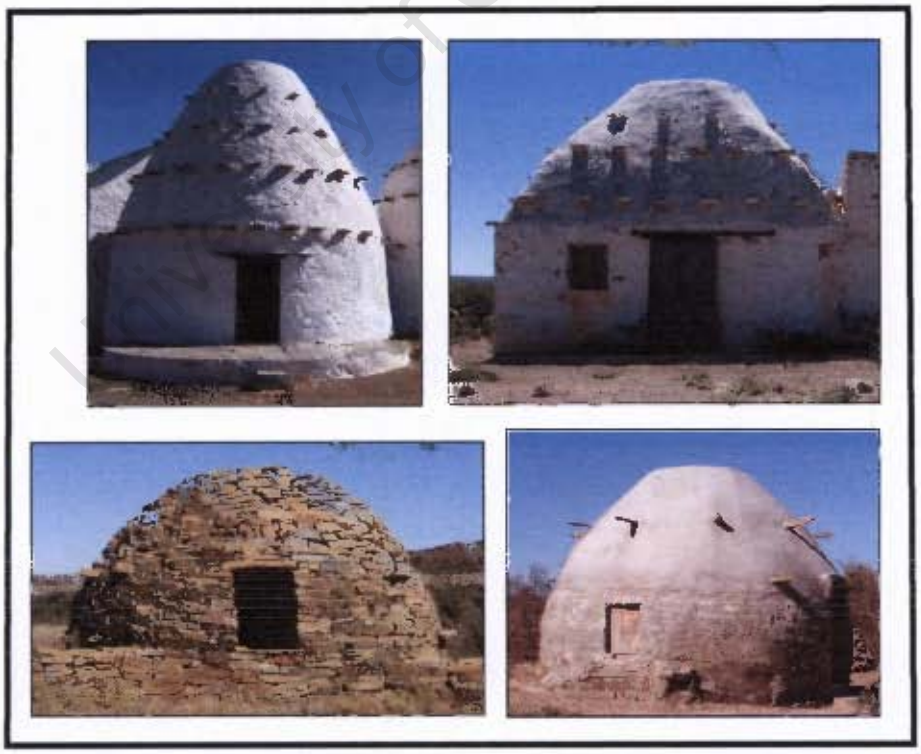

Figure 5.16 A Corbelled buildings with projections. Stuurmansfontein I A2bi *(top left)*, Klipkolk B3bi *(top right)*, Stuurmansfontein II A1aii *(bottom left)*, Ongeluksfontein A1aii *(bottom right)*.

Niches, shelves, stoves/chimneys and hooks

Windows indicate that the building initially served as a domestic dwelling. Other attributes such as storage niches, shelves or stoves will correlate with this purpose and co-occur. I compiled data to elaborate this discussion. These atttributes do not have meaningful patterns and have not been used to define a building Type. I suggest that shelves, niches and other domestic attributes do not occur in *kafhokke* or storerooms (Fig. 5.17). (A full set of tables detailing all the elements can be found in the Appendix 1 Tables A4 to A13.)

The role of niches in domestic buildings has been identified by two early visitors. Lichtenstein (1812: 106) writes: "...instead of shelves, drawers or closets, open niches are made in the wall where these things are stored", and Moodie (1835: 68) comments "...our host handed down a bottle and wine-glass from a square recess in the wall".

For buildings Type A1ai, 70% of the structures with windows also have shelves and wall niches. Over 15% of the structures have no shelves or niches (Fig. 5.17). The percentage of Type A1bi structures with both windows, shelves and niches is even higher, at just over 80%. This confirms the domestic purpose of these buildings. In contrast, all *kafhokke* (Fig. 5.17; Types A1aii and A1bii) have no windows, and no built-in shelves or niches of any description.

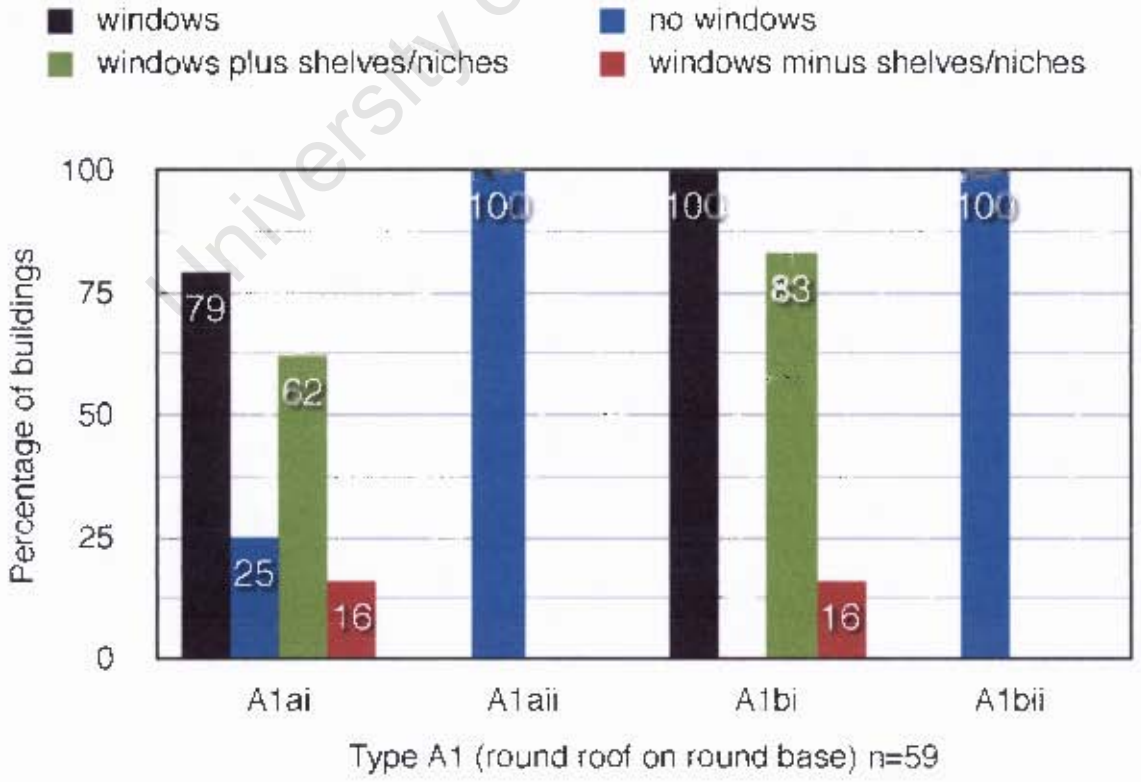

Figure 5.17 Relationships between windows and shelves/niches in Type A1 buildings.

The A2ai Type (cone on round base with full door) buildings reflect the pattern revealed in Table 5.8, that is that 66.6% of the buildings do not have windows. Fig. 5.18 shows that nearly 60% do not have shelves or niches. The question is whether the same buildings have neither windows nor niches or shelves. Out of the sample of 12 buildings, 9 of those with no windows (75%) also had no other features, so one can assume these were not built as dwelling places. The *kafhokke* (A2aii) once again have no windows or other features, while the large A2bi buildings follow the domestic house pattern.

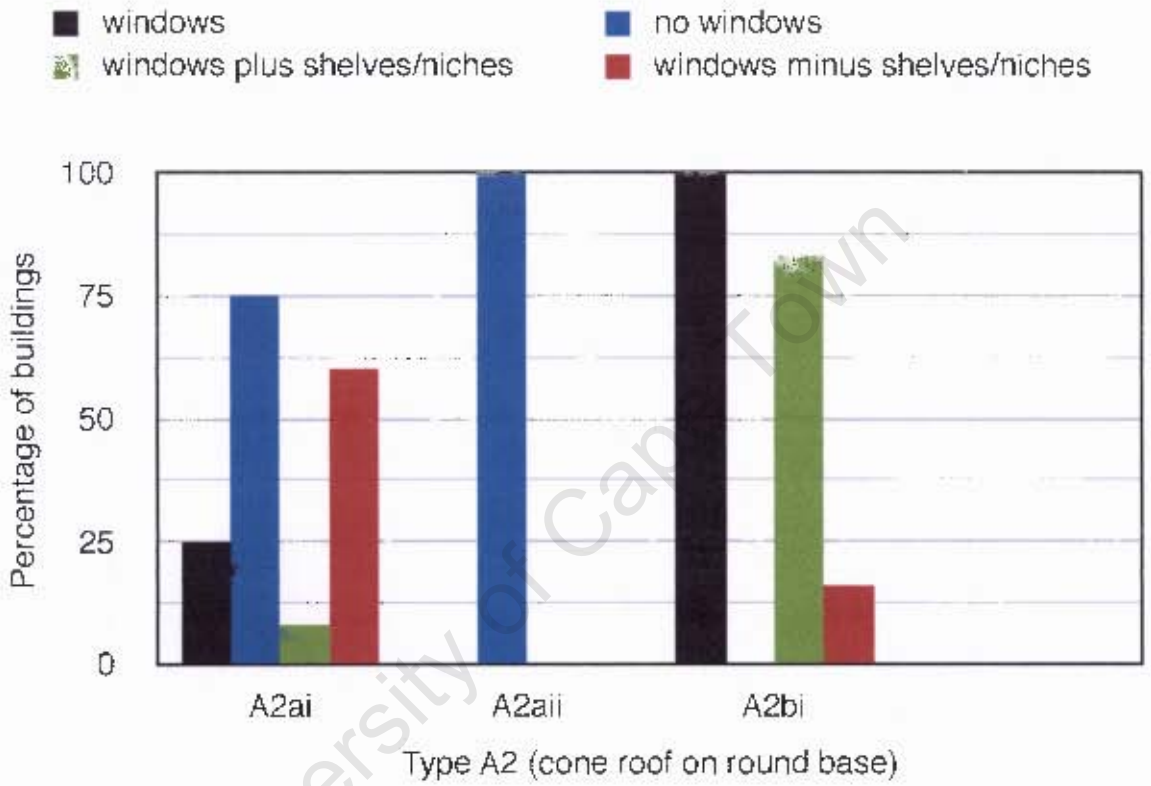

Figure 5.18 Relationships between windows and niches/shelves in Type A2 buildings.

The small buildings of B1i all have windows, but over 50% are not associated with built-in elements, while the B3ai buildings, which are also small, show a range of features across the whole spectrum (Fig. 5.19). The B3bii buildings have been identified as *kafhokke* and, as expected, do not have windows. The large pitched roof buildings (B3bi) all have windows and over 60% are associated with built-in elements, all of which are wall niches. No shelves are present, possibly indicating the presence of furniture.

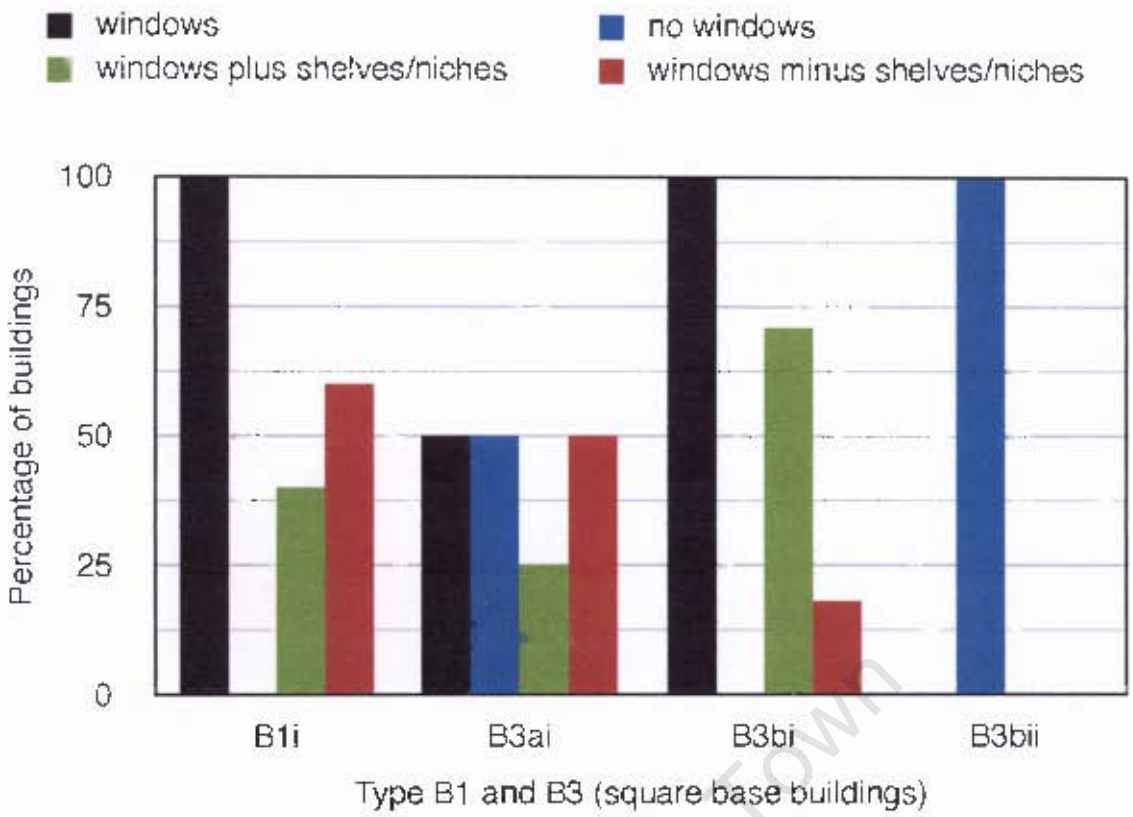

Figure 5.19 Relationships between windows and niches/shelves in Type B1 and B3 buildings.

Discussion

The aim of this chapter has been to divide the 91 corbelled buildings into Types using supporting metrical data taken from the buildings. The starting point, Level 1 of the typology is the base form of the building and I have identified four: round, square or rectangular and, in one case, oval. A second key attribute (Level 2) of the typology is the roof shape. The has been complicated by the fact that both the round and square base forms, the roof shapes form a continuum from low to high, with the floor size adjusted accordingly. I identified three basic roof shapes – round, cone and pitched. The pitched roof is fairly obvious, but comparisons of roof heights to floor diameter ratios have been used to separate the round roof shape buildings from the cone roof shape buildings. It is the combination of base form with roof shape that defines the core types in this analysis. These are:

A1 – round roof on round base form

A2 – cone roof on a round base form

B1 – round roof on a square base form

B3 – pitched roof on a square base form

I subdivided these four basic types into sub-types based on variability within the roof shapes (Level 3). Because I have a good knowledge of every building in my sample, I felt that cone roof buildings with roof heights over five metres should fall within a sub-category. Apart from their sheer size they also had a combination of built-in features that separated them from the smaller cone roof buildings. In the same way, I have made a sub-category of round roof on round base buildings which have a floor diameter of over five metres. The pitched roof type has also been subdivided on the basis of size, into pitched roof and small pitched roof groups.

A final subdivison (Level 4) is based on the form of the door openings. There are two options, either a full- or half-door. This feature defines the intended function of the building. The half-door opening is found only in those buildings used as *kafhokke*, or chaff store houses and they are often associated with *trapvloere* or threshing floors. Features associated with houses, such as niches or shelves, are also entirely absent. Half-door openings which have been altered at a later date to make a full door when the function of the building changed, are also classified at half-doors in this typology. Door shape is a key element in the building and this has been given its own level in the typology (i = full door; ii = half door). The full typology is given in Table 5.15 and Figure 5.18 illustrates the Types in their hierarchical position.

Further attributes, such as windows, projecting stones and built-in elements, such as niches and shelves, are not considered significant enough to warrant further definition of types.

Table 5.15 Summary of corbelled building typology. (See Figure 5.18.)

Type	Description
A1ai	Round roof on a round base form with a full-door opening. Height to floor diameter ratio less than 1. Floor diameter less than 5 metres.
A1aii	Round roof on a round base form with a half-door opening. Height to floor diameter ratio less than 1. Floor diameter less than 5 metres.
A1bi	Large round roof on a round base form with a full-door opening. Height to floor diameter ratio less than 1. Floor diameter more than 5 metres.
A1bii	Large round roof on a round base form with a half-door opening. Height to floor diameter ratio less than 1. Floor diameter more than 5 metres.
A2ai	Cone roof on a round base form with full-door opening. Height to floor diameter ratio more than 1. Roof height less than 5 metres.
A2aii	Cone roof on a round base form with a half-door opening. Height to floor diameter ratio more than 1. Roof height less than 5 metres.
A2bi	High cone roof on a round base form with a full-door opening. Height to floor diameter ratio more than 1. Roof height more than 5 metres.
B1i	Round roof on a square base form with a full-door opening. Height to floor diameter ratio less than 1. Floor diameter less than 5 metres.
B1ii	Round roof on a square base form with a half-door opening. Hight to floor diameter ration less than 1. Floor diameter less than 5 metres.
B3ai	Small pitched roof on a square base form with a full-door opening. Height of roof less than 5 metres.
B3aii	Small pitched roof on a square base form with a half-door opening. Height of roof less than 5 metres.
B3bi	Pitched roof on a square base form with a full-door opening. Height of roof more than 5 metres.
C1i	Round roof on an oval base form with full-door opening.

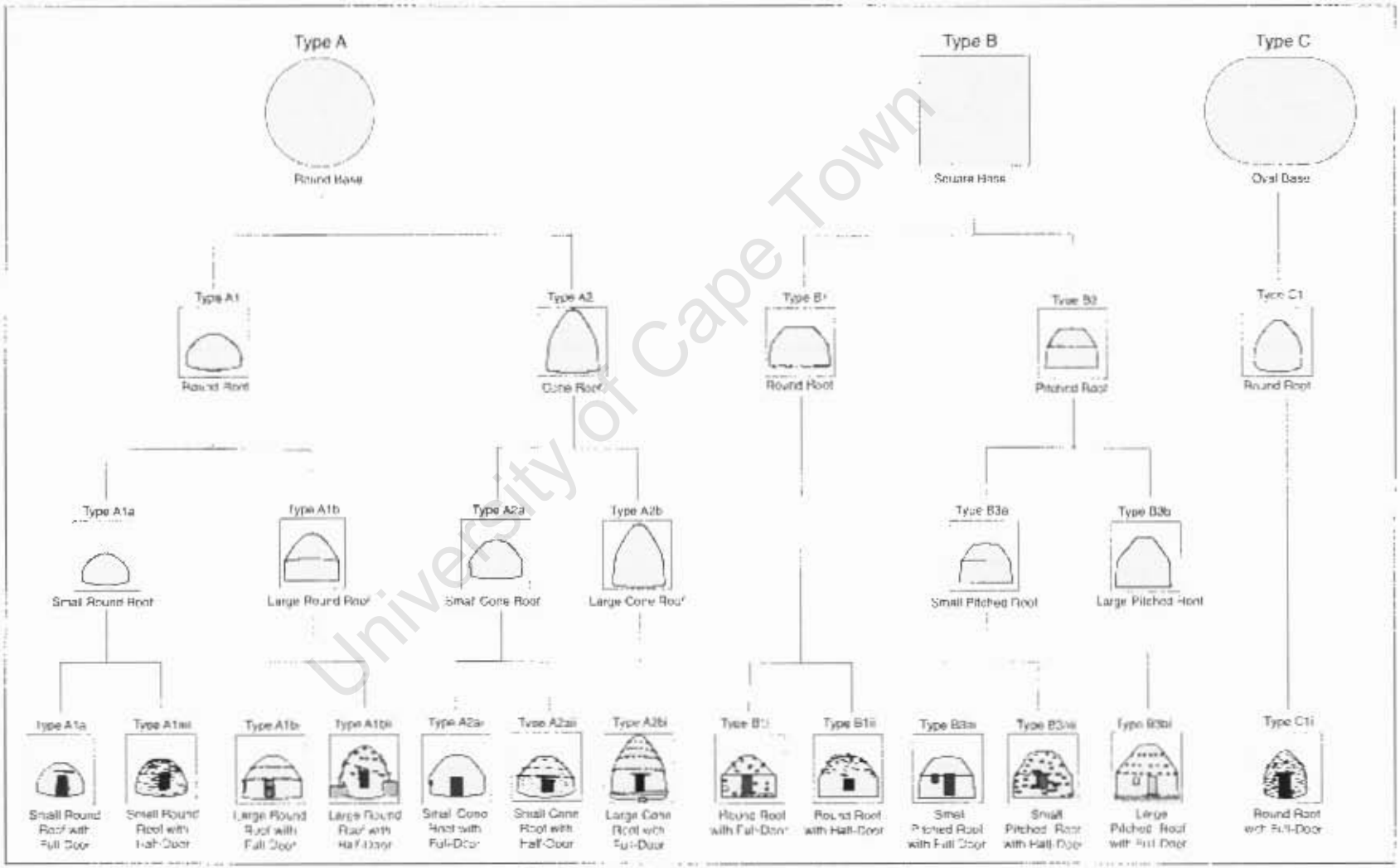

Figure 5.20 The complete corbelled structure typology

Although it follows that buildings with windows were initially occupied at some point, too many buildings, particularly in the A2ai Type (cone roof on a round base), do not have windows – a phenomenon which is yet to be explained. Functional explanations range from meat stores, and smoking rooms to servant housing or undetected *kafhokke*.

In all types the windows are small in proportion to the size of the building. This is for climate control and/or structurally to reduce the strain on the building. When the earlier 19th century buildings were constructed, glass was not available. When it did become available, it was probably expensive, and this might also have been a contributing factor to the small size of the windows. One definite correlation that links building function to windows occurs in the case of *kafhokke,* which do not have windows.

The position of the window varies among the Types, and while windows appear in all quadrants, quadrants 2 and 3 are unpopular positions for windows. Three buildings have windows in quadrant 2, while there are no windows in any of the buildings in quadrant 3. At this point it is not known why this should be the case. In contrast, it is clear that windows on the left side were favoured positions. This south facing preference for windows could be linked to keeping the interior cool during summer.

The presence of projecting stones do not define other Types. Projecting stones occur right across all building Types, but are more common in the tall buildings. If they were used as scaffolding or steps to help with the maintenance of the building, then this is understandable.

Built in elements such as shelves, niches hooks and hearths are attributes that also do not define Types, but in combination with the presence or absence of windows are taken as an indication that the building was used as a habitation. Of the 40 buildings with windows, 69% were also associated either with niches or shelves, or both, while 31% had windows with no other built-in elements. Buildings now designated *kafhokke* do not have windows and also do not have any built-in elements, except for wooden beams.

Whereas in the Type A group the height to floor diameter ratios were used to define Type A1 and Type A2, this was not used as a defining factor in the Type B group, because, except in one case (Vaalhoek) all the height to floor diameter ratios of the square base buildings are less

had become available from towns and was easier to obtain on improved roads and with possibly more money to spend once merino sheep and the wool industry gained a foothold.

The distribution of the Types of corbelled buildings and possible chronological implications will be discussed in the final chapter. This typology has been based on stand alone single corbelled structures. I will now proceed to discuss the extensions that were built onto corbelled buildings in the next chapter.

CHAPTER SIX

EXTENSIONS TO CORBELLED BUILDINGS

The typology for corbelled buildings developed in the previous chapter dealt only with the corbelled building in its original form. But many of these had later buildings attached or built onto them and these I have called "extensions". Sometimes there is more than one extension and it takes a careful deciphering of the stratigraphy of the building to work out the order in which they were built.

These extensions are not attached to the original building in the sense that they are "tied in", because there has been no attempt to lock in the stone work. Extensions butt up tightly against the original building in such a way that the "join" is clearly visible (Fig. 6.1). Sometimes an opening is made at the point of contact to connect the two buildings, but this is not always the case. When an extension is added, windows or doors in the original building have sometimes been blocked and other openings made.

Figure 6.1 Aasvoelsvlei. An extension abutting the original corbelled building at Aasvoelsvlei I *(left)*, and round base form building with a rectangular extension "attached" at Aasvoelsvlei II *(right)*.

In order to structure the analysis of the extensions to the original corbelled building, I use the basic types defined in Chapter Five. The object is to identify any patterns in the way extensions were added to corbelled buildings. Does the base form, for example, determine the type of extension and does the shape of the original building limit the type of building that can be attached to it?

The additions to the corbelled buildings, whether single or multiple, have clear and obvious implication for the chronology and sequence of construction. Most important, however, are the implications for the social wrapped up within the expansion of the domestic dwelling unit and changes to the oganisation of domestic activity. This analysis, therefore, also considers the domestic infrastructure of the *werf*, such as the position of the *kookskerms*, rubbish dumps and so on. Together the combination of sequence of the extensions and the form of the extensions will be discussed in terms of the implications they have for the development and change in the organization of domestic space, which would have originally been focussed on the arrangement of domestic activities on the *werf* around the original corbelled building.

The extensions have chronological implications and the style of construction and the raw materials used suggest a sequence.

The plans of the extensions that follow are the result of my own fieldwork, supplemented in a few cases by Walton's plans (Walton, 1960). Because there are sometimes multiple additions to the buildings, it is important to make the sequence clear in order to base some judgement on what the extensions might mean for the social, and domestic and economic structure. In Figure 6.2 I present a master key through which all my plans can be interpreted. The scale on the plan refers to the plan and not to the front view figures.

In order to place the buildings in context, each section begins with a Google Earth illustration of the layout of the *werf*.

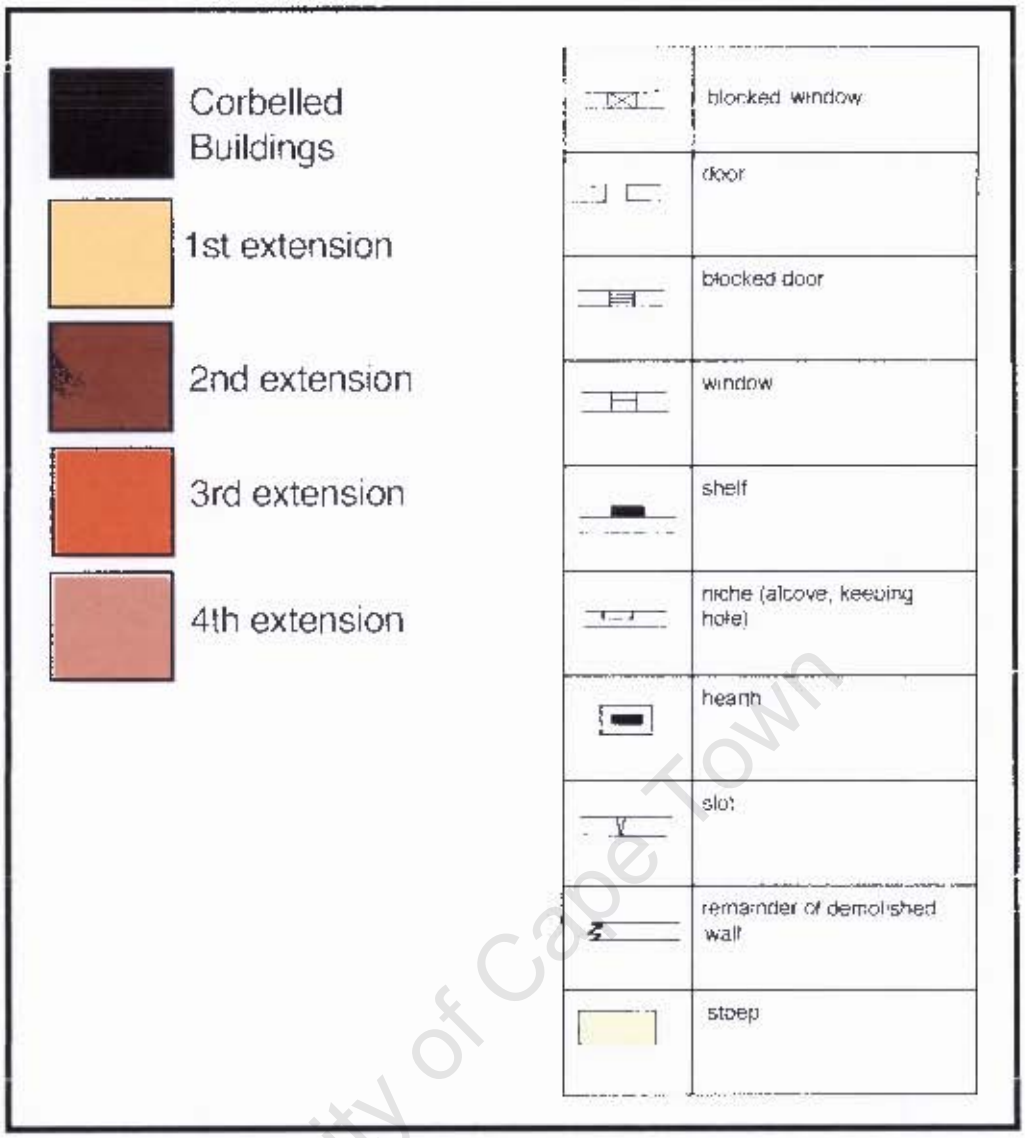

Figure 6.2 Key to the extension plans.

EXTENSIONS ON TYPE A1a (Round roof on round base form)

Silvery Holme

Silvery Holme (Fig. 6.3) comprises two adjacent corbelled structures (Fig. 6.4) which lie 425 metres from the main *werf*. They are close to the riverbed, a possible source of water, on a piece of land which changed hands frequently. The unusual English name was already used in surveys conducted in the 1830s.

Figure 6.3 Silvery Holme *werf*. Google Earth image.

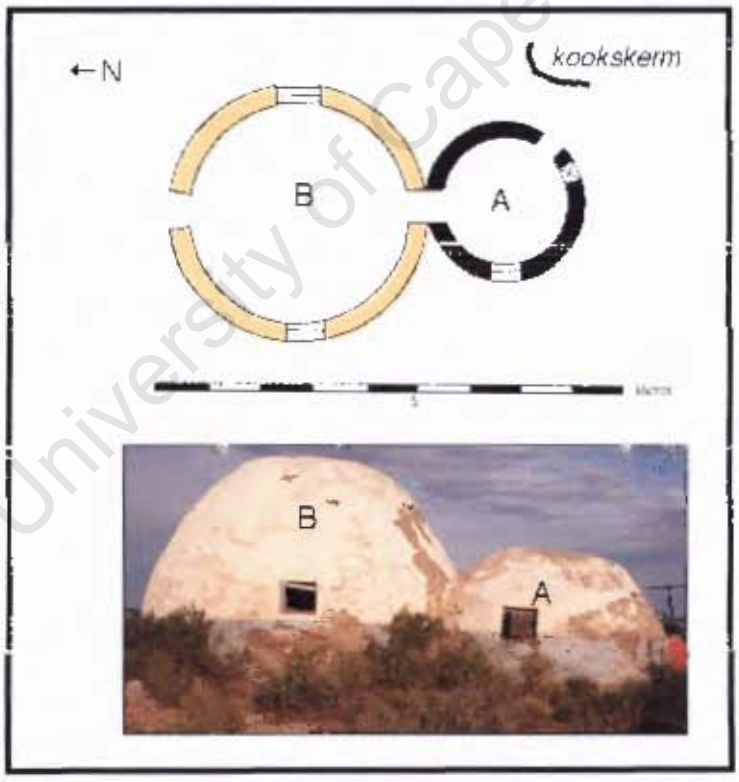

Figure 6.4 Silvery Holme. Plan and rear view.

It seems most likely that the smaller of the two corbelled buildings was built first (Fig. 6.4, A). An examination of the point of contact shows that the profile of the smaller building

continues all the way down to the ground, whilst the wall of the larger building (Type A1b) rests on the smaller building (Fig. 6.4, B). Both buildings have windows that are the same size. In contrast, and of importance, the doors face different directions. Structure A has a door that faces north-east, which conforms to the dominant door direction of buildings with domestic features, while the door of the later B building faces north. Although the doors do not face the same direction, the rear windows do. The smaller, earlier building has a blocked window to the left just inside the door (in quadrant 1) and the two buildings were joined through an internal door.

My interpretation of Silvery Holme is that the smaller building was constructed first. It had two windows and the door faced the dominant position of north east. A *kookskerm* may have been outside the door. The larger building was built later. The stonework, woodwork, shape and size of the windows suggest that these were built by the same builder probably soon after one another.

Although the door of the larger building shifted direction by 180° thus moving the front of the building to face north, the rear windows of both buildings faced the same direction, demarcating the rear of the building. The original door was now towards the rear of the building and the *kookskerm* was probably placed outside this door which was no longer the main entrance. The surrounds are too disturbed for the dump to be located. The extension appears to represent extra living space.

At the time of my visit the building was occupied by an itinerant farm worker, who used the small building as a storeroom and the larger building for sleeping. He used all the hooks for hanging clothes and equipment, and wire strung between the sawn-off beams was used to hang meat, veld herbs and so on. His *kookskerm* was outside the door of the small building.

Eendefontein

Three A1a buildings are joined together in a linear arrangement on the Eendefontein *werf* (Fig. 6.5). Only cursory measurements were taken when the buildings were visited, but I have sufficient evidence to reconstruct the building sequence.

Figure 6.5 Eendefontein *werf*. Google Earth image.

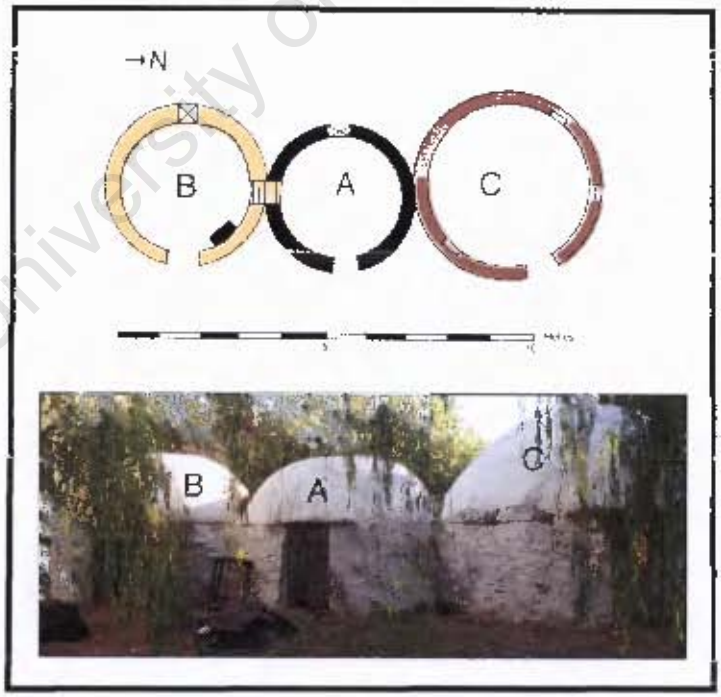

Figure 6.6 Eendefontein I. Plan and front view.

At Eendefontein, the three buildings are in a row with all the doors facing east (Fig. 6.6), although one (C) is offset slightly towards the north. Consequently, there is a consistent front area and definite back area for all three buildings. The building (C) with the door which is slightly offset is also the largest of the three. Due to disturbance, no dump could be located. The dump is always a useful feature as it usually confirms the inhabitants' view of front and rear of the building and it is usually placed at the rear.

It is difficult to be precise about the order in which the corbelled structures were built because they have been plastered. The middle building (A) has retained its original shape most clearly, so it is likely that the other two were built later, one on either side, although their walls have not been moulded to fit the original building (Fig. 6.6), as is the case at Silvery Holme (Fig.6.4). All three buildings have windows (now blocked in two extensions, A and B), two have a niches and one has a shelf. Since there are no signs of internal hearths, these extensions appear to have provided extra indoor living space.

The farm has a *kafhok* and *trapvloer* and other signs of farming activities, such as kraals (Fig. 6.5). These corbelled buildings were abandoned as living areas when a rectangular building was built 24 metres to the north. Subsequently, windows and connecting doors were blocked and the buildings were used as storerooms, as they still are today. In the 1950s a third "modern" farmhouse was built on the *werf.*

The three buildings form a linear arrangement, much like the additions to a *langhuis.* All face forwards so that the rear remained consistent after additions were added, and all are small and confined spaces. The presence of windows in all three buildings, as well as the shelf in one and niches in another, point to the fact that these were abodes and cooking remained an outdoor activity. Eventually the inhabitants of these buildings moved to a new house. Both the corbelled buildings and the "new" house faced north-east, to take advantage of the weather. The 1950s house faces north probably because the weather was no longer such an important issue and the occupants preferred a clear view of the approaching road.

Aasvoelsvlei I

On Aasvoelvlei (Fig. 6.7) there are two complexes which lie some 285 metres apart. The occupants of these buildings appear to have shared the facilities on the farm such as the *trapvloer*, *put*, furrows, kraals and agricultural lands. In 1895 the farm was divided into five sections shared between two families and this may explain the buildings on the farm. The settlement is completely abandoned and is now merely part of a larger farm. Some 1.5 kilometres to the west is another abandoned settlement - Knapdaar - with one collapsed corbelled building, rectangular stone buildings, *puts* and a *trapvloer*.

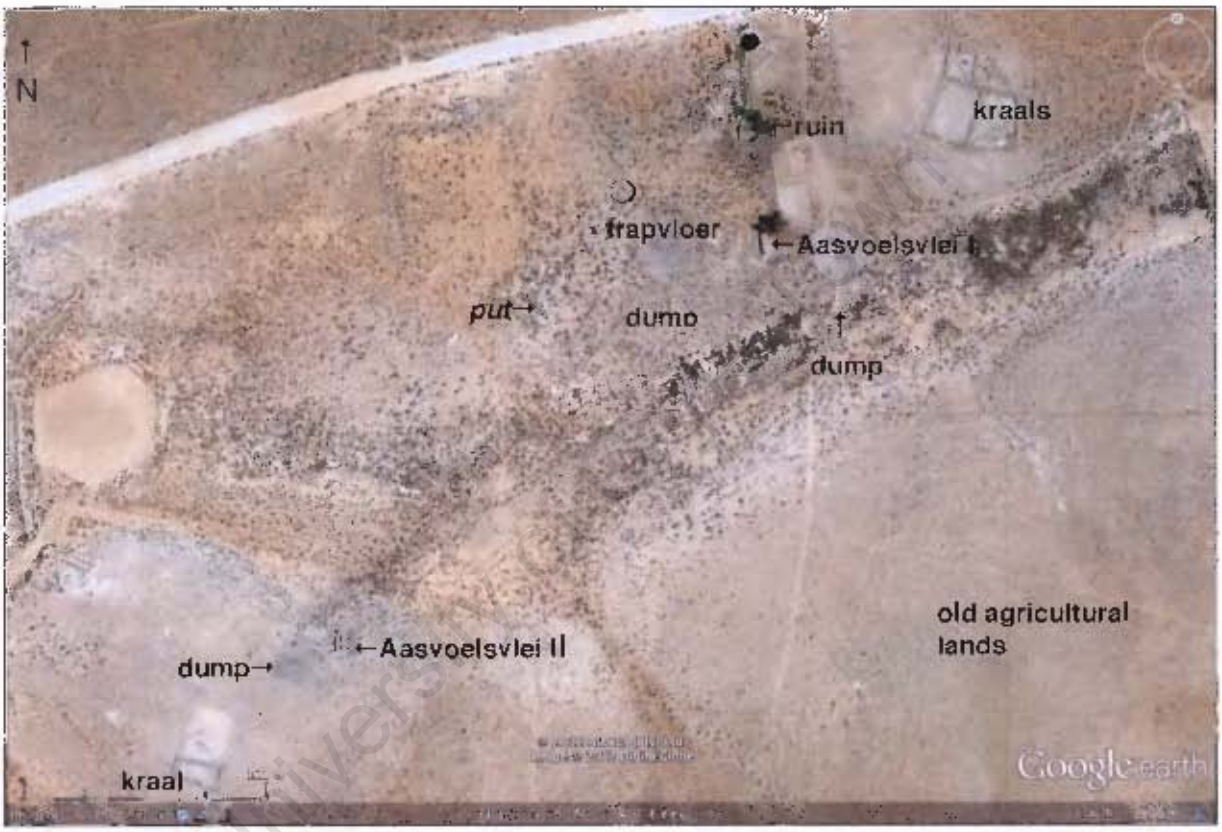

Figure 6.7 Aasvoelsvlei *werf*, including Aasvoelsvlei I and Aasvoelsvlei II. Google Earth image.

Aasvoelsvlei I is made up of three linear linked corbelled buildings (Fig. 6.8). The two outer buildings one round based (A) [Type A Ia] and the second with a square base (C) [Type B1a] were initially freestanding. It is difficult, however, to say which was built first. The natural inclination is to suggest that the round base structure is the earliest building, but we know that at Koppiesfontein both round and square base buildings were built at the same time. This is because both buildings had a unique construction style and were built by the same builder.

Structure C at Aasvoelsvlei I has signs of an internal stove or hearth. This evidence suggests that the round base building came first.

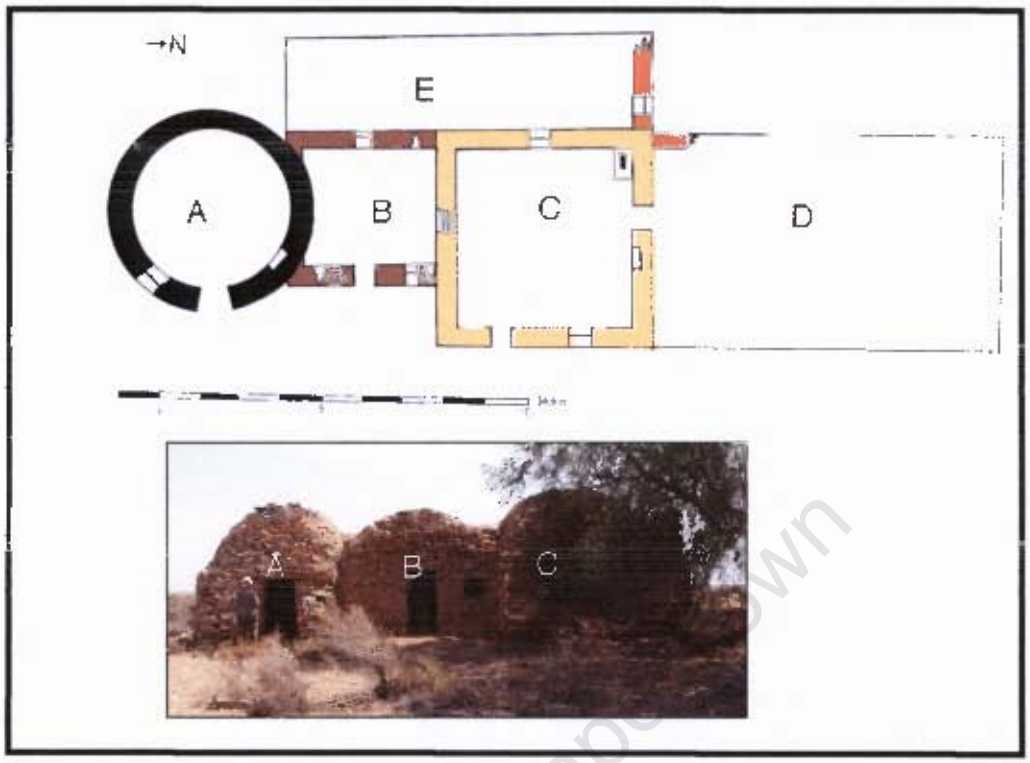

Figure 6.8 Aasvoelsvlei I. Plan and front view.

Structures A and C were linked together by an infill building (B) to complete the linear arrangement. Subsequently, a rectangular building with a stone foundation and brick walls was built onto end of building C. The mud bricks have now all but disappeared, but the stone foundation still exists. More of the mud brick walling was still standing when Walton photographed it in 1960 (Walton, 1989: 128). There are also the ruins of a rectangular extension which ran down the back length of the buildings B and C. Much of this has also disappeared. The rear windows of the B and C buildings were probably blocked when this addition was made.

The three buildings do not have interleading doors, although one door in the southern wall of C was blocked when B was constructed as there is no sign of this doorway in B. Structure C, however, had a "new" doorway in the northern wall that led to the northern extension. This "new" doorway is propped up with metal pipes for lintels.

Except for the two back windows, all the original doors and windows face an easterly direction and consequently the orientation of "front" first established in building A, was retained throughout the sequence.

There is a dump on the south-east side of building A as well as a dump at the rear of the buildings. The position of the front dump is unusual but contains the same ceramic types as the rear dump. There is also a *trapvloer* and deep *put* at the rear. A huge system of kraals is positioned in front of the buildings (Fig. 6.7).

In summary, Aasvoelsvlei I originally consisted of two corbelled buildings, one round base, the other square base. Together with the infill building and two other later extensions the complex would have had at least five rooms, including an indoor kitchen/cooking area, if the evidence has been interpreted correctly. The corbelled buildings are small, but the brick extension might have been more spacious with a *brakdak* or thatch roof. None of the corbelled buildings are linked and both the infill building (B) and C have rear windows which have been blocked, probably to provide privacy from extension E. The buildings had a clear view of the kraal.

Aasvoelsvlei II

Aasvoelsvlei II lies behind Aasvoelsvlei I complex and both face east (Fig. 6.7). The extensions to the corbelled building (A) take the form of a rectangular structure consisting of four rooms built in three stages in the order B, C, D1 and D2 (Fig. 6.9).

The two rear extensions (B and C) each had a door opening to the west, but these were subsequently blocked. It is not clear whether this meant the orientation shifted 180°, so that east now became the front. This is unlikely as the dump is at the rear of the building (west). The facing doorways, to B and C, were probably blocked when the additions D1 and D2 were added, thus placing the front to the east, as indicated by the doorway in D2. This, therefore, retains the original orientation, established when the corbelled hut was built. The doorway (a) from the corbelled building to B might have originally been a window. The bottom half of the door is uneven and appears to have been tampered with. In addition, the width of the opening

is only 0.48 metres. None of the doors measured to date are this narrow, although quite a few windows are.

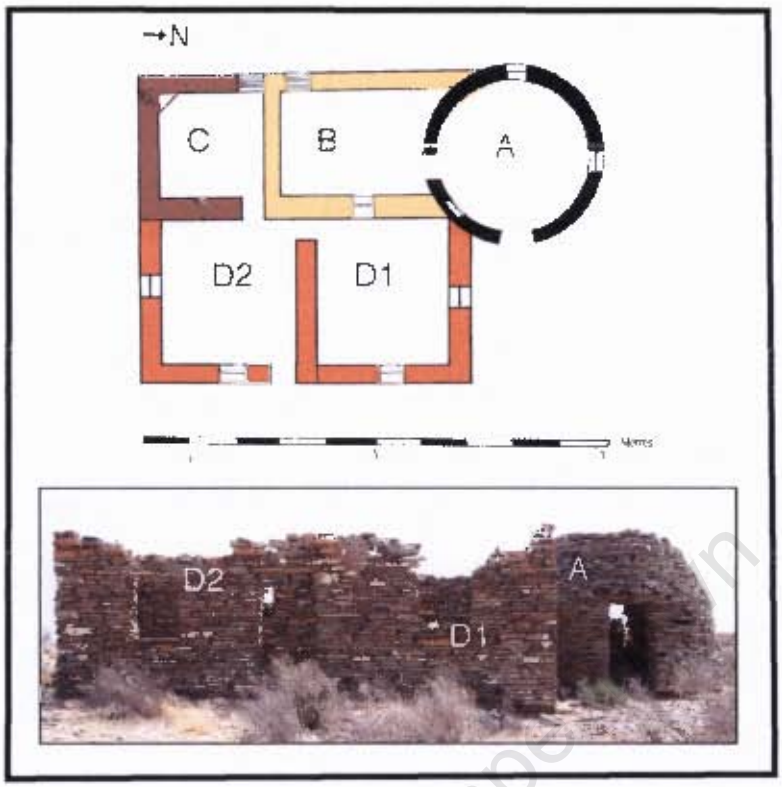

Figure 6.9 Aasvoelsvlei II. Plan and front view.

The corbelled building and its extension are interlinked, but are not linked to the other three rooms, which are in turn linked to each other. In other words, the corbelled building and the first extension are separated from the other extensions. Building B has signs of corbelling at each corner so there was an attempt to create a corbelled roof across the rectangular space. There is no internal hearth, so it can be assumed that cooking was still an outside activity.

Unlike the extensions at Aasvloelsvlei I, these extensions are arranged in a square pattern. The manner in which the stone is packed gives a clear indication of the sequence. In addition, D1 and D2 have substantially larger windows than the corbelled building and its extenstion (B). The complex has a definite rear and front with the dump at the rear. Buildings D1 and D2 have assumed a prominent place and the corbelled building has been 'pushed' to the rear. Altogether this complex is made up of five rooms which means that Aasvoelsvlei I and II had a total of 10 internal spaces, not counting the other buildings on the site which are complete ruins.

Leyfontein III

Leyfontein is an abandoned settlement which has four corbelled buildings, numerous ruins, kraals, walled gardens, *kafhok* and *trapvloer*, agricultural lands and a spring which still produces water to the present day (Fig. 6.10). The farm was settled very early for an area this far north because the quitrent land grant was made in 1838 while the surrounding farms were only granted 30-40 years later. This does not mean that the corbelled buildings were built in 1838, but rather that the site with its spring was desirable. The settlement had been abandoned by 1911, when the ancestors of the present owners bought the farm. The present owner's father can remember attending school in one of the corbelled buildings (Willie Nolte, pers. comm.).

Figure 6.10 Leyfontein *werf*. Google Earth image (obscured by cloud).

The A1a type structure at Leyfontein III could not be fully measured but a plan of the building and its extensions was done at the time of the visit to the site (Fig. 6.11).

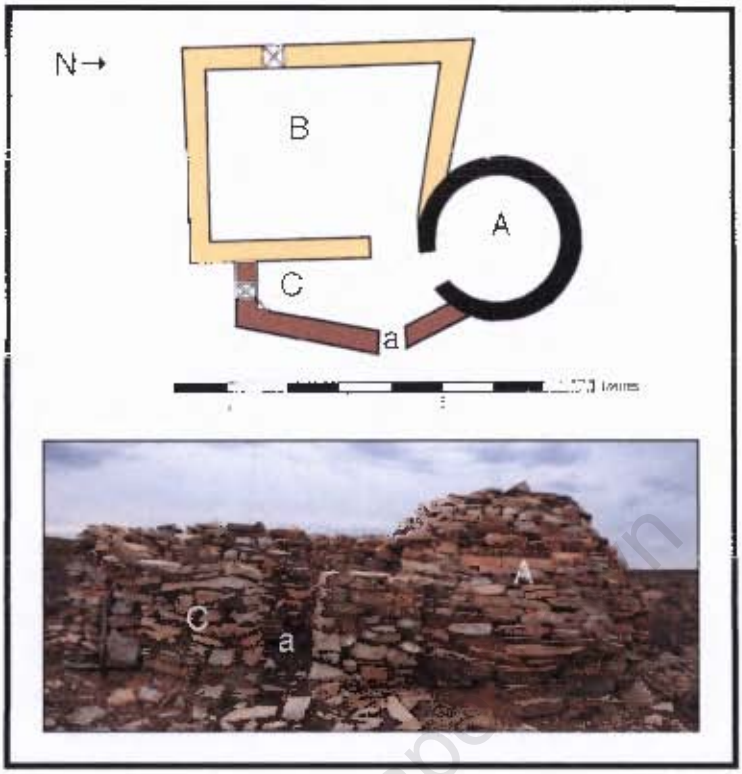

Figure 6.11 Leyfontein III. Plan and front view.

The corbelled building itself is small – the internal roof height is only 1.8 metres. There are no windows but there is one horn hook. The whole complex is roughly built, unlike the corbelled building (Leyfontein II) 22 metres away (Fig. 6.12) which is a finer structure.

Figure 6.12 Leyfontein II with Leyfontein III in the background.

The extensions of Leyfontein III have deteriorated badly, but the outline of one window in each of the extension buildings is still visible, so the extension walls were probably originally higher and covered with a roof. The windows indicate that they were built to provide extra living space.

In summary, B was added first and provided extra internal space, but was not directly connected to A. C spans the entrances to A and B and becomes the "new" front of the building, pushing the corbelled building and its original extension (B) to the back. The style of construction of all three buildings is the same. The presence of a hook in the corbelled building and windows in the extensions points toward the provision of extra living space. The rough style of construction and situation behind Leyfontein II, which had a large extension, now reduced to a stone outline in places on the ground, could indicate that this was possibly the abode of a servant. Dumps could not be located, because rainwater on the bedrock has dispersed material across the site. Most of the ceramics have now been removed from the site.

Krabfontein III and IV

Krabfontein (Fig. 6.13) was granted in 1838 and is still owned by the original Le Roux family to this day. Unfortunately, much of the farm history has been lost. The two buildings discussed here are part of a *werf* which contains four corbelled buildings – three Type A1ai structures and one Type A1bi structure. (Fig. 6.13).

Figure 6.13 Krabfontein *werf* Google Earth image.

Krabfontein III and IV are connected to a rectangular building, now a ruin. (Fig. 6.14).

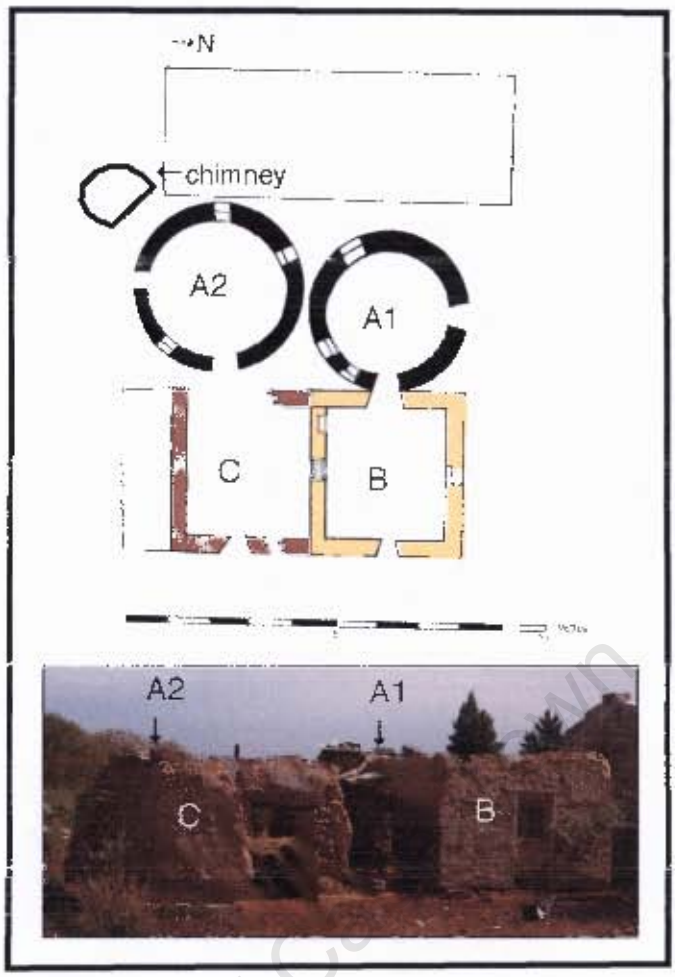

Figure 6.14 Krabfontein III and IV. Plan and front view.

Both corbelled structures were poorly built and have deteriorated badly (Fig. 6.14). Both have windows and one has a niche, so were originally built as domestic accommodation. The original doors faced east and the extensions were also built on this side of the buildings (Fig. 6.14). Building A1 was directly attached to the first rectangular extension which is built of stone to a height of 1.5 metres and then finished with mud bricks up to rafter height. A new door to the exterior was made on the northern side of the corbelled building.

The second corbelled building (A2) is slightly smaller than A1, and does not seem to have been directly attached to the rectangular building to the front, although the door was less than a metre away from this extension. A new door in A2 was opened facing south. Both the "new" doors in the corbelled buildings are in a bad state of repair.

There is a large stone platform at the rear of the corbelled buildings which seems to suggest that another rectangular building stood on this site. It was probably also made of bricks which have since disintegrated.

In the photograph taken by Walton about 40 years ago (Fig. 6.15), there is a brick building with a chimney either next to or attached to A2. There is no longer any sign of this at all, including a foundation.

Figure 6.15 Photograph by Walton which shows the brick chimney in the background (Walton n.d.:66).

The arrangement of the extensions in front of the corbelled buildings resulted in a square shaped complex in which the corbelled buildings are pushed to the back. The doors of the extensions face east, thus retaining the east facing aspect of the original corbelled building doors. With regard to the sequence, building B was probably the first extension. The lower section is made of fine stonework which has been cut into equal sized blocks. It also connected directly with corbelled building A1. Building C is made entirely of mud bricks. Mud suitable for making bricks is available on this farm and until recently, the farmer had a small mud brick making business.

All domestic features in C have disappeared, but B has niches and a window. A brick chimney which appears in Walton's photograph (Fig. 6.15) suggests that cooking was done at the rear of the complex, and A1 and A2 were possibly connected to food preparation. It is possible that the complex forms two domestic units, each consisting of a corbelled building at the rear and a rectangular extension in the front.

Altogether, if the stone foundation also accommodated a building (Fig. 6.14), there would have been a substantial amount of accommodation on this part of the *werf*, complete with indoor cooking area. Additionally, just 84 metres across the *werf* to the north-east was another larger, better built corbelled building (Type A1b) with a sturdier rectangular extension. I discuss this below, but this could be an indication of more than one family unit on the farm.

Summary: Few Type A1a corbelled buildings have extensions as they do not appear to have been large enough to warrant extensions. On the whole the extensions are small and did not add spacious living areas. This picture is different when one looks at the extensions on the large Type A1b buildings.

EXTENSIONS ON TYPE A1b (Large round roof on a round base)

Krabfontein I

Krabfontein I is a large round roof on a round base form and the floor diameter is large (5.7m) (Fig. 6.13). It has two niches, windows and shelves, all the features associated with a building that was built for occupation (Fig. 6.16).

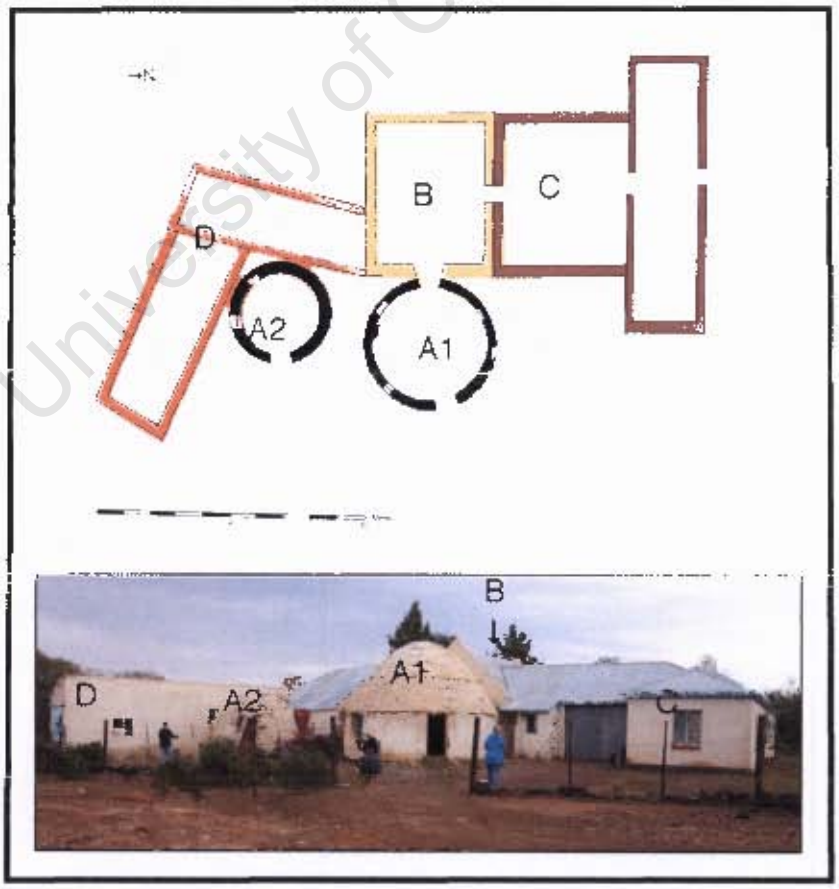

Figure 6.16. Krabfontein I and II. Plan and front view.

My interpretation of the extensions is that first a rectangular extension (B) was added to the west and this was a pitched roof house (Fig. 6.16). This was later extended further to create a substantial house with Victorian features such as the wooden mouldings on the stoep (C). Extension B, while attached to the back of A1, meant, however, that the front door probably moved to the front of this building, now facing north. A new connecting door was opened between A and B. The later Victorian extension (C) was added later and the front door moved to the front of this building. The original door of the corbelled building eventually became the back door of this complex, and this structure lost its status as the main building on the *werf*. At some point the corbelled building was given a wooden floor and ceiling and the walls covered with impermeable plaster – giving rise to the damp which is now present.

Local heresay about this corbelled building recounted by Walton (Walton, 1989: 123) says that the date '1815' and the words 'Te boer' were originally painted over the doorway, but this has since been painted over. Given my earlier discussion, this date is highly suspect.

About one metre to the south of A1is a Type A1ai building. This building is small with an internal height of 3 metres and diameter of 3.8 metres. It, too, was built to be inhabited as it has a window and niche.

In summary, the A1 building did not retain its position in the front of the complex, despite its size. The two subsequent extensions became the main buildings on the *werf*. Nevertheless, the corbelled buildings were clearly valued as the positioning of D (workshops and barns) indicates that the builders built at an angle rather than demolish the small corbelled building.

The variability in construction quality of the corbelled buildings on this *werf* may be due to social status or wealth differences. Alternatively, the two complexes could also be due to sequence. This is perhaps the more likely scenario given that the Krabfontein I and II complex has a grand Victorian extension while the III and IV complex is humble. In all of these extensions, the aim seems to have been to acquire more interior living space.

Gorras

The Google Earth view of Gorras is too blurred to be useful.

The Van Wyk family were granted this farm in 1873 and when it was surveyed in 1870 a "roundable" was noted on the property. This date ties in with anecdotal evidence of the present owner Gys van Wyk. The family were able to build a Victorian house opposite the corbelled building with wealth gained from astute dealing in ostriches around the turn of the 20th century, and built their 1960s-style house on the proceeds of the 1950s wool boom. The farm was also on the main wagon route from Amandelboom (Williston) to Schietfontein (Carnarvon) so often provided accommodation for travellers (Gys van Wyk, pers. comm.).

Gorras I is another A1b structure – a large round roof on a round base form. (Fig. 6.17). The first extension (B) is a simple rectangular building with a pitched roof, which does not have a connecting doorway with the corbelled building. It does have a niche and window, so was built with accommodation in mind. According to Walton's diagram of Gorras (Walton 1989: 130), extension B originally had a wall which divided it into two rooms, but there is no longer any trace of this. The pitched roof is part of the original structure as the end gables have not been built up at a later date.

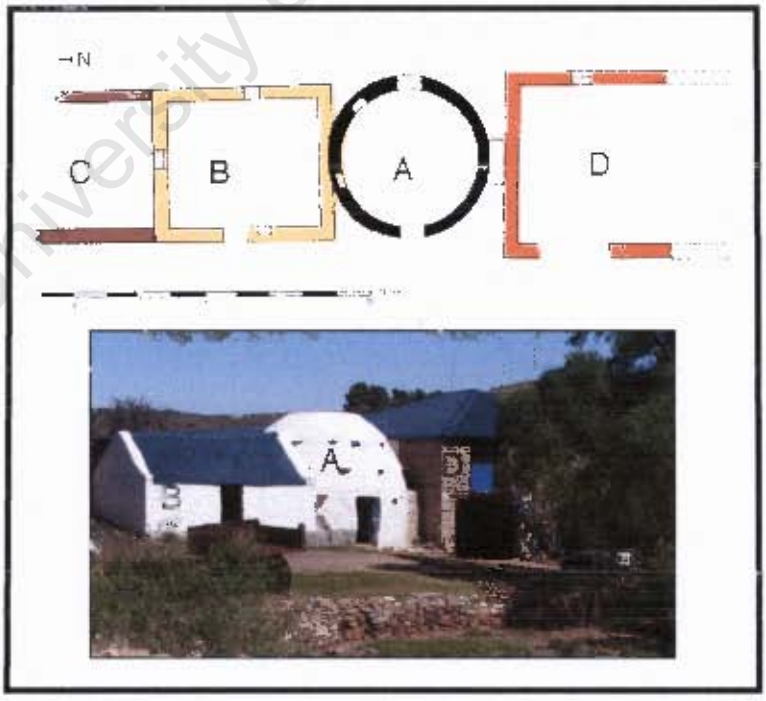

Figure 6.17 Gorras I. Plan and front view.

It is difficult to say when extension B was built. Judging from the simplicity of the building and the niches which are similar to those found in the corbelled builing, as well as the old clay plaster, it was probably built not long after the corbelled building. The doorway faces east, therefore retaining the front orientation of the original corbelled structure.

Attached to B is another rectangular extension (C), now completely disappeared. The remnants of it were still visible when Walton photographed the buildings in 1960 (Fig. 6.18) (Walton, n.d.). There was a connecting door between the two extensions. On the northern side of the corbelled building is a large barn made of beautifully dressed stone that is probably late Victorian in date (Fig. 6.17, D).

Figure 6.18 Walton's photograph shows the second extension (C) walls still standing. A door connected extensions B and C (Walton n.d.).

The corbelled building at Gorras is large with considerable floor space and a high roof which gives it a feeling of spaciousness. The first extension is also spacious with a pitched roof, windows, niches and a horn hook but does not have a connecting door with the corbelled building. Nevertheless, the orientation remains east and the building was divided into two rooms. Extension C, now disappeared was also a rectangular building which connected to B with an internal door. The layout is linear and has retained a clear rear and front with the corbelled building retaining its position in front. There is no sign, however, of an internal hearth and the *werf* is too disturbed to be able to trace a dump.

In summary, the two original A1b buildings with extensions have been treated differently. At Krabfontein I, the building has been pushed to the rear and relegated to the status of a "spare room", whilst at Gorras I, the corbelled building has retained its position in the front of the

complex but, eventually it too was relegated to lower status when the Victorian building was constructed across the *werf*.

EXTENSIONS ON TYPE A2a (Cone roof on a round base)

Type A2a buildings (cone roof on a round base form) is a type full of anomalies. Many are without windows or doors, but there is no sign of a *trapvloer* so they might not be *kafhoks*. Some might have been purpose-built as store rooms, smoke houses or for other functions which did not require windows. Significantly, none of the 12 buildings in this group, has any sign of extensions.

EXTENSIONS ON TYPE A2b

Type A2b buildings are big and were purpose built as dwellings.

Stuurmansfontein I

The Stuurmansfontein I buildings lie at the head of a valley (Fig. 6.19) which contains numerous other ruins of Type A1ai corbelled buildings. At the southern end of the valley is T'kokoboos, a set of three large connected corbelled buildings, which are probably A2bi Types, but I could not gain access to them at the time of my visit.

On the title deed diagram of Stuurmansfontein (granted in 1874), there is a notation "house", which can only refer to one or both of these huge corbelled buildings. Stuurmansfontein I has two high cone shaped buildings, one of which has the highest roof height found to date at seven metres (Fig. 6.20).

The arrangement of the extensions is linear (Fig. 6.20). Buildings A1 and A2 are so alike that they could have been built at the same time and definitely by the same person. Whatever the time difference, building A1 was built first based on the fact that at the point of the join, the join of A2 is attached onto A1. A flat-roofed extension (B) was added to A2 and at a later date, the pitched roof building (C) was added to A1. Pitched roof buildings are generally accepted as being of a later date than flat-roof buildings, because of the problem of obtaining wooden beams to support the roof. It could be that corrugated iron was used if the building was built

after 1874, when corrugated iron found its way north to Kimberley and distribution was improved by a better road system and railways.

Figure 6.19 Stuurmansfontein *werf*. Google Earth image.

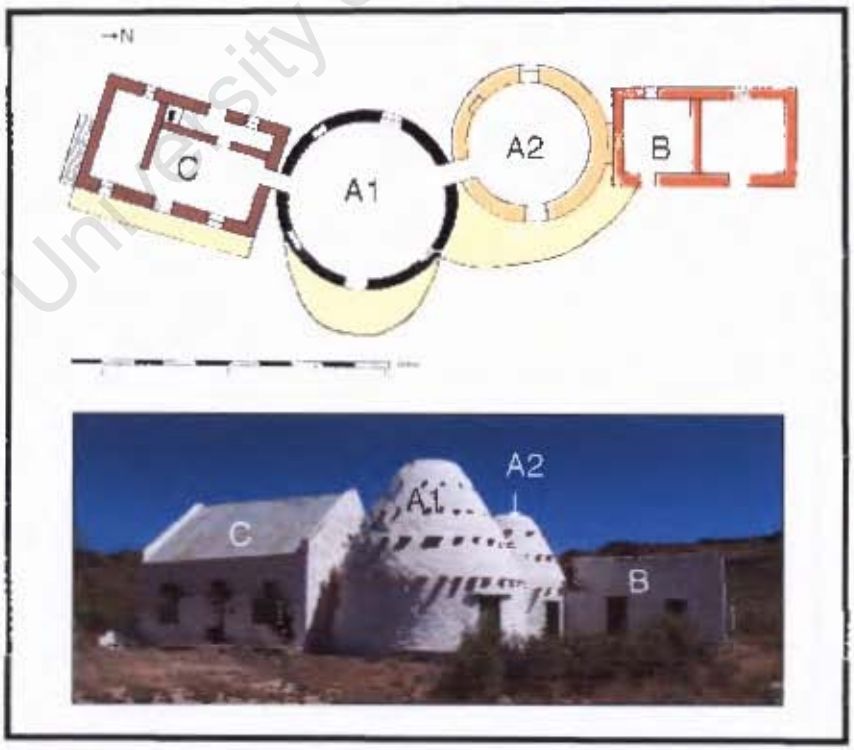

Figure 6.20 Stuurmansfontein I. Plan and front view.

The buildings have a definite front and rear that was retained throughout the extension process. The front faces east and the dump is at the rear of the buildings. The pitched roof building (C) contains a kitchen with a hearth, indicating that domestic dwelling had moved indoors (Fig. 6.20). Buildings A and C are all connected through internal doors, forming a comfortable domestic unit. Building C consists of three interleading internal spaces, including the kitchen, while B has two rooms, each accessed only via an outside door.

In summary, the sequence appears to be A1 and A2 (the two corbelled buildings), while architectural styles and the availability of raw materials point to B being the first extension and C the second extension. All the rooms have windows but only the corbelled buildings have niches. In this case the substantial corbelled buildings have retained their position and not been pushed to the rear of the complex. The farm has a corbelled *kaffhok* with a *trapvloer.*

Grootfontein

Grootfontein (Fig 6.21) is a working *werf* and the Hodgson family only moved out of the corbelled building and its extension after they had made money in the 1950s wool boom.

Figure 6.21 Grootfontein *werf.* Google Earth image.

Grootfontein is a large building with a internal diameter of 5.66 metres and a height of 5.96 metres, and made a comfortable living space (Fig. 6.22).

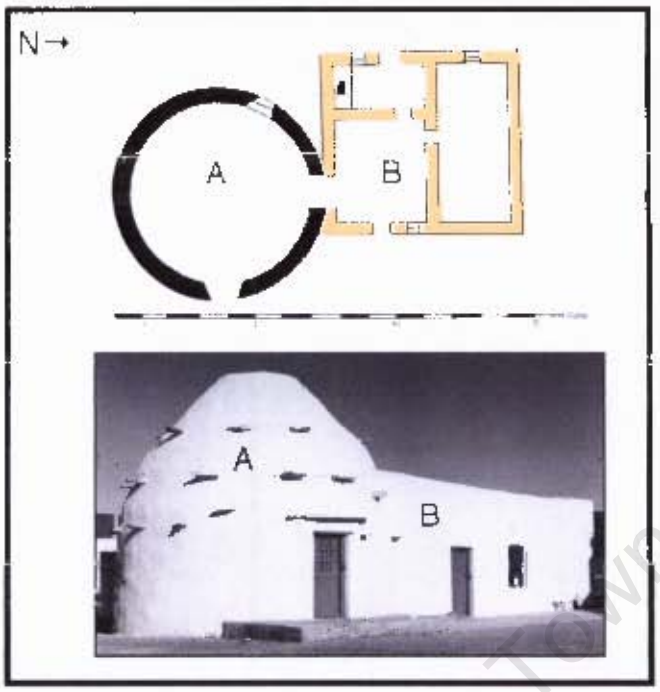

Figure 6.22 Grootfontein. Plan and front view.

The extension is a rectangular building attached to the northern side of the corbelled building. A new door was made in the corbelled building that leads into the extension. The extension has three rooms, possibly four as I could not gain access to the room on the northern side of the extension. One of the rooms is a soap-making room, which could also have been used as a kitchen or hearth.

Once again there is a definite front and rear to the complex, but there is no sign of a dump due to disturbance. As in the case of Stuurmansfontein I, the substantial corbelled building has retained its position in the front of the complex.

Grootfontein is a large, comfortable corbelled building with an embrasured door and window to admit maximum light. The rectangular extension has a monocline roof and the interior has a pine tongue-and-groove ceiling. The complex provided at least three rooms for use as interior domestic spaces. The original structure faced east, and the extension is linear and has the same orientation resulting in the corbelled building remaining prominently in the front of

the complex. Mr Hodgson, the present owner, still uses the corbelled building to rest on hot summer afternoons because it remains cool inside (Hodgson, pers.comm.).

Konka

The A2b building at Konka is, according to anecdotal evidence, itself the extension, and it is discussed in the extensions on Type B3b (large pitched roof on square base form).

EXTENSIONS TO TYPE B1a (Round roof on a square base form)

Extensions to Type B1a buildings are rare and to date only two examples have been found.

Koppiesfontein II

Koppiesfontein is an old farm, which although it was granted in 1838, had long been a stopover destination for travellers in the area (Fig. 6.23). The Koppiesfontein II corbelled building is a simple structure – three metres square and 2.6 metres high (Fig. 6.24). It had one window opposite the original door and was constructed using a distinctive style of stonework – the same style used on the *kafhok* which is about 120 metres away (Fig. 6.23). The farm has a corbelled *kafhok* and *trapvloer*, former agricultural lands, furrows and dams.

Figure 6.23 Koppiesfontein *werf*. Google Earth image.

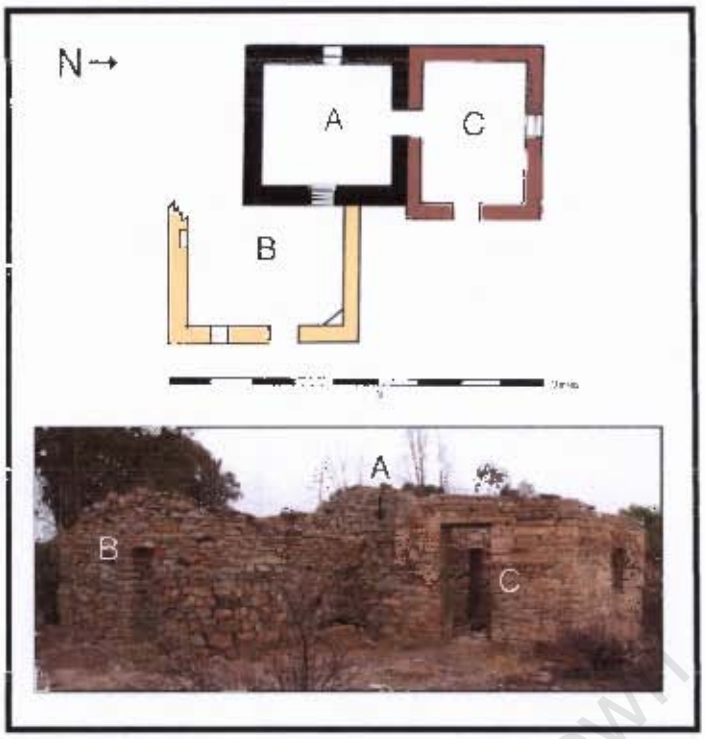

Figure 6.24 Koppiesfontein II. Plan and front view.

The extensions take the form of two additional rooms, each built in a different style (Fig. 6.24). The first (B) is a square building built onto the front of the corbelled building, with a window, a niche and a corner shelf. The original door was converted into window, and the lower section plastered on the interior wall of the corbelled building. The second extension (C) was built with dressed stone. It is attached to the northern side of the corbelled building and a new door (supported by logs and a metal pole) was opened up to connect the two buildings. This complex of extensions does not form a linear arrangement, but a block of buildings in which the corbelled building has been 'moved' to the back, although the original east-facing front orientation has been retained.

A pitched roof building was built about 230 metres away to the west and the corbelled building complex was probably abandoned or occupied by farm workers thereafter (Fig. 6.23).

To summarise, the two extensions have completely different construction styles which are easy to identify. Extension B is roughly built and in places the lower walls resemble the "crazy paving" style of the corbelled building and the *kaffuk*. It has a hipped gable in front and a window and niche. The original door of the corbelled building, which would have opened into this room, has been partially blocked and turned into a window, so that the

buildings are not totally connected. The second extension (C) is built of finely cut stone, quite distinct from the other rooms. It has a large window and high door opening. A new door between the corbelled building and this structure was opened up. Cooking remained an outside activity and the dump was at the rear of the complex.

Brownslaagte

Brownslaagte (Fig. 6.25) is a bigger and more finely built structure than Koppiesfontein, but still falls into this Type as it has a round roof (Fig. 6.26). The size difference could be linked to the date of construction. The Koppiesfontein title was granted in 1838, whilst Brownslaagte was granted in 1865 and these dates could possibly be a clue to the differences in sizes and skills exhibited in these two building..

Figure 6.25 Brownslaagte *werf*. Google Earth image.

The first extension (Fig. 6.26) was a *kookhuis* – a little room with a hearth (B). This small room originally had a window opposite the door which subsequent extensions blocked. It had no internal connection to A. Extension C was built with dressed stone and added to the south-east wall of B. It had a window but did not connect internally with either B or A.

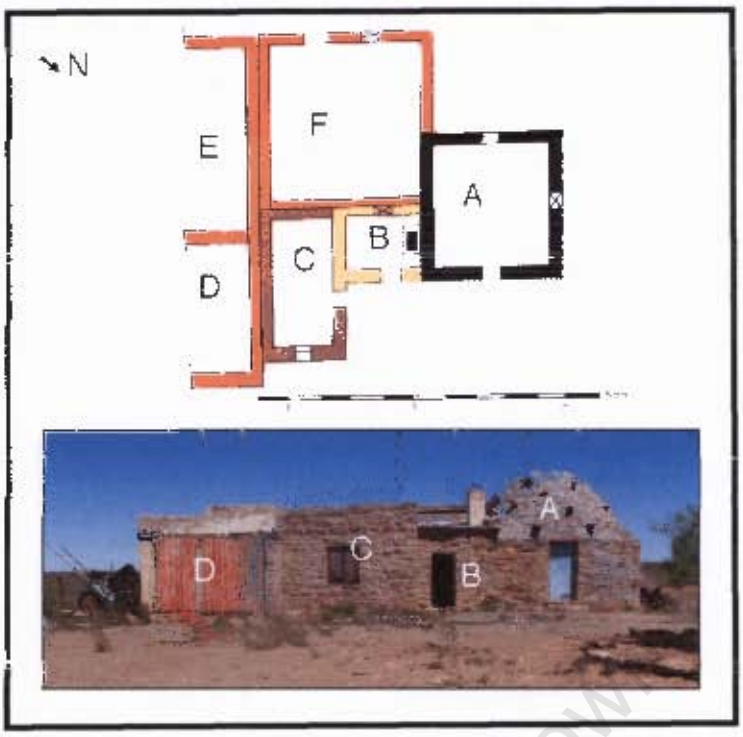

Figure 6.26 Brownslaagte. Plan and front view.

Extensions D, E and F were technically outbuildings and they are still used as barns and storage spaces at present. They are not related in any way to the domestic 'function' of A, B and C, except that D was probably a wagon shed originally (Fig. 6.26). This is indicated by their size and the fact that their entrances are large and generally the outbuilding entrances are orientated 180° away from the domestic dwellings. Despite the fact that these are outbuildings, it is notable that they cluster and are physically joined to the domestic units. The domestic doorways are all orientated towards the front, while the outbuilding entrances are more orientated towards the side and back.

In this complex, therefore, the corbelled building retains its position in the front and with the original extensions (B and C) formed a linear arrangement, with all doors facing south-east. The *kookhuis* had a monocline roof, as does extension C, although the latter was raised at some point. Buildings A, B and C all had windows, but none had shelves or niches. The dump is at the rear of the complex. A 1950s-style house was subsequently built on the property, but the whole site is now abandoned (Fig. 6.25).

In summary, the two corbelled buildings with extensions in Type B1a were treated differently. Koppiesfontein was pushed to the rear and became almost invisible, while Brownslaagte remained in the front. Clearly the small corbelled building at Koppiesfontein was no longer considered to be the main building, whereas Brownslaage was a large structure and put on full 'display' in the front of the complex.

EXTENSIONS TO TYPE B3b (Large pitched roof on square base form)

Droogeputs

Droogeputs (Fig. 6.27) consists of two large attached square base buildings with pitched roofs which were probably built soon after the land was granted in 1869.

Figure 6.27 Droogeputs I *werf*. Google Earth image.

Although both corbelled buildings were built around the same time by the same builder, the front building (A1) was constructed first (Fig. 6.28). The clue to this is the fact that at the point where the two roofs meet, the roof of the second building (A2) overlays the roof of the first. The interleading door between A1 and A2 is original. A2 and A3 share a corbelled roof and are divided into two rooms by a wall. There was also a doorway between A2 and A3

which was subsequently blocked. Initially, therefore, all three rooms in the complex were connected with interleading doors (Fig. 6.28).

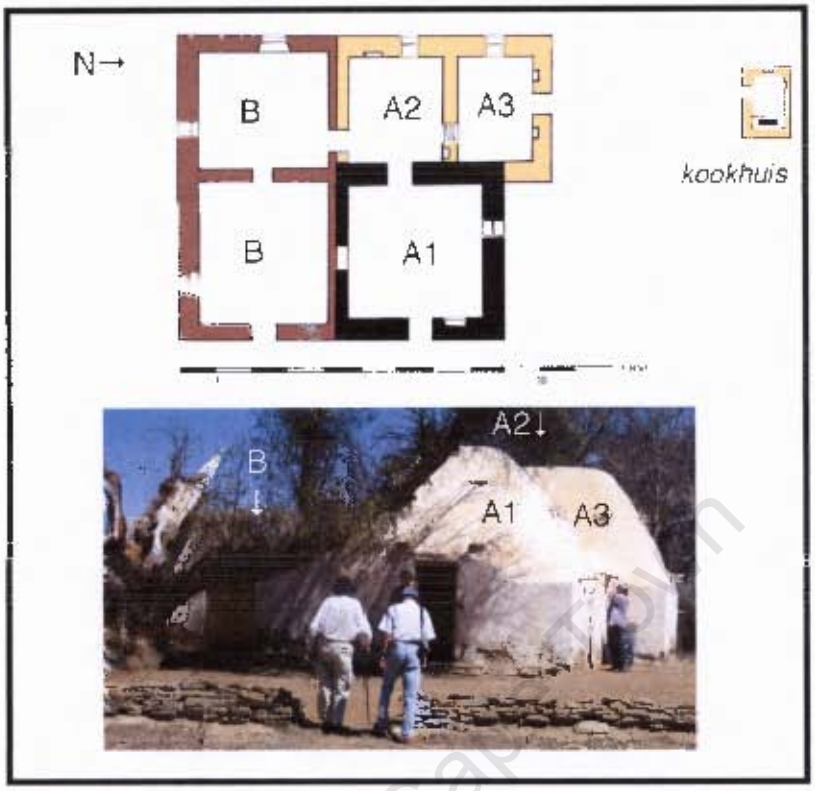

Figure 6.28 Droogeputs. Plan and front view.

A second extension (B) – a two-roomed flat roof building was attached down the southern side of both corbelled buildings, making a substantial square-shaped house. The later extension has larger windows (two are embrasured), pine floorboards and a pine ceiling. The connecting doorway between A2 and B was opened when B was constructed. A detached corbelled *kookhuis* (Fig. 6.29) was built about 10 metres from the 'back' door of A3 and is in the same style as the main corbelled buildings and so predates the flat-roofed extension. The house was occupied well into the 1950s and continued to be occupied even after the 1950s-style wool-boom house was built on the *werf*.

Figure 6.29 Droogeputs. The *kookhuis*

The end result at Droogeputs is a large, spacious five-roomed complex with an outside *kookhuis*. The two corbelled buildings and the *kookhuis* were all probably built at the same time and the two-roomed extension (B) added in the early 20th century. The walls of the corbelled structures are thick with small windows and a number of niches. Corbelled building A1 retains its place in the front of the complex. A veranda has been constructed at the front of the house and a small garden wall marks the edge of the property (Fig. 6.28). The dump was at the rear of the complex, reinforcing the idea of front and rear. This complex indicates that some outside domestic activities have moved indoors, although the *kookhuis* is still apart from the main buildings. The stoep and garden wall both indicate a sense of permanence and pride in the place.

Arbeidersfontein

The Arbiedersfontein *werf* (Fig. 6.30) comprises a large square-base corbelled structure, dams, a kraal with unusual coping of upright stones, and old agricultural lands. The corbelled building is located on the eastern edge of the *werf*, with the newer 1950s house located on the western side of the *werf* (Fig. 6.30).

Figure 6.30 Arbeidersfontein *werf*. Google Earth image.

When Walton saw Arbeidersfontein in 1960, he was told that it had been divided into two rooms by a wooden partition (Walton 1989: 125). Since his visit two of the small extensions to the side and rear (C and D) have been demolished, although the foundations still remain (Fig. 6.31). The third extension, a small room with a hearth still exists (Fig. 6.33, B). The original front of this large purpose-built house has been retained and the extensions were all small and arranged around the side and back of the original building, creating a block-shaped complex.

Figure 6.31 Arbeidersfontein. Walton's 1960 photograph of the corbelled building and three extensions, two of which have since been demolished (Walton, n.d.).

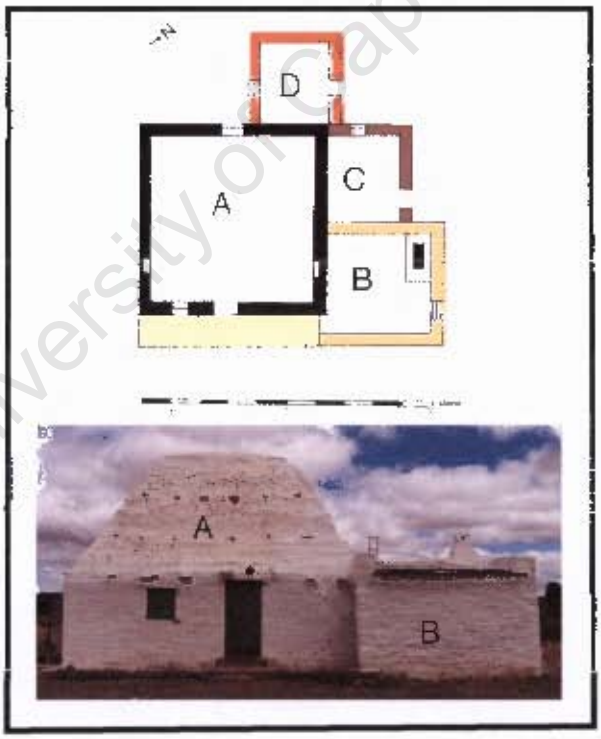

Figure 6.32 Arbeidersfontein. Plan and front view.

Neither of the two extensions which have disappeared had a doorway linking them to the main corbelled building and they had to be entered from the outside. Both also had small windows. The third extension, the *kookhuis*, also has no connecting door with the main

building so the food would have been eaten in the rather cramped *kookhuis*, or taken elsewhere to be eaten. This building has a low monocline roof and one blocked window on the eastern wall.

Although the corbelled building had three extensions, these were all small and placed at the side and rear of the building, leaving the corbelled structure as the only substantial structure in the complex. It has two windows and two niches, and the fact that it is a purpose built house could never be in doubt. Local anecdotal information and quitrent grant dates suggest that the original corbelled building was constructed in the 1870s. All three extensions had windows, so might have been constructed to provide extra accommodation, though when this was done remains unknown. The *kookhuis* was built after the corbelled building was completed, as it abuts the side of the corbelled building.

Vaalhoek

Vaalhoek lies in an isolated spot about 0.5 kilometres from the nearest discernable water source (Fig. 6.33). There is a large dump on the north-east side of the building. Today it is abandoned.

Figure 6.33 Vaalhoek *werf*. Google Earth image.

The original corbelled building is a large square base structure with no projections, which is unusual for this Type and size of building (Fig. 6.34).

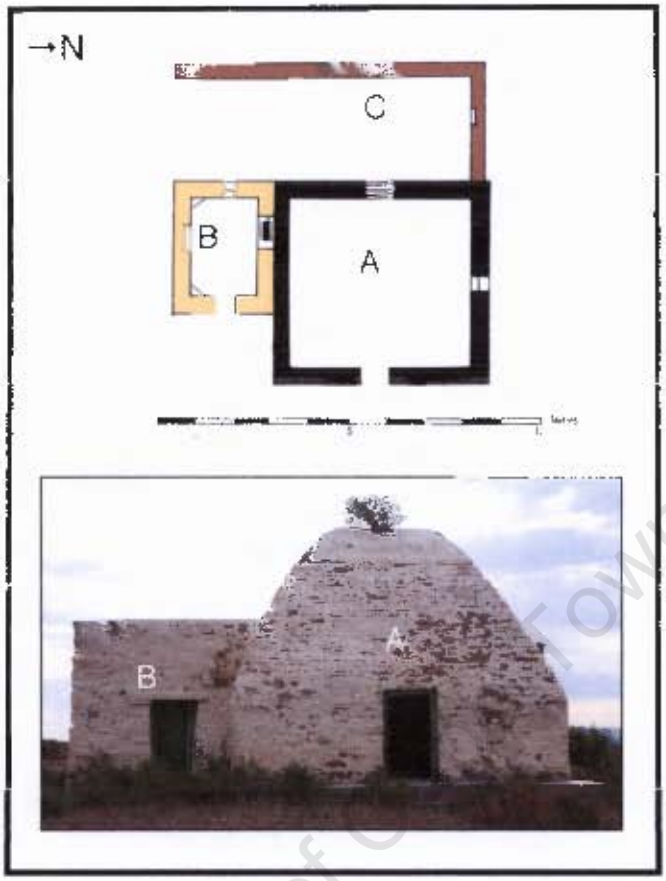

Figure 6.34. Vaalhoek. Plan and front view.

The first extension (B) was a *kookhuis* (Fig. 6.34) with a flat roof. The second extension (C), which spans the back of the building, was a wagon house. This extension also has a monocline roof. It appears as though the original corbelled building had a back door which was opposite the front door, but this was blocked, probably when the wagon house was built. Both extensions are built with stone in the same style as the base of the corbelled building, and were probably built soon after its construction. The *kookhuis* has a window through to the wagon house. Apart from the hearth, the *kookhuis* is well equipped with two corner shelves and a large niche.

The original corbelled building retains its importance as the main building in the complex. As was the case at Arbeidersfontein and Brownslaagte, the *kookhuis* is a separate building attached close to the front door of the main structure for easy access. The whole complex is

self-contained in a block shape. Strangely for its size, the corbelled building has only one small window in the north wall, and as a result, presents a rather blank facade to the front.

Brakwater

Brakwater (Fig. 6.35) consists of two large Type B3bi buildings (Fig. 6.36 A1 and A2) with rectangular extensions on either side, one of which contains a hearth (B). Together the corbelled buildings and their extensions make a substantial sized house and this complex was occupied until the 1940s. There is also a walled garden area, spring (100 metres away) and large dump at the rear of the buildings.

Figure 6.35 Brakwater *werf*. Google Earth image.

The two corbelled buildings were probably built at the same time because A2 does not have an outside door. Of the two, A1 was built first as, apart from having the door to the outside, the roof of the A2 rests on the roof of A1. Both have windows and niches. The third extension (B) is a small room with monocline-roof. This room contains a hearth and it is accessed from

the outside. Extension C is constructed of bricks and was probably built in the 1940s and connected to A2 via a new door opening. It has a pitched corrugated iron roof. All the buildings have pine ceilings and floors, probably installed when C was built.

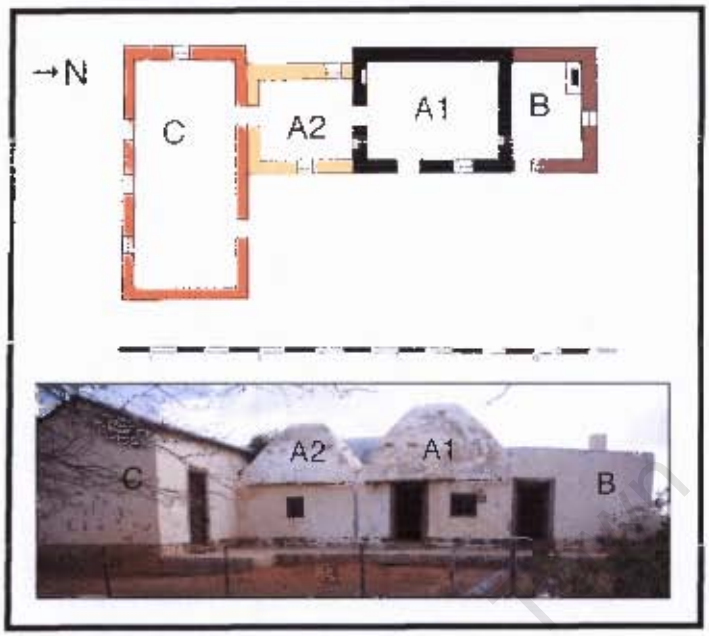

Figure 6.36 Brakwater. Plan and front view.

The front of A1 and A2 faces east and these two original buildings have maintained their status as key buildings in the complex. The arrangement of the three buildings is linear. The extension C gives the complex an L-shape. All rooms are connected, except the *kookhuis* (B). As is the case at other B3b buildings, the *kookhuis* is in front, close to the front door, but separate from the living quarters. Although small, the *kookhuis* could have accommodated a table for eating, so even this activity could have moved indoors.

The front and rear aspects of the corbelled buildings have been maintained throughout the sequence and the complex has a substantial amount of indoor accommodation. The *kookhuis*, although small, could have accommodated a table for eating, so even this activity could have moved indoors.

Klipkolk

Klipkolk (Fig. 6.37) is a large square base building with two large extensions both with monocline roofs (Fig. 6.38).

Figure 6.37 Klipkolk *werf*. Google Earth image.

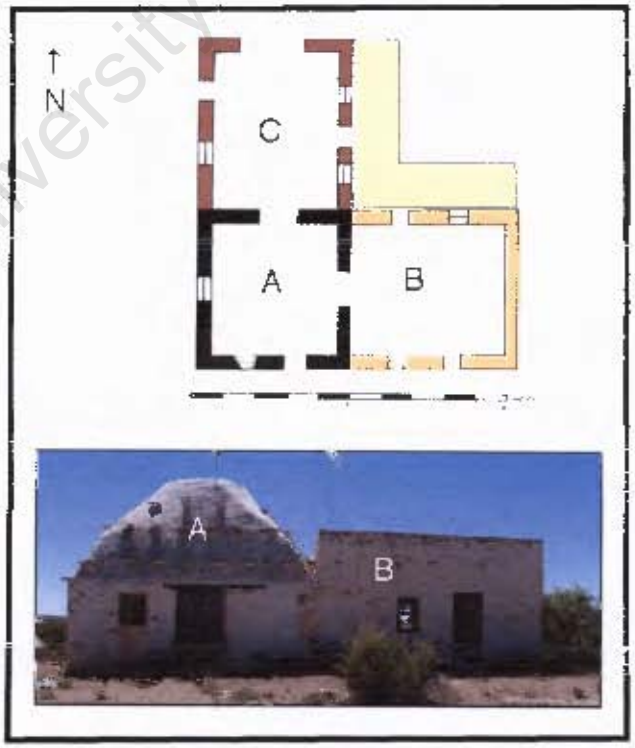

Figure 6.38 Klipkolk. Plan and front view.

The arrangement of the extensions B and C result in an L-shaped house (Fig. 6.39), but the approach from the front has retained the corbelled building as the main building. Over the years the building has been altered inside, so it is difficult to ascertain exactly what the internal arrangements were with regard to internal walls, doors, niches and so on. The dump is at the rear of the building, thus reinforcing the arrangement of front and rear (Fig. 6.37).

Figure 6.39 Klipkolk. Rear of the building.

The corbelled building was purpose built as a house, probably in the 1870s. The floor space is large (over 5 metres square) and may have been divided into smaller areas with screens (as at Arbeidersfontein) or with internal walls. Unfortunately, any evidence of internal spacing has been removed. As is common in Type B3b buildings, there are two windows, one next to the (now altered) front door. The front of the corbelled building together with extension B faced the front, while the L-shape formed in the rear provided a sheltered 'stoep' area by the juxtaposition of B and C. This 'stoep' faces east, as do many corbelled buildings, and probably provided a warm spot sheltered from westerly winds. Unlike the other B3b buildings, Klipkolk does not have a *kookhuis*, or any sign of an internal hearth, although this could have been removed during alterations to the building, although there is no chimney.

The extensions were built onto the corbelled building after it was constructed as both butt up against the original building. Extensions B and C also have larger windows than the two which occur in the corbelled building. The large double doors at the front (A) and rear (C) of the building are later additions as the presence of windows and doors indicate that this was a house, not a barn or wagon house. The extensions are very similar in design and construction and could have been built at the same time or shortly after each other.

Leeuwkrantz

Leeuwkrantz is now an abandoned site (Fig. 6.40) which also has kraals, extensive stone walling, a *trapvloer* and cultivated lands. The corbelled building was constructed on a ridge and the two extensions (B and C) were built on either side of it (Fig. 6.41). There are no other buildings in the vicinity and the house seems to have been abandoned at which point the corbelled building was converted into a *kafhok* by turning the full door into a half-door. The modern farm buildings are some 1.25 kilometres away.

Figure 6.40 Leeuwkrantz. Large camp surrounded by stone walls (Fig. 6.41 inset). Google Earth image.

There are some interesting points to be made here about the kraals. There are two large kraals behind the complex – one directly behind and the other towards the south. However, a large area to the east of the complex has been enclosed by a long meandering dry stone wall (Figs. 6.41 and 6.42).

The northern wall was built along a low rising ridge and the southern wall was also built on a low ridge. The eastern wall was built on high ground at the headwaters of two small drainages. The whole enclosure is evenly built around a drainage and the north and south

walls run roughly parallel to this. This wall clearly encloses a grazing camp that may have been built close to the *werf* in order to manage the animals. The distance from the corbelled building to the eastern wall is 750 metres, while the camp width is 410 metres.

In contrast with the meandering walls of the camp are the precise right angled stone kraals within the camp (Fig. 6.40). This may have been built later, but its purpose was to separate certain animals from the rest of the flock. There is also a small kraal in front of the corbelled building (Fig. 6.41).

Figure 6.41 Leeuwkrantz *werf* (inset of Fig. 6.40). Google Earth image

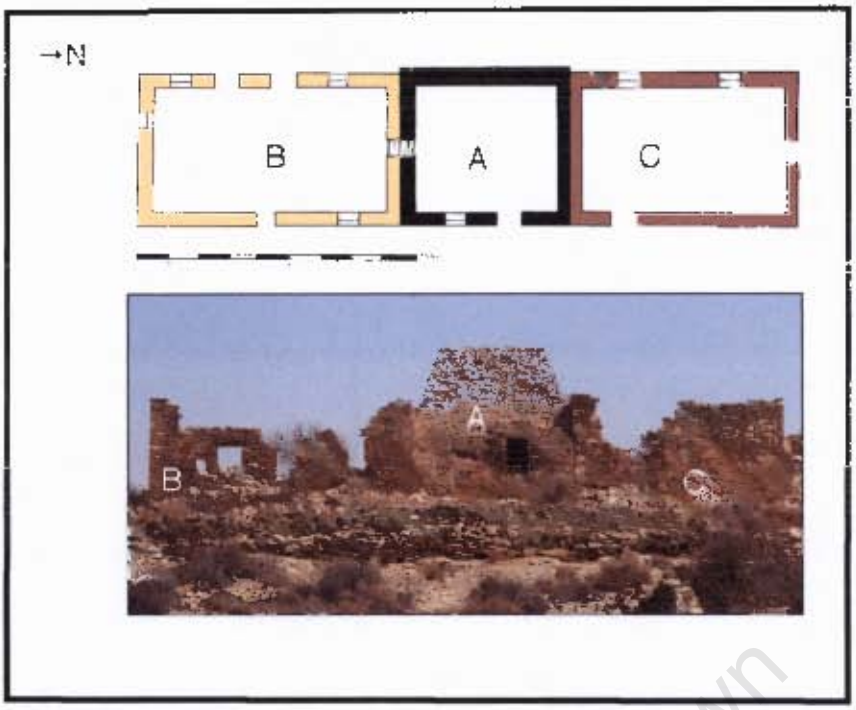

Figure 6.42 Leeuwkrantz. Plan and front view.

The extensions and the original building are all built of the same stone and in the same style so it is difficult to determine which extension was built first. Both extensions lean up against the corbelled building (Fig. 6.42) and although the entire exterior of the corbelled building was plastered, there is no sign of plaster on the extensions.

The corbelled building had a door which was probably blocked when extension B was built (Fig 6.42). It had only one window, situated next to the door facing the front. Inside the building are beam holes on three levels, indicating that there was a loft on at least the lowest level of beam holes. Extension B has three doors, one at the front and two at the rear, and four windows. Extension C has two windows and two door, one at the front and another in the north wall. These structures probably had internal dividing walls which have now disappeared. If this is correct, then in total this complex would have had five rooms. There is no sign of a hearth or *kookhuis*.

The complex is linear and faces east and the corbelled building retains its position in the front. The whole complex is on a rise overlooking kraals, old cultivated lands and the approaching road (Fig. 6.41). There is a dump at the rear, western side of the building, which because of the slope, has eroded downhill.

Konka

The Konka *werf* is focussed around a spring, kraals, a large walled garden and outbuildings, and was quite a substantial farm (Fig. 6.43). It is now abandoned.

Figure 6.43 Konka *werf*. Google Earth image.

Konka consists of two corbelled buildings,one with a square base (Type A3b) (A), and the second with a round base (Type A2b) (B) (Fig. 6.44). Both are large buildings with windows and B has a niche. The story told by the farm's previous owners is that the square base building was built first and the circular building was built later (Walton 1960: 8). According to this source, the round building was linked to the rectangular building (C) by the present doorway, but the door into the modern house, was built at a later date. Apparently the family lived in the round base building and used the square-base building as a larder/storeroom. This situation continued right up until the 1950s when a new house was built.

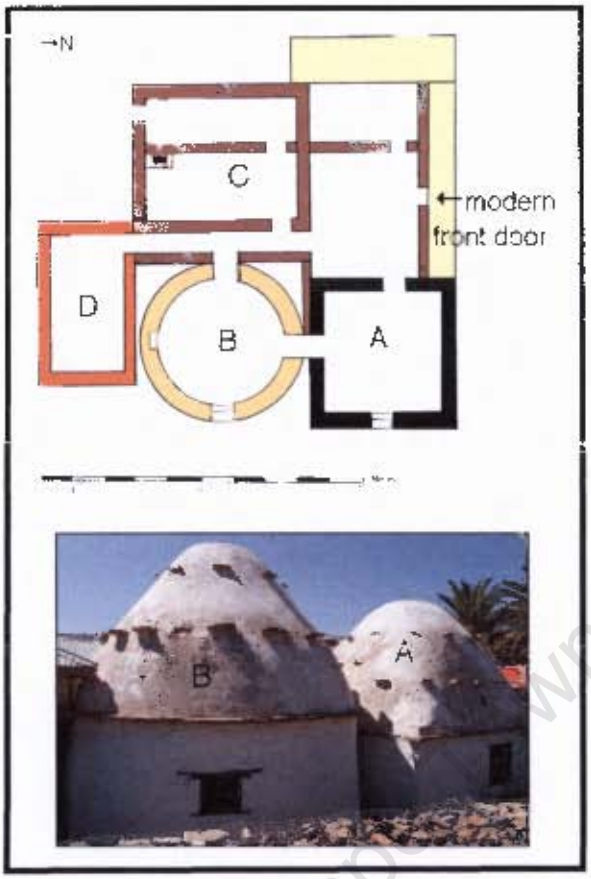

Figure 6.44 Konka. Plan and rear view. During the improvement of the road which passes through the *werf*, gabions were placed next to the corbelled buildings.

If the information above is correct, the square base corbelled building faced west and the round-based building did not have a door which led to the outside. Both had windows at the rear (east). The corbelled buildings now open directly into the new building and have been reduced to the status of bedrooms on the side of the house (Fig. 6.45).

Figure 6.45 Konka. The corbelled buildings have been enveloped by the 1950s building.

The situation at Konka does not fit the pattern of other large corbelled buildings. First, it is unusual to find a large square base building with a large round base extension. In addition, the large corbelled building usually retains its position in the front of the complex. The only other

large corbelled bulding which was pushed to the rear was at Krabfontein. It would appear that people who built Victorian or 1950s wool-boom houses were no longer interested in presenting the corbelled building as the front of the complex and they wanted to present a more "modern" image. At Konka, instead of building the new house away from the corbelled buildings, they were incorporated into the new building.

Voorstevanzylsplaas

The site has kraals and a *trapvloer* (Fig. 6.46). The Gannarivier flows through the *werf* and the modern house is on the site of a large public outspan on the wagon route from the Sak River to Amandelboom (Williston).

Figure 6.46 Voorstevanzylsplaas *werf*. Google Earth image.

Voorstevanzysplaas (Fig. 6.46) has one corbelled building with a rather quirky roof design (Fig. 6.47). Although the interior of the building is Type B3b, the exterior of the building is stepped, as if steps were built instead of projections.

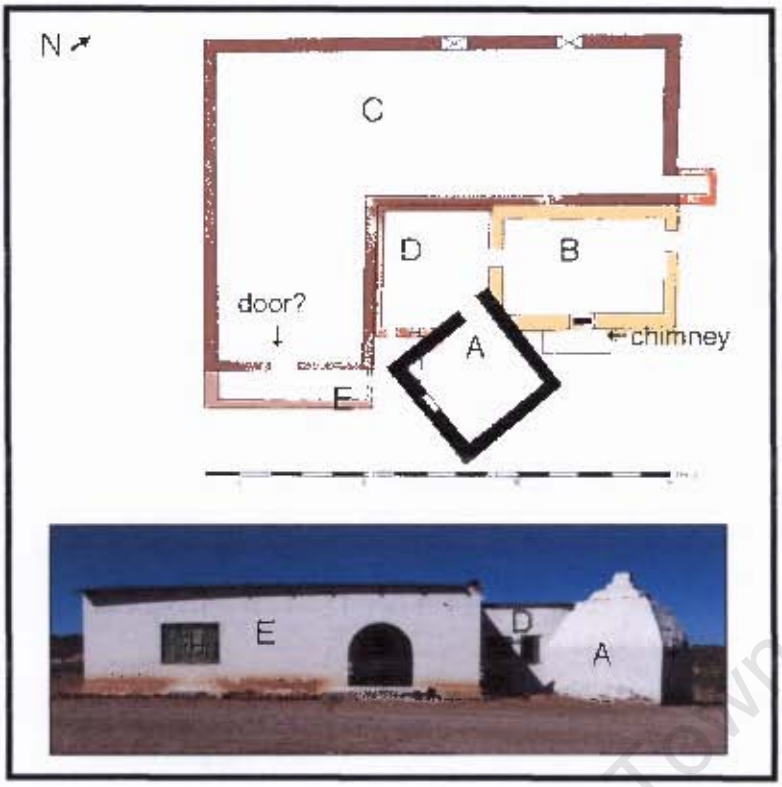

Figure 6.47 Voorstevanzylsplaas. Plan and front view.

As in the case of Konka, the entrance to the corbelled building (A) now opens into another building (D) (Fig. 6.47). No windows could be located in A, but the space was very dark, so I may have missed signs of a blocked window. However, there was a niche and a stone corner shelf.

The first extension (B) is a barn-like structure with a large hearth, the chimney of which is visible on the exterior of the building. Both the corbelled building and B are roughly constructed in the same style. At this point the entrance to the corbelled building was not enclosed and faced north-east. There was no direct connection between the corbelled building (A) and B but if (a) is an original door in B, then the doors of A and B were close together and faced the front. Extension B has signs that a wall once divided the room. This made a domestic arrangement of at least three rooms, one of which included a hearth.

The second extension (C) is a stone building, more finely built than A or B. It has two small windows at the rear and originally had a flat roof. Gables were built on each end of the building at a later date to accommodate a low pitched roof. I was not able to determine if the front door moved to the south-east wall as the building was locked when I visited it.

Extension D is a small brick structure which filled in the space between A, B and C and encloses the doorway of the corbelled building and extension B. This extension has a small window with a metal frame. Extension E is also a brick structure, built in the 1950s.

The combined effects of the construction of D and E on the complex is profound. The corbelled building and extension B are both pushed to the side of the complex (Fig. 6.48) and a new front was created (E). The corbelled building has been reduced in status to a storage room and chicken coop.

Figure 6.48 Voorstevanzylsplaas. Side view of the complex showing the chimney.

Summary: None of the B3b buildings which were purpose-built as houses are occupied today. There were two periods when farmers in the area made money – the ostrich feather boom in the late 1800s and the wool boom in the 1950s. With money available, one of two things happened. Either the corbelled building complex was abandoned for a new house (either Victorian, or later, 1950s style) or the corbelled building complex was absorbed into the new structure and relegated to the status of spare rooms or store rooms.

EXTENSIONS ON TYPE B3a

Type B3ai are small square base form buildings which have an internal height of less than five metres – and a corresponding smaller floor space.

Leyfontein IV

The complex is next to a large kraal and opposite the spring and walled garden. It has been suggested that this was a shepherd's hut as it is next to the kraals, but all the original habitations on Leyfontein are small and simple. However, it has housed shepherds in recent years.

Leyfontein IV (Fig. 6.10) is a small pitched roof building of very simple construction with an equally simple rectangular extension (Fig. 6.49). Together they form a two roomed building with no connecting internal door. The extension appears to have had a rare flat stone roof at one stage, but most of this has collapsed, and the roof was raised probably to take beams to support a corrugated iron roof. The extension is easily identifiable as a result of the different colour stone used in the construction. The extension also leans against the corbelled building.

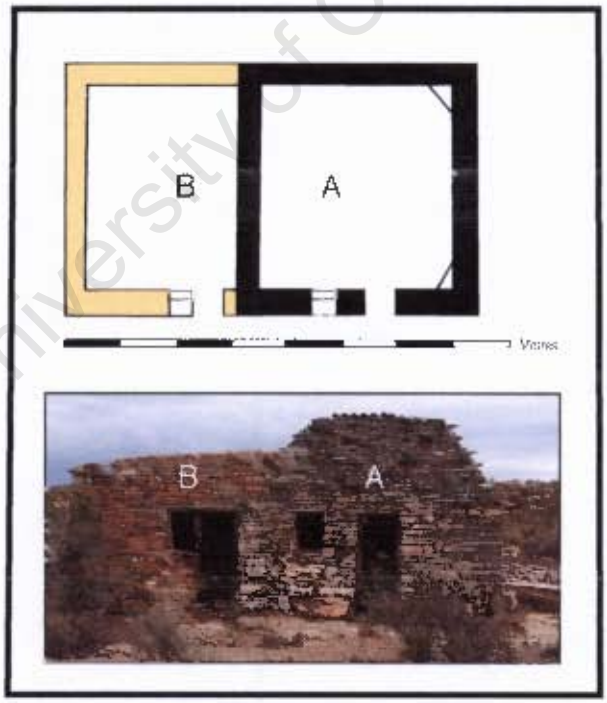

Figure 6.49 Leyfontein IV. Plan and front view.

The original corbelled building (A) (Fig. 6.49) has two windows, one of which is very small with a stone corner shelf, while the extension (B) has one window. The original building has

stone lintels, whereas B has wooden lintels, often a sign of a later building. The floors are simply smooth bedrock. Both buildings face east and the front orientation of the corbelled building has been retained in this linear arrangement. The complex contained two rooms, both with features associated with habitation and the extension must have been constructed for extra living space. There is no sign of an internal hearth, so cooking was still an outdoor activity. There is a dump at the rear of the building (west).

Ystervarkspoort

According to Walton's notes (Walton, n.d.), there are three small square base corbelled buildings on this farm. I have only seen two, one which has been renovated and the one discussed here which lies in an isolated area on the farm (Fig. 6.50).

Figure 6.50 Ystervarkspoort *werf*. Google Earth image.

The corbelled building and its extension at Ystervarkspoort is virtually identical in construction style to that at Leyfontein. The two farms are next to each other although the buildings are 18 kilometres apart. The small corbelled building has a window and a stone corner shelf. There is also a blocked door facing north. The rectangular extension is built in a different style to the corbelled building, and larger blocks of stone have been used, so the original building and its extension are clearly distinguished. Room B has one window. The buildings were not interconnected and there is no sign of an internal hearth.

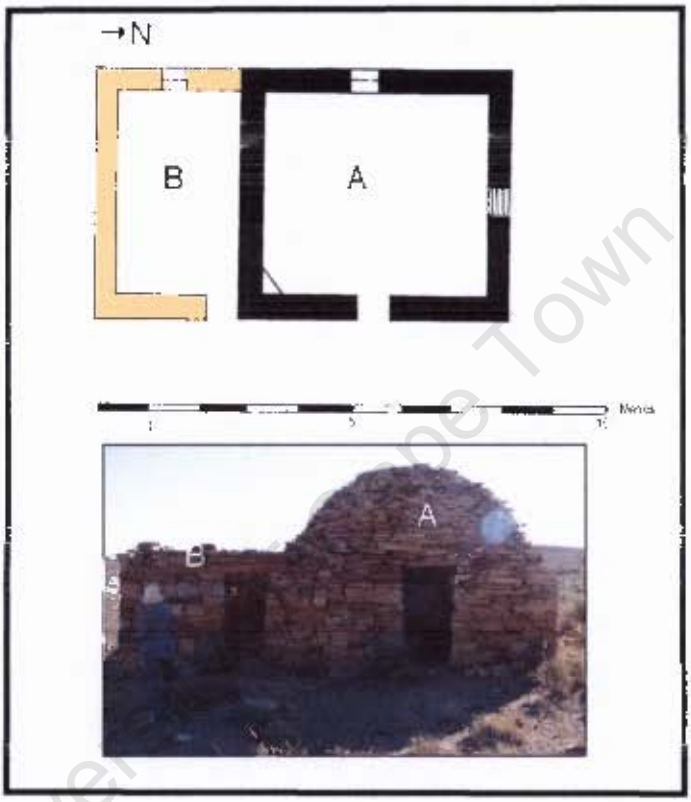

Figure 6.51 Ystervarkspoort. Plan and front view.

The complex faces east and there is a definite front and rear with the dump at the rear. The extension provided extra interior space, either for storage or sleeping, but all other activities were still carried out outdoors.

The extensions on the two Type B3ai buildings in the sample are virtually identical and it is reasonable to infer that this indicates either a kin or a direct building connection. In both cases a rectangular room was attached to the south wall and had a window, indicating the building was constructed for occupation and the buildings do not have any connecting doorways. The

arrangement of the original building and its extension is linear and the corbelled building thus retains its position in front of the complex.

Discussion

Extensions on corbelled buildings must signal a more settled environment in which an investment is made in the land and that mobility and transhumant trekker were over. This is where the family were going to stay. As Naude notes (2002: 110) in his discussion of sketches by Erich Mayer of farm dwellings, "The final endorsement of permanence is when the first hut is extended by new additions to its side or by connecting other nearby huts with each other forming a cluster and at the same time a new vernacular dwelling tradition".

Extensions were built when more interior space was required. Trekboers and, in fact, all the other inhabitants of the Karoo, traditionally lived an outdoors lifestyle and most of the daily domestic activities were performed outdoors, usually in specially demarcated areas of the *werf.* The interior of the corbelled building was used mainly for sleeping and storage and for shelter from inclement weather. Cooking was done in an outside *kookskerm,* soap was made over outside fires, laundry was done at the river or outdoors using water brought up from the *put* or well. Much of the family's leisure time was also spent outdoors. Trekboers, however, must have noted developments elsewhere in the Cape and had some stylistic knowledge of the type of house that occurred in more settled areas. When they had the means, they extended, "built-on" and improved the original cramped dwelling or moved to a new site completely, and abandoned the original structure.

The construction of extensions to the original corbelled buildings clearly marks a change in the original arrangement of the household and the cultural aspect of 'dwelling'. In some cases the cooking process was moved indoors to a separate room which contained a hearth, although in most cases the kitchen and hearth could only be accessed from the outside. This could be because breaking an opening through the corbelled building wall would destabilise it, although there are enough examples of new door construction to show that isolating a kitchen was a conscious preference. It is possible that as the family grew in size additional sleeping space was built, or that those who slept outside in tents or wagons now moved indoors. Also, the acquisition of furniture from newly established towns would demand more indoor space, perhaps even a parlour.

The extensions to corbelled buildings can be described as "free-form organic growth" (Winer & Deetz, 1990: 64). They were not built to a prescribed pattern, but simply added on as the need for additional space arose. Winer and Deetz (1990: 60) have described three stages of vernacular architecture in the Eastern Cape and some of this is applicable to the Karoo. Stage one consists of improvised, impermanent buildings, often borrowed from indigenous inhabitants while stage two marks a period of permanence and the development of a local vernacular form. Due to historical circumstances, the third phase in the Eastern Cape differs from that in the Karoo. In the Eastern Cape rural houses were heavily fortified to withstand Xhosa raids during the frontier wars. A third phase in the Karoo involved expanding the existing domestic living space with extensions to the corbelled building or, alternatively, constructing a totally new house. The fact that the corbelled buildings were not destroyed, but either incorporated into the larger complex or kept on the *werf* to serve another purpose, such as storerooms, is an indication that the effort that went into constructing them was appreciated and all buildings on a *werf* could be put to some use.

Extensions are readily identified based on different stone or style of construction and the obvious joins to the previous wall. They have a chronological sequence which has implications for the use and development of the *werf* over time. They also provide evidence of the gradual move of outdoor domestic activities indoors.

The majority of the small corbelled buildings do not have extensions and were probably simply abandoned when a new rectangular pitched or monocline roof house was built. This is understandable when one considers that these were small, squat buildings with spatial limitations. Large corbelled buildings, on the other hand, were built as big houses and did not have these spatial constraints. Furthermore, the construction of extensions onto these buildings could take advantage of corrugated iron, which became available in the 1870s.

The nature of the extensions show some patterns that are linked to the different types of corbelled buildings.

Extensions onto Type A1a take the form of both rectangular buildings and round base corbelled buildings. When the extensions are round base corbelled buildings, the buildings tend to line up in a linear fashion. In cases where two or three corbelled builds are joined, the

front and rear areas of the buildings are clearly defined with all the doors facing forwards. In this arrangement the original corbelled building retains its importance in terms of fixing the conceptual front and back of the complex. The construction sequence in these linear complexes does, however, vary. At Aasvoelsvlei I, for example, the two outer buildings were built first and then an infill building was constructed to link the two, whereas at Eendefontein, the middle building is the original building, and the other two were built on each side of it. Of interest is the fact that not all of these buildings had interleading doors. This variability must relate to the specific preferences linked to a family unit, how it grew, its composition and its material means, but perhaps significantly, how the idea of 'dwelling' varied from an expression of a series of internally linked spaces, compared to joined, but isolated spaces, in which access to them was always from the outside.

Where rectangular extensions are made onto a round corbelled building (Aasvoelsvlei II and Krabfontein III and IV), the original corbelled buildings appear to lose their 'importance' and are 'moved' to the rear and become almost secondary in the arrangement of the building. In these cases the newer rectangular additions are on 'display' at the front of the house. In all of these buildings, the aim seems to have been to acquire more interior living space, except possibly at Krabfontein where a brick chimney was constructed possibly linking the original corbelled buildings to a cooking function.

It is interesting to note how many buildings of the Type A1a do not have extensions or signs that extensions once existed and of the 19 buildings which I used to supply door measurements, only four have extensions. There could be two reasons for this: either the small buildings were difficult to extend or they were simply abandoned for a larger rectangular building when the means to build one became available. Type A1a corbelled buildings do not appear to have been large enough to warrant extensions. Linear arrangements retained the original concept of front and back, while rectangular extensions created a block-like complex which retained the original front of the corbelled building, but now hid the corbelled building at the back.

This picture is different when one looks at the extensions on the large round roof on round base (Type A1b) buildings. Three A1b building have extensions – Silvery Holme I (already discussed with the conclusion that Silvery Holme I was itself the extension), Krabfontein I

and Gorras I. Both Krabfontein I and Gorras I were extended with a pitched roof rectangular building. Unlike the case of the A1a buildings, these larger buildings had substantial extensions with end gables which supported pitched roofs and clearly they were large enough to be extended with this type of building. At Gorras the front was retained, but at Krabfontein, the front moved to the north-east. At both these farms money was subsequently made from the ostrich boom with the result that the original corbelled building and its extension were 'hidden' when the grand Victorian-style building was constructed. In the case of Krabfontein the corbelled building is still attached but relegated to the status of back room. At Gorras the Victorian building was built across the *werf* from the corbelled building, and the corbelled building was reduced to the status of an outbuilding.

Type A2b buildings are big and were built to provide a substantial living space. Both Stuurmansfontein I and Grootfontein have rectangular extensions, which are themselves divided into rooms. In this way a substantial amount of indoor living space was provided – including a hearth. The front of the corbelled building has been retained in both cases and remains east facing. Despite their large size, when the means allowed, they were abandoned. Stuurmansfontein I is now abandoned (although rented out for holiday accommodation) and Grootfontein was replaced by a 1950s wool boom house on the same *werf,* and is now merely a storeroom.

Extension to Type B1 buildings are not linear and form a block of extensions. This is probably because it is easier to build up against a flat wall than a round wall. Brownslaagte retains its position in the front of the complex, while the corbelled building at Koppiesfontein II has been pushed to the back. The reason is probably linked to size as the original corbelled structure at Brownslaagte is a sizeable building, while the corbelled building at Koppiesfontein is small and could be described as 'humble' and was displaced backwards by two rectangular stone buildings, one with a hipped gable and the other made of dressed stone.

The corbelled buildings of Type B3b are all large, imposing structures which were purpose-built as houses and the extensions made them into substantial houses. Of the seven discussed here, five have extensions with hearths. All the extensions have flat, monocline roofs and all are rectangular. Except for Leeuwkrantz, all extensions are built to create a block shape. Leeuwkrantz is the exception and is linear because it is perched along a ridge and the

extensions could not be constructed toward the rear. All the complexes are east facing, and except for Voorstevanzylsplaas, the corbelled buildings have retained their prominent position at the front of the buildings. Although it is not entirely constant, extensions that create a 'blocky' form are internally linked, whereas in linear forms, spaces are less likely to be internally linked.

'Blocky' complexes indicate a distinct move of domestic activities indoors but pride in the size of the original corbelled building meant that the original front was retained. Even at Klipkolk where the original building faced south, the front was retained and a comfortable, sheltered area was created at the rear by the addition of L-shaped extensions.

Only two examples of Type B3a small pitched roof corbelled buildings with extensions were found (Ystervarkspoort and Leyfontein IV). Both original buildings are small and simple and neither shows any attempt at plastering, either internal or external. Windows and shelves indicate an abode and the simple rectangular extension, with a window, must indicate the need for more indoor living space. In both cases the front was retained with the dump at the rear.

The overall implication of the extensions is that the original corbelled structure was part of a mode of living in which cooking and presumably other domestic activities took place outside. These domestic activities were not necessarily physically marked and the corbelled structure provided the only interior space within this inside/outside household. The extensions, however, added additional roofed space and this marked a shift in which some activities, such as cooking, were brought into the inside of structures. It may be possible to track the sequence from an outside *kookskerm* to a fully integrated indoor kitchen. This would see an open cooking *skerm* located outside the original corbelled structure, often in the front developing into a roofed kitchen that was still, however, physically separate from the 'house'. A third stage sees the kitchens attached to the house, but without being internally linked, and a final stage sees kitchens being internally linked and integrated within the interior space of the extended house. There was a trend away from the household being outside, to more of it being inside.

Finally, the extension to corbelled buildings provide proof of a certain state of mind which existed at the time, of how people perceived themselves and others. The fact that the large

corbelled buildings retained their front position after the addition of extensions indicates that people were proud of them. However, even their eventual abandonment shows that people, no matter who they are, are looking for comfort and modernity and when they can afford it, they move on. "The front of the house faces the world and makes a statement of modernity..." (Winer and Deetz, 1990: 62). This is the key to the final rejection of the corbelled buildings when the opportunity arises to build "smarter" extensions.

In concluding this chapter I point out that little has been mentioned about the chronology of these extensions. That they date from the late 19th century and even to the first quarter of the 20th century is clear. In the discussion that follows, I make some suggestions about what these Karoo families were responding to through their building extensions that necessarily considers the wider economic developments in the Cape from the 1850s.

CHAPTER SEVEN

DISCUSSION OF CORBELLED BUILDINGS

The aim of this project was first and foremost to provide a comprehensive record and description of the corbelled buildings of the Great Karoo. The work also contributes to creating a more complete picture of life in the late 18th century and 19th century Karoo. Of central importance has been to treat the 19th century history of the Karoo as an entanglement of coloniser and colonised and to see the corbelled structures in this way. This has meant that the effect of "cross-cultural pollination" (Frescura, 1985: 91) between all the people who found themselves vying for resources in this fairly harsh environment has been taken into account when considering the evidence. This thesis now presents "...a more objective, less value-laden account of the past" (Winer and Deetz, 1990: 55).

I summarise the main issues that have been discussed.

Distribution

The majority of the corbelled buildings that were located for this project lie within a specific area in the Great Karoo. Even Walton recognised this after his visit to the area (1960: 18). There are good reasons for this limited distribution. Their existence depends on the environment in which they are found – low, sporadic rainfall and poor soils which resulted in a lack of substantial trees. This lack of timber for roof beams, together with an abundance of suitable stone, combined to encourage the construction of corbelled buildings. But, although the environment played an important role in their construction, it alone does not explain the development of this vernacular style. The indigenous cultural substrate provided a dwelling solution suitable for their needs that was compatible with a sheep herding economy based upon varying degrees of mobility. Without this cultural preparedness to adopt and adapt a basic indigenous form, corbelled buildings would not have been built.

The environmental reasons for the absence of the corbelled buildings towards the north, west and south have already been discussed, but the lack of corbelled structures towards the east is not as easily explained. The stone was available and there were no trees, so why did settlers there not resort to corbelled shelters? The absence of corbelled buildings in the east can be attributed to the fact that as the 19th century progressed, this became a prosperous prime

merino sheep farming area. To a certain extent the development of a large export wool economy was driven from the Eastern Cape by the English 1820 settlers. Their domestic architecture reflected success. The marginal areas to the west could not support merino sheep farming on such a large scale. Corbelled houses and their extensions do reflect this relative impoverishment, but they also reflect a dwelling form that stems from a deeper relationship with this landscape compared to those participating in a global export economy. I return to this issue below.

Chronology of the corbelled buildings

As a result of the difficulty of dating these buildings accurately, I have constructed a chronology based on information gathered from various sources. In Chapter Two early traveller accounts, oral histories and information obtained from the surveyors' diagrams were fully discussed. Based on this information, and other material clues, I conclude that the corbelled building period peaked and ended in the 1870s, when the large purpose-built corbelled houses were constructed. After this money obtained from wool sales or the easier availability of timber and roofing materials meant more "modern" rectangular houses could be built. Nevertheless, the use of corbelled houses persisted, and the Hodgsons of Grootfontein, for example, lived in their corbelled building with its extensions until the 1950s.

The start date for the construction of the corbelled buildings has to be pieced together from circumstantial evidence. The 1830s surveyors' diagrams are not helpful since these diagrams do not mention neither corbelled buildings nor houses.

Other dating avenues have been developed. One is the legal relationship of trekboers to the land. This was discussed in Chapter Two, but briefly, the Cradock Proclamation of 1813 enabled perpetual quitrent grants to be bequeathed or sold for their full value. In addition, to obtain a perpetual quitrent grant a survey had to be paid for by the applicant that included the travelling expenses of the surveyor, such as the hire of a wagon (100 rix dollars) with an extra 10 rix dollars per day for every day in excess of five days (Baker, 1958: 11). Although a farmer could still apply for more than one farm, it can be assumed that more investment would now be made in the 'home' farm. Although the Proclamation was made in 1813, the Surveyor's Office was not really in a position to act on it. Surveying only got under way in 1828 when a Board of Commissioners for Land was formed (Baker, 1958: 12).

Furthermore, by this date trekboers already had a cultural experience of living in round buildings as many living in Khoe influenced *matjieshuise*. Therefore, they were 'pre-adapted' to living in stone buildings of similar shape (Fig. 7.1).

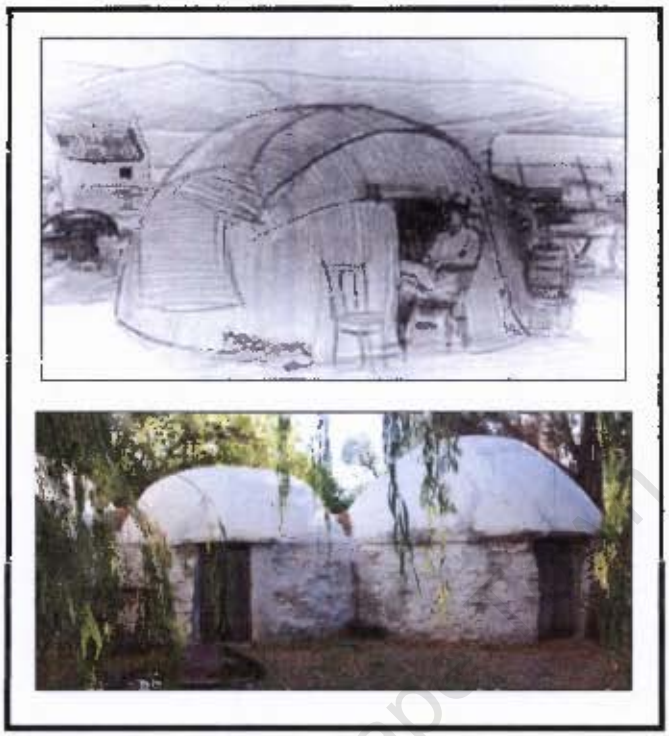

Figure 7.1 Trekboers were used to living in small, round structures. *Matjieshuis (top)* sketch by Erich Mayer, and similar shape and size of stone building at Eendefontein *(bottom)*. (Sketch: National Cultural History Museum.)

I have suggested this was prompted by the arrival of the Sotho-speaking "Mantatees" in the 1820s who had been displaced by the Difaqane on the Highveld and moved south into the Northern Cape. They had a stone building tradition dating from 1650 to about the 1830s (Maggs, 1976: 129) and knew the principle of corbelling. Their arrival in the Northern Cape coincides perfectly with the legal change to perpetual quitrent farms that were virtually privately owned properties as proclaimed by the Cradock Proclamation in 1813. The "Mantatees" were employed to build stone walls and other structures around Graaff Reinet, Cradock (Beinart, 2003: 59) and Victoria West (Loos, 2005). The influence on settler dwelling of an indigenous vernacular may also have been driven by Tswana-speakers' cone-on-cylinder style and Xhosa-speakers' beehive hut style. Additionally, people of European descent must have had building skills that might also have played a role. For example, a contingent of Irish settlers were settled in Clanwilliam in 1820. Unhappy with their situation, most left within a few years, including a number of stone masons. Many joined the British settlers in Albany district, but not all of them can be accounted for in this way (Dickason 1973).

Based on the information above it would appear that the corbelled buildings began to be constructed as abodes from about the mid-1820s onwards. This would give this style of vernacular architecture a lifespan of about 50 years.

Construction and builders

The corbelled buildings are a typical vernacular architecture and built from materials that were immediately available, such as stone and clay and the debris of colonial expansion, such as such as pieces of railway track or bits of broken wagon.

A detailed analysis of construction techniques was dealt with in detail in Chapter Four. "Successful" corbelled building depended on physical principles, the most important of which was an understanding of the relationship between floor diameter and roof height in order to build a dome. The arrival of the "Mantatees" from the Highveld in the 1820s may prove to be a key factor in this discussion. While there are differences in the construction techniques of the Sotho corbelled buildings and the corbelled buildings in the Karoo, the fundamental concept of corbelling remains the same. As romantic as the European theory sounds, realistically it is far more likely that the origins of the corbelled buildings lie with indigenous influences with elaborations added by the trekboers or end users.

But the creation of the corbelled structure was only the first step. The trekboers themselves obviously had input in their construction and elaboration. The building was adapted to suit, not only the needs of the end user, but incorporated features which were already known from familiarity with stone rectangular houses closer to the western Cape. Round base corbelled buildings were simply simple rectangular houses in the round. Rectangular base corbelled buildings were simply houses with a corbelled roof, instead of a normal pitched or flat roof. They are examples of indigenous ideas and knowledge, entangled and combined with need, and then elaborated with European features. At the same time one has to keep in mind that there are relatively few of these buildings with a limited distribution and this suggests a relatively local area where historical and cultural factors combined.

Irrespective of who exactly the builders were, stylistic similarities between structures suggest that a builder's individual style can be recognised. The two Koppiesfontein corbelled buildings (Fig. 7.2), for example, were built by the same builder because the base has a

particular "crazy-paving" arrangement of stone which is quite distinctive and has not been seen elsewhere. This builder also built both square and round based buildings, although the square base building still has a round and not a pitched roof. This shows that round and square-based buildings appear to have been constructed at the same time and that the intuitive sequence of round to square bases does not hold universally.

Figure 7.2 Koppiesfontein. Square base building *(left)* and round base building *(right)*.

It is, however, unlikely that the builder of this square-based building at Koppiesfontein had the skills required to build the large square-based buildings that are located further north, for example at Klipkolk (Fig. 7.3). This is an example of an initial idea that was elaborated and enlarged to create a substantial house.

Figure 7.3 Klipkolk. Large square base building which required a particular skill to build.

A common builder may also be identified through building dimensions. At Modderfontein (Fig. 7.4) there are three corbelled buildings, all within a few hundred metres of each other. The smallest was a *kuthok*, and the other two were built as habitations. The two dwellings are about 240 metres from each other and although outwardly, they appear to have distinctly

different stylistic features, their dimensions are almost identical. The internal features are also almost identical with windows, stone shelves and niches in both buildings. Finally, the construction of the roof is very fine and in both cases the roof holes have been closed with a single roof stone, which is a difficult feat. It appears that the same builder constructed both buildings, but each with a distinctive external style.

Figure 7.4 Modderfontein *(left)* and Brakvlei *(right)*. Their dimensions are identical.

In contrast, emulation and copying between builders can be identified. On Witfontein, south of Fraserburg, there are three corbelled buildings on the property (Fig 7.5), one being a well-built round-base *kaffiok*, and the other two are small square-based buildings, which appear to have been built using dressed stone scavenged from an older stone ruin. The time span between the construction of the *kaffiok* and square buildings is not known, but the larger of the two square structures is well built, while the other is smaller and the building style is untidy and uneven. This must represent the work of two different builders, the second perhaps attempting to copy the first building.

Figure 7.5 Witfontein. Two buildings built with the same stone but differing levels of competence.

De Wilg (Fig. 7.6) is another case in which two corbelled buildings occur close to each other, but appear to have been built by different people. The building in the foreground is a different shape and flat stone slabs were used, whereas the builder of the structure in the background used square blocks of stone and created a different shape.

Figure 7.6 De Wilg. Different shapes of stone have resulted in different buildings.

The examples above illustrate a number of points about the builders. First, in some cases the same builder could build both round and square base buildings. Second, a few of the builders had an identifiable, distinctive style. Third, proximity of buildings to one another does not mean that they were built by the same person or the same time. These comparisons also demonstrate different levels of ability amongst the builders. When one considers the large square base corbelled buildings with pitched roofs (B3b), the "hand" of the builder can also be seen. For example, it is quite possible that Arbeidersfontein and Klipkolk were built by the same person or group of people. Unfortunately, the interior of Klipkolk has been altered, but the exteriors can still be compared. (Fig. 7.7)

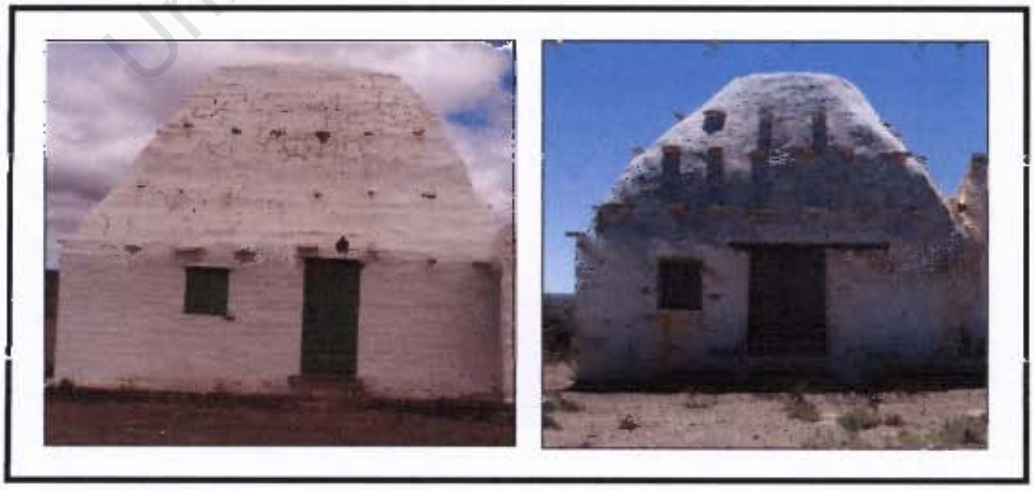

Figure 7.7 Arbeidersfontein *(left)* and Klipkolk *(right)* have similar construction styles.

Vaalhoek (Fig. 7.9), on the other hand, another large square base pitched roof building, was obviously built by a different builder and presents a rather blank facade to the front. Vaalhoek is over 80 kilometres from Klipkolk, so distance might be an issue.

Figure 7.8 Vaalhoek. A distinctive large square base building.

Finally, considering the base shape, the natural assumption is that the round-based buildings preceded the square-based buildings. However, we now know that in the 1870s both base shapes were constructed and, in addition, oral history from Konka confirms that in this case, the square building was constructed first, and round-base building at a later date. Despite this case, evidence does suggest that the square base forms with pitched roofs occur predominantly on farms in the north and date from around the 1870s.

Corbelled buildings and domestic use

Close examination of the corbelled buildings has led to a number of conclusions related to function. The presence of windows, niches and shelves together with a full-door is a clear indication that the building was constructed as a dwelling. All of these features are present in stone rectangular buildings of the Roggeveld with which the trekboers would have been familiar and they simply added them to round- or square-based corbelled buildings. Windows, niches and shelves (which took the place of furniture) represent all the features required to call a building a house, no matter what the shape of the building. The later large corbelled buildings built between about 1860-1870s, were purpose-built as houses and the addition of an extension with a hearth confirms this. In the later large buildings of the northern areas, there are few stone shelves, although niches are still common. Stone shelves were probably replaced by furniture that was becoming available from shops in the newly established towns,

while the niches were being adapted into *muurkaste* with the addition of a door – a feature common in houses of the Cape.

Another construction feature that clearly indicates function are half-door openings which indicates that the building was used as a *kafhok* or chaff storage building. This is usually confirmed by the presence of a *trapvloer* or threshing floor in the front or close by. The absence of windows, shelves and niches also indicates a building not intended as a dwelling. Many of these buildings have had the half door altered to a full door at a later date to serve as accommodation for farm workers (often with the later addition of a stone "veranda"). A few buildings, constructed as houses, were converted to *kafhokke* when no longer inhabited and Schuinshoogte was converted from a house to a *kafhok* and back to a house again (Judy Maguire, pers.comm.). In other words, the farmer adapted whatever buildings were available to suit his needs.

Some other construction clues that indicate function are niches at floor level (chicken coop), and a built-in hearth to accommodate a soap pot, usually with a chimney as well (soap making building). Other buildings without windows were used as cold store rooms for meat, tallow, butter or candles, or as general storerooms. It is possible that some of the corbelled buildings were built originally to house farm workers, but this is unlikely considering the amount of work involved, not so much in constructing the actual building, but in breaking and sorting and transporting tons of stone before building of structures for land owners could even begin. Noble (1875: 255) describes "a few huts or "pondoks" (the native shepherds' quarters) where ebony-coloured urchins are rolling about in company of goats, fowls or tame springboks". Another description of farmworkers' accommodation dating to 1864, describes the workers "sharing a straw hut" on the farm Drupfontein in the Victoria West district (Loos, 2005).

It is probable that the corbelled buildings were not the first habitations on a loan place. Initially, when still moving around seasonally, the farmer would sleep either in his wagon or a tent or *matjieshuis*, all of which were portable. A corbelled building to serve as a house would only be built when a certain amount of permanency relating to the piece of land evolved, and even then, this would only be built on what was considered to be the main or "woningsplaas". Even today farmers in the Roggeveld regard their winter homes as not worthy of spending too much time or money on. For example, Hennie and Anna-Maré Steenkamp live in two Nissen

huts on their lower Karoo farm, Kraaifontein, and they do not see any point in upgrading their accommodation as they regard this farm as their temporary winter place (Hennie Steenkamp, pers. comm.).

A further clue as to the function of the buildings is the presence or absence of a midden or dump. Buildings that were houses and where the surroundings have not been disturbed by farming activities, always have a midden at the rear. *Kafhokke* do not have these middens, except in cases where the *kafhok* has been converted into a house for farmworkers. In these cases, the dump usually contains tin cans and few ceramics that are later in date to material from earlier occupations.

The direction that the door faces is yet another indicator of function. It was found that 78% of the half-door openings faced west. Since these buildings were *kafhokke*, they were positioned so that the wind blew across the *trapvloer* in order to assist in winnowing the cereal. Eighty-one per cent of the full-door openings, on the other hand, face towards the east or north east. This orientation avoided the wind blowing into the door and possibly also minimised the impact of the hot afternoon summer sun.

The corbelled buildings with different functions occur in precise patterns. All corbelled buildings, whether they were houses, *kafhokke* or storerooms are associated with other structures, that is, no corbelled building was found to occur in total isolation. Those that were built on *werfs*, are associated with other buildings and a kraal. Those that are not on *werfs* and appear to be isolated structures in the open countryside, are, however, always associated with kraals and were possibly used for seasonal occupation and have features that earmark them as an abode. *Kafhokke* always occur on *werfs* where there is some sign of soil disturbance or cultivation of crops. All buildings without domestic features, possibly storerooms, occur on *werfs* in association with other farm buildings.

Extensions – signs of changes in lifestyle and domestic organisation

A careful study was made of the extensions to corbelled buildings as it was felt these would give a clear picture of the changes in lifestyle and the aspirations of trekboers. The corbelled buildings were initially single units on the *werf* and most domestic activities, especially

cooking, were carried on outside in designated areas. There might have been *matjieshuisies* or tents or even wagons which were used as interior space for storage or sleeping.

In all cases, the extensions for each building are distinctive to that particular corbelled building and presumably the cumulative requirements of the particular owner. Some pattern in the way extensions were added could be identified. Some round-based structures seem to have been extended in a linear fashion, most with additional round based buildings, probably a simple practical response to the original base form, while larger structures and rectangular corbelled buildings were extended in a 'blocky' form.

The analysis of extensions suggests ideas about the farmer's view of the building he inhabited and how he wished to be perceived by others. Within the marginal conditions of the Karoo, trekboers must have had aspirations, particularly in view of the surging wool export market developing to the east in the second half of the 19th century. Houses were obvious 'vehicles' to express those aspirations. When they moved into the Roggeveld and Karoo, they bemoaned the fact that there was not sufficient timber to build a good house. "I have heard those among the inhabitants of the country, who are in good circumstances, assert that if they had but better timbers, they would build as handsome houses as could be seen" (Lichtenstein 1812:106). The planting of poplars and eucalyptus groves indicates that they were planning to have timber in the future. In addition, the fact that they copied features present in rectangular houses with pitched or flat roofs into their corbelled houses indicates that these features were embedded in their minds as desirable domestic features in the home.

The extensions are fully discussed in Chapter Six, but I can say that the large scale abandonment of smaller corbelled buildings, or their shift to the background by means of added extensions shows that the farmer was well aware of the social status which his house afforded him. Extensions communicated change, connectivity to a wider, modern world and status. The larger purpose-built houses retained their position in the front of the complex, and in these cases most of the extensions are actually smaller than the original corbelled structure. But eventually, they too were either abandoned or relegated to the status of "back" rooms when either modern Victorian houses or 1950s houses were built. When the means became available, the farmer wanted modernity and comfort, even if it was not on the scale of the houses being constructed in the Eastern Cape.

The farmers in the part of the Karoo in which the corbelled buildings are located were small stock farmers in a marginal habitat. They did have financial windfalls, such as the ostrich boom at the end of the 19th century and the wool boom in the 1950s when demand increased as a result of the Korean War. In both cases, 'modern' houses were immediately constructed. This area was, however, never as wealthy as the areas further to the east around Graaff Reinet, Middelburg and Cradock. These were prime merino producing areas where wealthier farmers built relatively large and imposing houses to reflect this wealth. The farmers in the corbelled building areas were slow to switch to merino sheep, as this was an expensive process, but within the limits of their habitat did eventually do so and benefited greatly from the overseas demand for wool. Noble, writing in 1875 noted that: These [Rubridges, Southeys[42] etc.] brought with them numerous flocks of merino sheep of the best kind which they greatly improved from year to year by importations from Europe. The older inhabitants seeing the new comers successful followed their example until now the merino sheep, being found infinitely more profitable than either the Cape sheep, or horses or cattle, has nearly displaced them all" (1875: 149).

The steadily rising wool price which peaked in 1875 encouraged farmers to switch to merino wool sheep. In 1806 there were 1.5 million sheep in the Cape, most of which were fat-tailed. A steady rise in number of merinos from 5 million in 1855 to 12 million in 1891 saw farming incomes rise based on wool production (Beinart 2003: 9).

In 1865 in the Fraserburg, Sutherland and Williston districts of the corbelled hut area, there was a combined total of 400 000 indigenous fat tailed sheep, just over 81 000 merinos and a wool clip of 213 000 pounds (Noble, 1875: 136). By 1873, when wool prices were nearly at their peak, the wool clip for this area had risen to 1 500 000 pounds (Noble 1875: 136). But this was small compared to the prime merino areas to the east. In the Victoria West district, for example, the wool clip was 1 million pounds in 1865 but ten years later it had risen to 4 million pounds. Income flowing into the various areas differed greatly depending on the veld conditions. This was reflected in land prices. The west and east Nieuweveld required 1-2 morgen per sheep, the western Koup, in the rain shadow of the Nieuweveld Mountains,

[42] They were extremely successful merino sheep farmers of English 1820 settler descent in the Eastern Cape.

3-5 morgen per sheep, and the excellent pastures of Cradock 1 morgen per sheep. This prime land was also as much as 30 shillings per morgen (Noble 1875: 164).

The building extensions reflect the possibilities of the interior Karoo habitat, for merino wool production, but these were limited compared to the wealthier areas to the east. Furthermore, one needs to remember that the people who built the corbelled buildings and their extensions were embedded in a Dutch trekboer way of life. It was not just the environment that controlled them, but a fundamental cultural attitude. While they were clearly responding to a global and modern world, they were unlike the English, who were from that world and were informed by the modern world of global capitalism. Trekboer cultural history dated to the 18th century when as small and relatively impoverished small stock farmers they independently pushed outwards into the Karoo from the fringes of the VOC-controlled Cape.

The 19th century corbelled buildings of the Great Karoo, consequently reflect this cultural heritage and are not simply menial, humble and passive material expressions of marginal dwelling, but were vernacular buildings that meshed deeply with their historical entanglement with the landscape and its indigenous heritage. The structures are capable of giving us insight into the cultural life and attitudes of life in 19th century rural Karoo, which, from a material culture point of view, has been largely undocumented, unexplored and under-researched. This thesis goes some way to correcting this situation. In the last chapter, I briefly consider some future research directions and the current conservation status of these structures.

CHAPTER EIGHT

THE WAY FORWARD

The prime focus of this project has been on documenting and describing the corbelled buildings of the Great Karoo as a basis for developing a more contextual understanding of how they relate to and reflect upon 19th century social history. The research has shown the importance of these settlements and the insight they contribute to the cultural texture and history of the ordinary people of the Karoo. Their cultural history started in the early 18th century and was under-pinned by continuously living within and beyond the VOC frontier and the necessary entanglement with indigenous people and habitat that this required.

The original work of James Walton, and now this thesis, is only the beginning of research in the area and further research on corbelled structures can and will continue on several levels. First, is that the structures discussed here are only a sample of a larger record and consequently, I will follow up on all the reports of farms with corbelled buildings which I have not yet been able to visit. I am confidant that in the area south of Carnarvon and towards Loxton, nearly every farm originally had corbelled buildings, but if they have collapsed, land owners may fail to mention them. As a result, my inquiry technique has changed recently from "is there a corbelled building?" to "was there ever a corbelled building?" This altered approach has already yielded some results. In this way, I will be able to plot many more of the buildings which existed. All new information will be recorded and added to a corbelled building database.

Second is that future research will also involve more detailed studies and mapping of complete *werfs* and their layout. This expanded spatial consideration has emerged in the current thesis through my description and analysis of the building extensions and the implication for changes where domestic activities took place. Furthermore, understanding *werf* organisation could be expanded through comparison with indigenous domestic organisation, especially the spatial organisation of the Khoe household.

Third is that this thesis also provides a typological and chronological structure around which excavations can be planned. Excavations of dumps associated with corbelled buildings could expand or modify the basic structure I have described and reveal whether different corbelled

buildings were contemporary, or even occupied by the same social stata of people and what economics they had. At Knapdaar, for example, the corbelled building has collapsed and cheap early 20th century ceramics dominate the scattered dump. The dump at Aasvoelsvlei, a few hundred metres away, on the other hand, is full of 19th century transfer-printed, refined earthenware and Victorian glassware shards. It may even be possible, if the dumps are carefully selected, to trace a sequence from the original simple structure to a larger building with extensions. Excavations may also be able to identify shifts in domestic behaviour, for example, in the handing of cooking and food.

When Walton was invited to inspect the corbelled buildings in the Karoo in the 1960s, preservation and conservation of them was clearly on the agenda. This concern still applies, but the addition of this work may contribute to a change in the perception of their significance. What, though, does the future hold for corbelled buildings? On the whole farmers tend not to demolish them as every building on the farm is valuable and can be used for some purpose, such as storage. There are increasing signs among the farming community, however, that the buildings are being redefined as heritage in relation to their potential earning power and their use for tourist accommodation. This has been encouraged by the increased activity in the area linked to the Meerkat radio telescope currently under development, and the possibility that the Square Kilometre Array (SKA) telescope will be awarded to South Africa. For example, Droogeputs, a wonderful corbelled building complex which retained its old character and texture, has now been renovated and "fixed up". All the woodwork has been sanded, the roof has been cemented, plumbing installed and the "back" door which faced the *kookhuis* has been converted into a window (Fig. 8.1).

Figure 8.1 Droogeputs. Side view. The back door has been blocked and converted into a window *(right)*. (Photograph on right: Judy Maguire.)

One could argue that this is the owner's prerogative, but the new roof covering is not sympathetic to the original structure and in the longer term will result in the breakdown of the entire building.

In another case, at Konka, the old road to Vanwyksvlei passes right through the *werf*. This road has now been improved and raised to accommodate increased traffic relating to the astronomical developments in the area. As a result Konka, a provincial monument, now lies below the road (Fig. 8.2). As far as can be ascertained, no impact assessment on the possible effect this new road would have on the corbelled building was undertaken. Apart from ruining the visual aspect of the buildings, drainage problems may now undermine them, keeping in mind that they do not have foundations. The owner of Konka is attempting to reverse this development.

Figure 8.2 Konka. Before the road was raised *(left)* and after *(right)*. (1960 photograph: Walton, 1989: 126.)

On the whole farmers have tended to leave the corbelled buildings alone, particularly if they are in isolated parts of the farm or on abandoned *werfs*. Corbelled buildings on an operational *werf* are more likely to be "tidied up" (Fig. 8.3) as there is pride and respect for what they represent in terms of local history.

Figure 8.3 Ystervarkspoort. On the one hand the building is being cared for and protected, on the other hand it and its surroundings have been sanitised.

The greatest danger to corbelled buildings stems from the fact that they are structurally finely balanced and weakness in a single element can destabilise the whole structure. Natural forces obviously contribute to this and I am aware that an earth tremor in March 2010 led to the collapse of two corbelled buildings. The threat of cracked lintels perhaps presents the greatest threat of destabilisation, and many buildings now have lintels which have cracked. In one particularly good corbelled building at Bitterwater I, every door, window and niche lintel, has cracked. Eventually the building will collapse. Another threat is the splitting apart of the wall through lack of throughstones or because there are too many running joins which gives rise to cracking and parting of the wall.

These natural forces cannot be stopped, although some farmers have tried to prop up cracked lintels. In contrast, however, there has also been the deliberate destruction of corbelled buildings and other historic buildings on *werfs* or in the veld, which would give additional insight into 19th century life in the Great Karoo. Some intervention should and could be applied to prevent this by means of an active programme to inform farmers of the value of historic structures. Most land owners are keen to find out about their corbelled buildings, but this is nevertheless a balancing act, as heritage bodies are not in a position to offer any monetary compensation or reward for actively managing the ongoing conservation of these buildings. If the owner wants to sell the stone from the kraal walls or old timber, or even pick up ceramic shards from the dump to make into craft projects, we are in no position to stop him, despite the extremely good National Heritage Resources Act. All we can do is point out the historical value of the material on his farm.

This project will be continued on an informal basis and a register of all corbelled buildings will be created and handed to the South African Heritage Resources Agency, who have already requested it. Numerous copies of the two journals of The Vernacular Architecture Society of South Africa, which dealt with corbelled buildings, have been distributed to farmers and sold from a shop in Loxton, and it is hoped that a much shorter version of this thesis will be published in the VASSA Journal to be sold and distributed in the area (VASSA. 2007 & 2008).

The corbelled buildings of the Great Karoo are equal to, and even surpass, the corbelled buildings found around the Mediterranean and in the British Isles and Ireland. In fact, few of those buildings are more impressive than the two buildings at Stuurmansfontein, which so impressed James Walton in 1960 (Walton, 1960: 1). Acknowledgment must go to Walton for his progressive thinking at the time when it came to the corbelled buildings. He recognised "The corbelled hut.....constitutes one of the most interesting groups of South African folk building" (Walton, 1960: 3) and ensured that not one, but five of these buildings were declared National Monuments. This thesis has expanded considerably on his original work, and solid foundations have now been laid for future research in the Great Karoo.

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APPENDIX I

Table A1 Size of half-door openings and the direction of the opening – Type ii door openings

Farm	Type	height	Width	Direction of opening	Height of step (*drumpel*)
Daggafontein	A1aii	1m	0.78m	south	0.46m
Die Kolke	A1aii	0.88m	0.76m	south-west	0.6m
Driefontein	A1aii	1.0m	0.68m	south-west	0.35m
Hondefontein	A1aii	1.0m	0.77m	west	0.77m
Koppiesfontein	A1aii	1.15m	0.82m	west	0.32m
Louw se Plaas	A1aii	0.95	0.73	south west	0.25m (plus depth of internal step down)
Ongeluksfontein	A1aii	0.78m	0.5m	west	0.56m
Riethuisies	A1aii	1.17m	0.8m	west	0.5m
Stuurmansfon-tein II	A1aii	0.97m	0.74m	west	0.6m
Witfontein I	A1aii	0.9m	0.76m	south-west	0.7m
Skerpioensdrif	A2aii	1.0m	0.73m	west	0.4m
Rietbrak**	B3bii	1.0m	0.86m	west	0.7m
Rondom	B1ii	0.8m	0.8m	west	0.57m

** Rietbrak is not on the list of corbelled buildings with full dimensions as the roof has collapsed. However is was possible to take the door measurements.

TABLE A2 Doorways altered from half- to full-door size but still designated "ii" type.

Farm	Type	New Height of door	Width	Direction door faces
Eendefontein	A1aii	1.93m	0.8m	west
Gorras II	A1aii	1.42m	0.83m	west
Kiewietsfontein	A1aii	1.73m	0.84m	west
Leyfontein I	A1aii	1.35m	0.7m	west
Modderfontein	A1aii	1.9m	0.83m	south-west
Vlinkskolk	A1aii	1.34m	0.75m	south-west
Rietfontein II	A1bii	2.1m	1.1m	west
Swaelkrans	A1bii	1.66m	1m	west
Onderplaas I	A2aii	1.7m	0.75	east
Onderplaas II	A2aii	1.8m	0.8m	east
Rietvlei	B3aii	1.38m	0.65m	west

TABLE A3 Dimensions of full-door openings and ratio of height of door opening to height of the building, as well as the direction of opening – type "i" apertures.

Farm	Type	Height of door opening	Ratio height of door opening to height of building	Width of door opening	Direction door faces
Aasvoelsvlei IA	A1ai	1.39m	0.44	0.76m	east
Aasvoelsvlei II	A1ai	1.56m	0.59	0.8m	east
Bitterwater I	A1ai	1.66m	0.38	0.93m	east
Bitterwater II	A1ai	1.55m	0.59	0.82m	east
Brakvlei	A1ai	1.6m	0.37	0.85m	east
Dawidskolk II	A1ai	1.4m	0.32	0.7m	south-east
De Brak	A1ai	1.64m	0.86	0.6m	east
De Val	A1ai	1.52m	0.54	0.78m	north

Farm	Type	Height of door opening	Ratio height of door opening to height of building	Width of door opening	Direction door faces
De Wilg I	A1ai	1.66m	0.65	0.83m	south
Droogeputs III	A1ai	1.15m	0.61	0.54m	south-west
Gorras II	A1ai	1.66m	0.61	0.8m	south-east
Gorras IV	A1ai	1.4m	0.51	0.78m	east
Kareekloof	A1ai	1.29m	0.39	0.89m	south-east
Krabfontein II	A1ai	1.91m	0.64	1m	east
Krabfontein III	A1ai	1.6m	0.62	0.86m	east
Krabfontein IV	A1ai	1.5m	0.58	0.82m	east
Krugerskolk	A1ai	1.97m	0.60	0.9m	south-east
Leyfontein II	A1a i	1.9m	0.56	1.15m	east
Modderfontein II	A1ai	1.9m	0.43	0.83m	north-east
Mooskloof I	A1ai	1.37m	0.63	0.67m	south-east
Mooskloof II	A1ai	1.23m	0.45	0.98m	south-east
Silvery Holme II	A1ai	1.14m	0.49	0.58m	south-east
Stuurmansfontein III	A1ai	1.88m	0.44	0.76m	east
Vastrap	A1ai	1.67m	0.54	0.93m	south-east
Vlieefontein	A1ai	1.62m	0.48	1m	north-east
Dawidskolk I	A1bi	2.0m	0.46	0.9m	east
Gorras I	A1bi	1.83m	0.37	0.9m	east
Krabfontein I	A1bi	1.92m	0.46	1.12m	east
Schuinshoogte	A1bi	1.73m	0.34	1m	east
Silvery Holme I	A1bi	1.67m	0.40	0.67m	north
Spioenberg	A1bi	2.0m	0.40	1.16m	east

Farm	Type	Height of door opening	Ratio height of door opening to height of building	Width of door opening	Direction door faces
De Postjes	A2ai	1.7m	0.46	bottom 0.81m top 0.68m	south-east
De Wilg II	A2ai	1.38m	0.44	0.67m	south-east
Eensaamheid I	A2ai	1.65m	0.41	0.8m	south-east
Karelsgraf I	A2ai	1.6m	0.44	0.97m	south-east
Karelsgraf II	A2ai	1.6m	0.37	0.96m	east
Knegtsbank	A2ai	0.9m	0.30	0.6m	east
Langbaken	A2ai	1.92m	0.36	1.3m	south
Middelpos	A2ai	1.0m	0.43	0.66m	south-west
Perdegrasvlei	A2ai	1.5m	0.41	0.8m	east
Rietfontein I	A2ai	1.77m	0.53	1m	east
Vanreenensplaas	A2ai	1.2m	0.26	0.7m	east
Vinkfontein	A2ai	1.6m	0.36	bottom 0.76m top 0.59m	north
Grootfontein	A2bi	1.83m	0.30	0.82m	east
Konka	A2bi	1.87m	0.32	1.2m	east
Slingersfontein	A2bi	no measurement available		1m	east
Spoorkolk	A2bi	1.79m	0.32	0.8m	south-west
Stuurmansfontein IA	A2bi	1.77m	0.25	0.93m	north-east
Stuurmansfontein IB	A2bi	1.88m	0.31	0.76m	east
Aasvoelvlei IB	B1i	1.52m	0.52	0	east
Aasvoelvlei IC	iB1	1.m	0.30	0.62m	east
Blouhoogte	B1i	1.74m	0.44	0.8m	east

Farm	Type	Height of door opening	Ratio height of door opening to height of building	Width of door opening	Direction door faces
Brownslaagte	B1i	1.8m	0.43	0.66m	east
Tiervlei	B1i	1.77m	0.59	0.78m	east
Witfontein	B1i	1.43m	0.58	0.76m	north-east
Arbeidersfontein from 1.48 to 1.8 metres)	B3bi	1.8m	0.33	0.62m	south-east
Droogeputs IA	B3bi	1.8m	0.45	0.8m	south east
Droogeputs IB	B3bi	1.75m	0.42	0.7m	north
Janklaasleegte I	B3bi	1.94m	0.42	unknown	east
Leeuwkrantz	B3bi	1.93m	0.41	0.75	south-east
Klipkolk	B3bi	altered			south-east
Vaalhoek	B3bi	1.5m	0.34	0.9m	south-east
Voorstevanzylsplaas	B3bi	1.7m	0.40	0.86m	south-east
Droogeputs II (kookhuis)	B3ai	no measurement available		0.7m	north west
Janklaasleegte II	B3ai	1.76m	0.62	0.85m	east
Leyfontein IV	B3ai	1.9m	0.55	0.74m	east
Omkeerkolk	C1i	1.62m	0.98	0.82m	east

TABLE A4 Elements which would indicate that the building was built for habitation — niches, shelves, windows, stoves and hooks in Type A1ai buildings.

Type A1ai	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Aasvoelsvlei IA	1	0	1		0
Aasvoelsvlei II	1	0	2		0
Bitterwater I	2	1	3	yes	2 horns
Bitterwater II	1	1	1	yes	0
Brakvlei	2	3	2		0
Dawidskolk II	0	0	0		0
De Brak	0	0	0		0
De Val	0	0	2	yes	0
De Wilg I	0	0	0		0
Droogeputs III	0	0	0		0
Gorras III	1	1	2		1 horn
Gorras IV	0	4	2		0
Kareekloof	0	0	1		0
Krabfontein II	1	0	1		0
Krabfontein III	0	0	3		0
Krabfontein IV	0	0	3		0
Krugerskolk	2	1	1		4 horns
Leyfontein II	1	3	2		0
Modderfontein II	1	3	2		0
Mooskloof I	0	0	0		0
Mooskloof II	0	0	0		0
Silvery Holme II	1 (blocked)	0	1		0
Stuurmansfontein III	1	2	3		0
Vastrap	0	1	1		0

Type A1ai	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Vlieefontein	1	1	2		0

TABLE A5 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A1aii buildings.

Type A1aii	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Daggafontein	0	0	0		0
Die Kolke	0	0	0		0
Driefontein	0	0	0		0
Eendefontein	0	0	0		2 metal (fencing)
Gorras II	0	0	1 (vent)		0
Hondefontein	0	0	0		0
Kiewietsfontein	0	0	0 (1 modern)		0
Koppiesfontein I	0	0	0		0
Leyfontein I	0	0	0		0
Louw se Plaas	0	0	0		0
Modderfontein I	0	0	0		0
Ongeluksfontein	0	0	0		0
Riethuisies	0	0	0		0
Stuurmansfontein II	0	0	0		0
Vlinkskolk	0	1	0		0
Witfontein	0	0	0		0

TABLE A6 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A1bi buildings

Type A1bi	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Dawidskolk I	1	1	1		0
Gorras I	2	3	1		0
Krabfontein I	3	1	2		0
Schuinshoogte	0	0	1		7 horns
Silvery Holme I	0	0	2		2 wooden pegs
Spioenberg	0	1	1		0

TABLE A7 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A1bii buildings.

Type A1bii	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Rietfontein II	0	0	0		4 horns 2 metal
Swaelkrans	0	0	0		0

TABLE A8 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A2ai buildings.

Type A2ai	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
De Postjes	0	0	0		0
DeWilg II	0	0	0		2 metal 1 wood
Eensaamheid I	0	0	0		0
Karelsgraf 1	0	0	1		0
Karelsgraf II	0	0	3	X	0
Knegtsbank	7	0	0		0

Type A2ai	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Langbaken	0	0	0		0
Middelpos	0	0	0		0
Paardegrasvlei	1	0	1		0
Rietfontein I	0	0	0		2 horns
Vanreenensplaas	0	0	0		0
Vinkfontein	0	0	0		0

This Type – cone shape roof buildings – are the most enigmatic of all the Types due to the large number without window openings - a fact matched by the lack of other features associated with habitation.

TABLE A9 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A2aii buildings.

Type A2aii	Niches	Shelves	Windows	Signs of stove/ chimney	Hooks
Onderplaas I	0	0	0		0
Onderplaas II	0	0	0		0
Skerpioensdrif	0	0	0		0

TABLE A10 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type A2bi buildings.

Type A1bi	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Grootfontein	0	0	1		0
Konka	1	0	1		2 horns
Slingersfontein	0	2	1		0
Spoorkolk	1	0	1		0

Type A1bi	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Stuurmansfontein IA	2	0	1		0
Stuurmansfontein IB	1	0	1		0

TABLE A11 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type B1i buildings.

Type B1i	Niches	Shelves	Windows	Sign of stove / chimney	Hooks
Aasvoelsvlei IB	0	0	2		0
Aasvoelsvlei IC	2	0	1	X	0
Blouhoogte	0	0	1		0
Brownslaagte	0	0	2	hearth in extension	0
Tiervlei (2-room building)	1	3	3		2 horns

TABLE A12 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in B3bi buildings.

Type B2ai	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Arbeidersfontein	2	0	2	hearth in extension	0
Droogeputs IA	1	0	2	hearth in extension	0
Droogeputs IIA	0	0	2	as above	0
Janklaasleegte I	2	0	1		0
Klipkolk (much altered)	0	0	2		0
Leeuwkrantz	0	1	1		0

Type B2ai	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Vaalhoek	0	1	1	X and in extension	0
Voorstevanzyls-plaas	1	1	0 (unable to see)	hearth in extension	0

TABLE A13 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type B3ai buildings.

Type B2bi	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Droogeputs II (*kookhuis*)	1	0	ventilation shaft	hearth	0
Janklaasleegte II	0	0	1		0
Leyfontein IV	0	4	1		0
Witfontein II	0	0	0		0

TABLE A14 Elements which would indicate that the building was built for habitation – niches, shelves, windows, stoves and hooks in Type B3aii buildings.

Type B2bii	Niches	Shelves	Windows	Sign of stove/ chimney	Hooks
Rietbrak	0	0	0		0
Rietvlei	0	0	0		0
Rondom	0	0	0		0

TABLE A15 Ratio of window area to floor area to determine proportions of window size to building size.

Farm	Type	Window size (bxh)	Win-dow area	Floor dia-meter	Floor area	Ratio win-dow area to floor area	Height
Aasvoelsvlei IA	A1a	0.48 x 0.33m	0.15m²	3.39m	9m²	1.6	3.09m
Bitterwater I	A1a	0.67 x 0.43m	0.28m²	4.93m	19m²	1.47	4.36m
Leyfontein II	A1a	0.43 x 0.47m	0.2m²	4.28m	14.3m²	1.39	3.36m
Modderfontein II	A1a	0.45 x 0.4m	0.18m²	4.43m	15.4m²	1.16	4.35m
Silvery Holme II	A1a	0.57 x 0.44m	0.25m²	3.06m	7.3m²	3.42	2.32m
Vastrap	A1a	0.56 x 0.52m	0.29m²	3.26m	10.14m²	2.82	3.08m
Gorras I	A2a	0.58 x 0.76m	0.44m²	5.26m	21.7m²	2	4.0m
Krabfontein I	A2a	0.69 x 0.84m	0.57m²	5.61m	21.73m²	2.6	4,1m
Schuinshoogte	A2a	0.58 x 0.9m	0.52m²	5.57m	24.3m²	2.1	5.0m
Silvery Holme I	A2a	0.53 x 0.51m	0.27m²	5.04m	20m²	1.35	4.0m
Karelsgraf II	A2a	0.56 x 0.53m	0.29m²	3.53m	9.78m²	2.9	3.61m
Perdegrasvlei	A2a	0.47 x 0.3m	0.14m²	4.29m	14.45m²	2	3.64m
Grootfontein	A2b	0.63 x 0.79m	0.49m²	5.73m	25.7m²	1.9	5.96m
Konka	A2b	0.78 x 0.65m	0.5m²	4.4m	15.20m²	3.2	5.67m
Brownslaagte	B1a	0.54 x 0.43m	0.23m²	3.67m	13.4m²	1.7	4.10m
Koppiesfontein	B1	0.3 x 0.42m	0.12m²	3.16m	9.82m²	1.2	2.86m
Droogeputs IA	B3b	0.47 x 0.4m	0.18m²	3.6m	12.96m²	1.38	4.0m
Janklaasleegte	B3b	0.49 x 0.49m	0.24m²	3.6m	12.96m²	1.85	4.55m

Farm	Type	Window size (bxh)	Win-dow area	Floor dia-meter	Floor area	Ratio win-dow area to floor area	Height
Vaalhoek	B3b	0.55 x 0.77m	0.42m²	4.14m	18.21m²	2.3	4.35m

Table A16 *Kafhok* door dimensions.

Farm	*Drumpel* height	Door height	Door width
Driefontein	0.35m	0.91m	0.71m
Daggafontein	0.46m	1.09m	0.78m
Ongeluksfontein	0.56m	0.78m	0.5m
Riethuisies	0.51m	1.17m	0.8m
Rondom	0.57m	0.8m	0.8m
Skerpioensdrif	0.4m	1.00m	0.73m
Sterling	0.70m	1.03m	0.86m
Witfontein	0.70m	0.91m	0.76m

APPENDIX II

136/1

OMMISSION FOR THE PRESERVATION
OF NATURAL AND HISTORICAL
ONUMENTS, RELICS AND ANTIQUES.

DIE KOMMISSIE TOT BEHOUD VAN
NATUURLIKE EN HISTORIESE
GEDENKWAARDIGHEDE EN OUDHEDE.

WITWATERSRAND { UNIVERSITY / UNIVERSITEIT

No. 44-4989.

"NOMO"

In reply please quote:
Vermeld in u antwoord asb.:

No. H.M.C. 88/8/1

UNIVERSITY OF THE / UNIVERSITEIT VAN DIE } WITWATERSRAND
MILNER PARK,
JOHANNESBURG.

4th May, 1959.

James Walton Esq.,
Education Department,
Maseru,
BASUTOLAND.

My dear Walton.

RONDAWELS : WILLISTON : CAPE

The Commission has been asked to take some action to preserve one or more of a peculiar type of 'rondawel' of which some examples still exist in the district of Williston, Cape Province. I enclose a translation of a report we have received from the Magistrate of Williston and also a small photograph which gives some idea of the appearance of one of them.

We feel that there is no great urgency to protect these rondawels or a specimen of them, but would appreciate your comments and would be glad if, when you have an opportunity, you could visit the place and submit a report. Unfortunately Williston is somewhat remotely situated between Calvinia and Carnarvon, in the country East of Victoria West and I find it difficult to imagine a reason for a visit to those parts. If however, you reach a point anywhere within striking distance of Williston we would willingly meet the additional cost of going to Williston.

With kind regards,
Yours sincerely,

SECRETARY.

RONDAWELS.

Report by Magistrate, Williston dated 30/12/1958.

I visited the rondawel on the farm Arbeidsfontein of Mr. H. de W. Esterhuyse.

I enclose a photograph of the rondavel which please return.

This rondavel is built rectangular to roof height and then conically towards a point. The interior is more conical than the exterior.

The whole is built of natural flat stones placed upon one another, narrowing gradually so that at the top there is only a small opening. The opening is closed by a few large flat stones which rest on two wooden beams.

On the outside round the roof the flat stones protrude in such a way that scaffolding can be placed on them. Between the stones clay has been worked in to close the openings but the construction of the stones holds the building together. The walls at the base are very thick - 28 inches, and the building is 18ft. diameter at the base and 21ft. high. There are two small windows and a stable door. The only timber in the building is the jambs and the two beams about 4ft. long on which the topmost flat stones rest.

This rondavel is said to be 80 years old. Bricks, cement and lime were unknown in these parts and the abundant stone of the area was used. The rondavels were built so high for the sake of coolness. This area gets tremendously hot in summer.

The owner of the rondavel on Schuinshoofte is Mr. G.S. Esterhuyse. I did not visit this farm but ascertained that it is similar but circular from the bottom up. Both rondavels are well built, in good condition and can stand for a very long time.

D. DE V.J. VAN RENSBURG.

Magistrate of Williston

APPENDIX III

MASTER LIST OF CORBELLED BUILDINGS

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Aasvoelvlei I (3 linked) ●■■	IA A1ai IB B1i IC B1i	31°18'13.60"s 21°55'03.70"e	1890	
Aasvoelvlei II ●	A1ai	31°18.352's 21°54.996'e	1890	
Arbeidersfontein ■	B3bi	31°14.749's 21°15.475'e	1873	
Bitterwater I ●	A1ai	31°16.146's 21°51.228'e	Surveyed 1825 Granted 1937	
Bitterwater II ●	A1ai	31°16.241's 21°51.224'e	As above	
Blouhoogte ■	B1i	32°15.815's 21°23.748'e	1831	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Brakvlei ●	A1ai	31°29'01.62"s 21°43'32.39"e	1830	
Brownslaagte ■	B1i	31°10.226's 21°01.181'e	1865	
Daggafontein ● (*kathok*)	A1aii	32°12.038's 21°27.161'e	1830	
Dawidskolk I ●	A1bi	31°32'22.56"s 21°59'57.87"e	1830	
Dawidskolk II ●	A1ai	31°32'22.04"s 21°59'56.63"e	1830	
De Brak ●	A1ai	31°59.106's 21°18.758'e	1876	
De Kolke ● (*kathok*)	A1aii	32°11'28.39"s 21°28'40.11"e	1830	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
De Postjes ●	A2ai	32°15.073's 21°27.611'e	1830	
De Val ●	A1ai	32°04.377's 21°20.405'e	1830	
De Wilg I ●	A1ai	31°41'04.30"s 22°03'04.02"e	1830	
De Wilg II ●	A2ai	31°41'04.43"s 22°03'04.59"e	1830	
Driefontein ● (*kafhok*)	A1aii	32°14'03.88"s 21°20'37.22"e	1830	
Droogeputs IA & IB ■■ (2 linked)	IA B3bi IB B3bi	31°06'52.08"s 21°38'58.95"e	1869	
Droogeputs II ■ (*kookhuis*)	B3ai	31°06'51.58"s 21°38'58.73"e	1869	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Droogeputs III ●	A1ai	31°06'50.09"s 21°38'51.60"e	1869	
Eendefontein ● (*kafhok*)	A1aii	31°23'12.69"s 21°57'06.55"e	1830 part of Gansvlei	
Eensaamheid I ●	A2ai	32°16.330's 20°34.557'e	1832	
Eensaamheid II ● (Flat stone roof)		32°16.319's 20°34.580'e	1832	
Gansvlei ●	A1ai	31°24.797's 22°01.387'e	1830	
Gorras I ●	A1bi	31°11.316's 21°31.091'e	1873	
Gorras II ● (*kafhok*)	A1aii	31°11.253's 21°31.173'e	As above	
Gorras III ● (Volkswerwe)	A2ai	31°12.704's 21°24.810'e	As above	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Gorras IV ●	A1ai	31°11.175's 21°31.298'e	As above	
Grootfontein ●	A2bi	31°07.309's 21°11.538'e	1869	
Gunstfontein ● (*kafhok*)	A2aii	32°34.092's 20°40.934'e	1833	
Hondefontein ● (*kafhok*)	A1aii	32°12.659's 21°22.577'e	1830	
Janklaasleegte I ■	B3bi	31°28.993's 21°01.951'e	1866	
Janklaasleegte II ■	B3ai	31°28'57.36"s 21°01'54.97"e	As above	
Kareekloof ●	A1ai	30°56.585's 21°47.758'e	1876	
Karelsgraf I ●	A2ai	30°37'09.20"s 22°13'58.47"e	1866	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Kareisgraf II ●	A2ai	30°37'03.79"s 22°13'57.33"e	As above	
Kiewietsfontein ● (*kathok*)	A1aii	31°34.213's 22°13.248'e	1830	
Klipkolk ■	B3bi	31°06'02.28"s 21°43'35.59"e	1864	
Knegsbank ● (chicken coop)	A2ai	31°50.591's 20°01.119'e	1834	
Konka I ●■ (2 linked)	A2bi B3bi	30°54.808's 21°54.489'e	1849	
Koppiesfontein I ● (*kathok*)	A1aii	31°30'26.16"s 21°40'56.07"e	1838	
Koppiesfontein II ■	B1i	31°30'29.88"s 21°40'55.96"e	As above	
Krabfontein I ●	A1bi	31°26'35.80"s 21°51'59.23"e	1830	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Krabfontein II ●	A1ai	31°26'36.05"s 21°51'59.03"e	As above	
Krabfontein III ●	A1ai	31°26'37.12"s 21°52'02.03"e	As above	
Krabfontein IV ●	A1ai	31°26'37.29"s 21°52'02.05"e	As above	
Krugerskolk ●	A1ai	31°12.274's 21°49.116's	1876	
Langbaken ●	A2ai	31°21,502' 21°14.354'e	1864	
Leeuwkrantz ■	B3bi	31°14.639's 21°07.801'e	1869	
Leyfontein I ● (*kafhok*)	A1aii	31°15'49.24"s 22°36'28.05"e	1830	
Leyfontein II ●	A1ai	31°15'52.36"s 22°36'31.99"e	As above	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Leyfontein IV ■	B3ai	31°15'42.49"s 22°36'22.22"e	As above	
Louw se plaas (2 linked - 1 is a *kafhok* ●●	A1aii	32°15.927's 21°23.761'e	1831	
Louw se Plaas II ●	A1ai	32°15'58.03"s 21°23'46.57"e	As above	
Middelpos ●	A2ai	31°54.222's 20°13.756'e	1834	
Modderfontein I ● (*kafhok*)	A1aii	31°29'00.48"s 21°43'25.33"e	1838	
Modderfontein II ●	A2ai	31°29'04.17"s 21°43'24.23"e	1838	
Mooskloof I ●	A1ai	30°58.228's 21°47.429'e	1849	
Mooskloof II ●	A1ai	30°58.226's 21°47.382'e	As above	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Omkeerkolk ●	C1i	31°34.097's 22°01.745'e	1871	
Onderplaas I *(kafhok)* ●	A2aii	31°48.603's 20°06.321'e	1834	
Onderplaas II ● *(kafhok)*	A2aii	31°48.612's 20°06.525'e	As above	
Ongeluksfontein ◒ *(kafhok)*	A1aii	32°34.133's 21°26.356'e	1831	
Perdegrasvlei ●	A2ai	31°37.744's 21°51.432'e	1830	
Rietfontein I ●	A2ai	31°17.692's 22°08.079'e	1830	
Rietfontein II ● *(kafhok)*	A1bii	31°17.604's 22°08.028'e	As above	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Riethuisies ● *(kafhok)*	A1aii	32°15.951′s 21°27.890′e	1830	
Rietvlei ■ *(kafhok)*	B3aii	31°26.146′s 21°04.087′e	1833	
Rondom ■ *(kafhok)*	B1ii	32°23.782′s 21°30.156′e	1833	
Schuinshoogte ●	A1bi	31°15.170′s 21°21.588′e	1870	
Silvery Holme I & II (2 joined) ●●	I A1bi II A1ai	31°29.259′s 22°14.037′e	1830?	
Skerpioensdrif ● *(kafhok)*	A2aii	31°01′32.23″s 21°32′33.60″e	1864	
Slingersfontein ●	A2bi	31°34′30.42″s 21°55′42.82″e	1830	
Spioenberg ●	A1bi	31°18.380′s 21°40.383′e	1879	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Spoorkolk ●	A2bi	31°12.740's 21°45.102'e	1877	
Stuurmans-fontein IA, IB ●● (2 joined)	IA A2bi IB A2bi	30°54.955's 21°39.786'e	1874	
Stuurmans-fontein II ● (*kafhok*)	A1aii	30°54.760'e 21°39.485'e	As above	
Stuurmans-fontein III ●	A1ai	30°54.955's 21°47.758'e	As above	
Swaelkrans ●	A1bii	31°28.843's 22°39.786'e	1830?	
Tiervlei ■■ (two linked rooms built at same time)	B1i	31°15.117's 21°58.407'e	1876	
Vaalhoek ■	B3bi	31°28.295's 22°28.519'e	1874	
Vanreenens-plaas ●	A2ai	30°54'33.23"s 21°14'50.12"e	1870	

Farm name + base shape: ● = round ■ = square	Type	Coordinates	Date of survey for Quitrent grant	Photograph
Vastrap ●	A1ai	31°40.913's 21°44.558'e	1830	
Vinkfontein ●	A2ai	32°31.766's 21°05.551'e	1833	
Vlieefontein ●	A1ai	32°09'20.78"s 22°01'14.31"e	1833	
Vlinkskolk ● (*kafhok*)	A1aii	31°16.186's 22°05.736'e	1876	
Voorstevanzyls-plaas ■	B3bi	31°11.368's 20°49.169'e	1869	
Witfontein I ● (*kafhok*)	A1aii	32°15.540's 21°22.334'e	1831	
Witfontein II ■	B1i	32°15'35.69"s 21°22'25.07"e	As above	

The corbelled buildings listed below have either not been visited, could not be measured or have deteriorated or collapsed completely. Some information, for example, base shape and location could be taken.

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
Banksfontein ●	31°10'11.54"s 21°12'51.19"e	1863	Visited - roof missing	
Bastardsfontein	31°12'47.53"s 22°15'25.34"e		Reported	
Beukeskraal ●	32°06'25.51"s 21°13'34.15"e	1830		
Biesiesdam ●	30°44'45.47"e 22°38'46.75"s	1926	Collapsed	
Biesiespoort	31°11'15.51"s 22°05'21.78"e	1880		
Biesiesputs ●	31°10.658's 21°39.913'e	1873	Collapsed	
Boplaas I ●	31°26'23.87"s 21°44'56.20"e		Ruin	
Boplaas II ●	31°26'23.31"s 21°44'52.46"e		Ruin	
Brakwater I ■■ (2 linked)	31°20'14.37"s 22°14'07.97"e	1853?	Visited - measure-ments incomplete	
Bruinpunt	30°46'53.57"e 21°47'33.40"s	1925		

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
De Dam ●	31°02'23.95"s 21°21'07.93"e		Seen by Walton	
De Puts ●■ (2 linked)	31°21'49.45"s 21°52'08.04"e		Seen by Walton.	
De Kom ■	32°21'21.16"s 21°14'12.20"e	1833	Could not gain access	
Driekoppen	31°09'30.17"s 22°00'23.56"e	1830	Reported	
Driefontein II ■	32°14'01.46"s 21°20'37.55"e	1830	Soap house - could not gain access	
Driefontein III ■	32°14'01.69"s 21°20'34.70"e	As above	Could not gain access	
Driefontein IV ●	32°14'02.27"s 21°20'37.55"e	As above	Meat store - could not gain access	
Eendefontein I ●●● (3 linked)	31°23'12.69"s 21°57'06.55"e		Visited. Measure-ments incomplete	
Good Hope (Vosburg Road)	30°39'00.71"s 22°47'47.54"e		Not there	
Grootfontein I	31°50.296's 21°44.435'e		Seen from road	

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
Grootfontein II	31°52'05.92"s 21°41'25.10"e		Seen from road	
Hartbeesfontein ●	32 24 02.46s 20 31 21.97e	1830	Building full of chaff	
Hillandale (Esterville) ●	31°56'19.18"s 22°45'08.45"e		Reported	
Hongerkloof ●	31°43.958"s 21°23.248"e		Ruin	
Hottentots-fontein	32°27'53.27"s 20°32'11.89"e		Ruin	
Karelsgraf III ●	30°37'03.79"e 22°13'57.33"s	1866	Farmer has lost key	
Knapdaar ●	31°18'01.79"s 21°54'17.26e		Ruin	
Langfontein se Maanhaar ●	32°17'03.70"s 21°36'37.50"e		Reported	
Leendertseplaas	31°41'27.78"s 21°00'36.32"e	1832	Reported	
Leeufontein *(kafhok)* ●	31°04'20.50"s 21°51'21.19"e	1830	Seen by Walton.	
Leyfontein III ●	31°15'52.51"s 22°36'31.11"e	1830	Visited	
Middelwater	31°14'12.09"s 22°12'41.76"e		Reported	

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
Onderplaas ● (*kafhok*)	31°48.546's 20°06.482'e	1834	Ceiling prevented complete measure-ments	
Osfontein ■■ 2 linked at same time	31°14'22.84"s 22°20'13.52"e		Now tourist accommo-dation	
Perdegrasvlei II ●	31°37'43.57." s 21°51'44.09"e		Collapsed	
Request	31°14'04.29"s 22°32'07.08"e	1889	Reported	
Reutersfontein ●	30°57'48.52"s 21°27'14.73"e	1867	Walton reported	
Rietfontein ■	32°13'41.22"s 21°10'21.04"e	1833	Walton reported	
Rietpoort I ●	31°38'15.57"s 21°59'03.04"e	1830	Incomplete measure-ments	
Rietpoort II ●	31°38'15.76"s 21°59'03.19"e	1830	Incomplete measure-ments	
Rondom	31°15'38.06"s 22°17'01.83"e		Reported	
Rooikop ●	30°49.145's 22°09.324'e		Ruin	

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
Skietkolk	30°48'30.00"s 21°47'00.00"e	1874	Reported	
Sterling ■ (*kafhok*)	31°16.283's 21°26.611'e	1872	Roof collapsed. Building unstable	
Swartfontein ●●	30°41'01.81"s 21°33'30.26"e		Rumoured to have collapsed	
T'kokoboos ●●● (3 joined	30°57'26.12"e 2°40'53.33"s	1874	Seen by Walton	
Vanaswegens-fontein I ● (*kafhok*)	31°24'28.22"s 22°11'37.47"e	1825	Roof missing	
Vanaswegens-fontein II ●	31°24'17.75"s 22°11'50.01"e	As above	Roof missing	
Vischgat I & II ●■	31°28'41.06"s 22°02'57.19"e	1830	Visited but not measured	
Vryeleegte (4 corbels)	31°03'26.04"s 22°05'40.55"e	1874	Reported	
Waterval	30°54'18.00"e 21°33'46.17"s	1868	Reported	
Willow Glen ●●● (3 linked)	32°13'08.84"s 21°39'12.46"e		Walton reported	
Witfontein III ■	32°15'35.69"s 21°22'25.07"e	1831	Could not gain access	
Wolwefontein	31°09'26.43"s 22°19'36.82"e	1830	Reported	

Farm name +base shape: ● = round ■ = square	Coordinates	Date of survey for Quitrent grant	Comments	Photograph
Ystervarkspoort I ■	31°24'27.87"s 22°27'08.71"e	1908	"renovat-ed"	
Ystervarkspoort II ■	31°24'28.81"s 22°26'03.38"e		Visited - not measured