

The selective use of slate in vernacular farm buildings and structures north of the Vaal River

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Slate and shale are not usually considered as building stone for the construction of entire buildings in the vernacular farm architecture of the area north of the Vaal River (historically known as the Transvaal). Sandstone and granite as principal building stone types were more common. Slate and shale are two different stone types but due to their similar layered structure they are often used together in the construction of the same wall. Current research has revealed that slate and shale did play a significant but selective role in vernacular building technology in the region. Slate was used for finishing and solving specific problems in folk building technology. One of the reasons why these stone types were less popular as building material is the isolated occurrences of outcrops in the region. Sandstone and granite are more common and readily available. The few buildings constructed with slate and shale had a unique character reflected in the wall texture when the stone is laid flat. Because the stone is released from its rock bed in thin plates with an almost completely flat surface on both sides, it is usually laid flat and needs little mortar to secure a stable wall. This paper introduces rather than analyses the use of these materials in the vernacular architecture of the former Transvaal region.

Keywords: Stone buildings, slate, shale, stone masonry, vernacular architecture

Die selektiewe gebruik van leiklip in landelike volksboukuns noord van die Vaalrivier

Die gebruik van leiklip en skalie as konstruksiemateriaal vir geboue en strukture op plase in die ou Transvaal is minder algemeen as die gebruik van ander tipes klip soos sandsteen en graniet. Skalie en leiklip is twee verskillende gesteentes, maar as gevolg van hulle ooreenstemmende gelaagdheid en breekwyse kom beide materiale dikwels saam in dieselfde muur voor. Een van die redes waarom die materiale nie so algemeen gebruik word nie, is moontlik omdat dit minder algemeen as sandsteen en graniet in 'n streek voorkom. Op die plase waar dit as konstruksiemateriaal gebruik was, het dit geleidelik tot die skep van besondere geboue. Dit is deels as gevolg van die karakter van die klip wat as konstruksiemateriaal slegs op een manier gebruik kan word. As gevolg van die dun lae waarin dit ontgin word, word dit plat gelê en is min bindmateriaal nodig vir die konstruksie van mure. Hierdie artikel is 'n inleiding eerder as 'n volledige analise van die voorkoms en gebruik van hierdie materiale in die volksboukuns van die destydse Transvaal.

Sleutelwoorde: Klip geboue, leiklip, skalie, klipwerk, volksboukuns

Slate is a less common building material compared to granite and sandstone. However, it is not completely ignored as a building material and very selectively used to fill a particular niche in vernacular building technology. Popularly, it is associated with paving in urban areas and very little is known of its selective uses in vernacular architecture on farmsteads of the region north of the Vaal River (the former Transvaal Province).¹ Most published sources tend to refer to the use of slate in its 'sophisticated' or 'cut' form when it is used as roof tiles and as cladding for surfaces on commercial buildings. The reason being that in general, stone as a building material, is evaluated in relation to its construction capabilities and to a lesser extent for its decorative potential and specialist applications.

Although stone seems to be used more often in contemporary building, the propensity exists for cladding rather than construction. Stone as popular and 'modern' construction material in South Africa, has long been surpassed by the use of bricks, mortar, concrete and steel.

This paper highlights the use of slate on farmsteads in the old Transvaal and also the almost incidental exploitation of slate and shale as an isolated and simple mining activity on some farms. Depending on its availability slate has been used all over the cross-Vaal River area (former Transvaal) where outcrops have been identified. Today, it is used for the decoration of contemporary public buildings and also, on a small scale, the construction of contemporary farm buildings.

For commercial purposes modern techniques are used to cut the slate into tiles of standard sizes and thickness. Quarries on the farms in the western Transvaal (now located in the Northwest

Province) now produce vast quantities of tiles and even take the responsibility to transport it to their clients all over South Africa. Even Australia has become a major importer of our slate tiles.

Motivation for the study

When fieldwork and research were undertaken on farmsteads in various districts associated with the history of the Voortrekkers who moved to the Transvaal in the middle of the 19th century, it became obvious that a study of vernacular architecture also needs to include a thorough study of building materials. Field research started in the district of Graaff-Reinet investigating the remains on the farms of Andries Pretorius (originally known as Letskraal) and Gerrit Maritz (originally known as Riviertjie but has since been consolidated into a larger farm). On these farms, construction of the dwellings was done with clay bricks and sandstone types typical of the Karoo. The location of the stone quarry on the farm Riviertjie was established and made it possible to identify the origin of the stone the dwelling was constructed with. The on-site investigation into the characteristics of the quarry and the type of stone that was quarried, exposed various interesting aspects of the local stone (not part of this discourse though). These qualities were eventually reflected in the type and selection of stone used in the construction of the vernacular buildings on the farm,² and initiated the investigation into the use of various stone types in the vernacular farm architecture.

The study of building materials for the commercial construction industry has always been the domain of formal research institutions and formed the backbone of scientific and technological discourse. However, research publications reflecting on vernacular building technology have been mute, resulting in the loss of exceptional ‘pockets’ of indigenous knowledge that existed for many decades, but, although noticed, was not recorded. This article merely touches on the issue as living history cannot be ‘backtracked’.

In the field of conservation and restoration of buildings of both a vernacular or formal origin, it is essential that some data needs to be compiled on the local building materials, their use and applications prior to commencement of any maintenance or restoration work. This became clear when architects were asked to determine the significance of the Union Buildings in Pretoria after the site and building were proclaimed a Provincial Heritage Site. The definition of the site’s spatial configuration and the construction of the building were executed in stone and it has become one of the most significant examples of (master mason) stone masonry in Pretoria. Stone work was executed in a variety of stone types – mostly sandstones. However, the Union Buildings was erected inside a shale quarry and most of the terracing and retaining walls on the site were constructed with shale from this quarry.³

The lack of information on the origin and vernacular use of slate also became evident when fieldwork in the region north of the Vaal River, over a period of twenty years, revealed that many old farm buildings and related structures, ranging from dwellings to simple bridges crossing water-furrows were constructed with slate. Slate also appeared to have been used at a variety of places in the construction of buildings: for example as damp course and external stairs and in the interiors, for shelving, thresholds, mantelpieces and decorative elements, indicating its selective application. The most surprising aspect of the topic and the discovery of these applications of slate and shale was that it was not mentioned in any publications on vernacular architecture in the region.⁴ Published sources contained nothing on the topic of the application of slate in local vernacular architecture.

Currently, two vernacular traditions exist side by side. The first is the ‘real’ and historic vernacular consisting of buildings and structures erected by unskilled workers and in settings where personal ingenuity and tradition determined the best application (according to the natural characteristics) of slate. In these cases no architects, landscape architects or engineers are involved. These traditions can also be referred to as a ‘rural’ vernacular or ‘farmstead’ vernacular applications. The second vernacular tradition occurs mainly in urban areas. It is often the result of a formal design, according to the design, creativity and specifications of an architect or landscape architect. In these cases the application of local stone is to vernacularize the building or often to render the building to be more ‘rustic’. The materials are ordered by catalogue, delivered at the site with the assistance of commercial transport and the work is executed by skilled and semi-skilled workers – however, few are skilled and trained craftsmen or professional stone masons. Although both traditions are introduced, the ‘rural’ vernacular methodologies are highlighted.

Geology

Contrary to the use of slate in vernacular architecture, slate and shale have become popular paving, cladding and tiling materials in the commercial building industry and large quantities of slate are needed to serve in the consistent demand. Today, specific locations in the Northwest Province (referred to in older publications as ‘Western Transvaal’) are well-known for commercial slate quarrying. The districts where slate is mined are Pretoria, Vereeniging, Koster, Rustenburg, Swartruggens and Krugersdorp. The quality of slate in the various regions varies and different quarries serve the various needs of the market.⁵



Figure 1

Redundant slate quarries indicating the quantities of waste due to unpredictable breakages(Mazista slate) near Ventersdorp, Northwest Province (photograph: M. Naudé).

According to Wyberg the stone quarried in Pretoria are chiefly produced in the form of sawn slabs, used for paving, shelving and tables.⁶ These slabs are available in any size required.⁷ These are mainly produced for the commercial market and any relation with older types of vernacular buildings is incidental.

It can be obtained in any size and when needed as tiles for roofing and paving, it can be cut to fit the specifications of the architect, contractor or client. First class roofing tiles can be obtained to the south, southeast and southwest of Swartruggens. The quarries are located at intervals from 5 km south of Swartruggens to the farm Doornpoort (455 JP) and also Bokkraal (344 JP) 29 km southwest of Swartruggens. The main producer in the Mazista station area has quarries on the farms Klipbankfontein (445 JP) and Wagenboomsop (415 JP). About 65 % of their production consists of floor and roofing tiles.⁸

According to the former National Building Institute (now *Boutech*)⁹ of the Council for Scientific and Industrial Research (CSIR) in Pretoria, South Africa's slate is not comparable to the slate of the United Kingdom. South African slate is merely a type of shale in an altered form,¹⁰ and this is one of the reasons why both types are highlighted in this paper.¹¹ Slate is a metamorphic rock. Rocks which have been so altered, generally by deep burial in the earth's crust, become a new rock type and are then referred to as 'metamorphic'. Generally speaking, metamorphic rocks are harder and more compact than the original base materials.¹² Mudstone and limestone are the most susceptible to metamorphism but sandstone and even igneous rocks are sometimes altered to the point where they are regarded as metamorphic. Mudstone may be altered to a variety of rock types according to the nature of both temperature and pressure, causing the metamorphism. Among them are slate, hornfels and schist.¹³ Shale, after being squeezed and sheared under mountain making forces, is also altered to slate.¹⁴ Thus, slate shows a cleavage or ability to split into thin plates. Hornfels is a compact massive rock and schist is said to be foliated and possesses a wavy platy structure.¹⁵

Quarrying

Whether quarrying is done for local vernacular use or for commercial purposes the methodology remains the same. It will only differ in the scale of the 'mining' operation, the number of workers involved and the method of cutting. The tools needed for exposing and lifting slate from its rock bed are simple: a spade, wedges, hammers and a crowbar (commonly known as a 'gwala'). The topsoil is first removed. With small-scale operations it is done by using spades alone. On some farms it is removed with larger scale mechanical equipment such as a front-end loader and finally cleaned by spade to expose the underlying slate. Iron wedges are used to penetrate the natural cleavage of the stone (figure 2). A number of wedges are driven (horizontally) into the cleavage causing the upper part of the rock to split off (figures 3 and 4). The slab is then lifted with longer crowbars and taken out of its natural bedding. The removed slabs are carried to an area where they are stored upright (figure 5).¹⁶



Figure 2
Preparing well-defined profiles prior to inserting the wedges at various places to start the cleaving process (photograph: M. Naudé).



Figure 3

Exposed slate surfaces in the rock bed with small wedges driven into cleavages in order to split it into thin plates (photograph: M. Naudé).



Figure 4

Slate slab is lifted from its bed (photograph: M. Naudé).

Cutting

When the farmer wants to use the stone on a construction site, it is chipped to the appropriate size (on site) with a hammer. Size is dictated by its use, for example paving (ranging from odd shapes and sizes to exact rectangular slabs), roofing (thin tiles with the same size and consistency in colour and texture), or wall construction (at least the edge on one side must be straight and more or less square). On the farms where slate is quarried for commercial use, sizes, shapes, colour and thickness are standardised and accurate according to the specifications and therefore cut with sophisticated machinery such as a water-cooled saw.

Today, the stone is transported by vehicle but in the past it was either transported by wagon or on a sledge, the sledge being the more energy efficient vehicle for transporting blocks and slabs. The stone did not need to be picked up and lowered from the same heights as in the case of using a wagon. Suggestions and recommendations as to the size, construction and measurements of such a sledge appeared in the July issue of *Farming in South Africa* (1927). The author (unknown) suggests that the best way to make a sledge is to use the remains of an old wagon. It can also be made entirely from old materials obtainable on the farm. One or

two sledges could be made from a single wagon. The deck should be as near as possible to the ground and the sledge runners could either be made of soft or hard wood. If soft wood is used it should be sheathed with iron. The iron tires of an old wagon wheel would be ideal. Depending on the type of surface quality the runners may be discarded completely and strips of wagon tires, bolted lengthwise to the bottom of the sledge. The same sledge could also be used for transporting other heavy items such as machinery, engines and concrete troughs.¹⁷

Uses in semi-cut form

There has been widespread difference of opinion as to whether stone should be used and shaped immediately after it has been quarried or whether it should be allowed to dry first. Moist is present in all rock types immediately after it has been quarried and the rock tends to harden as soon as it starts to dry. This is especially true for sandstone, granite and travertine. It is of little concern to the users of slate as it is seldom shaped in the way and for the purposes of the other rock types mentioned above.¹⁸

As slate is released in large flat plates it is an ideal material to cover surfaces. Other stone types such as granites and sandstone have to be cut to create the same sizes. The various thicknesses of the slate determine whether it will be used as foundation stone, floor surface covering, lintels, thresholds, stairs, shelving, damp course or as roof tiles. Fieldwork has not revealed the use of slate as vertical structural members. It is only used vertically as cladding (in contemporary formal architecture).¹⁹



Figure 5
Different formats (slabs and bars suggesting different uses) are stacked to dry – Bankdrift – Koster, Northwest Province (photograph: M. Naudé .

Slate is mostly laid flat and seldom used upright. If it is laid flat for construction purposes the thin layers inherent in the stone and visible from the side are exposed to the weather (figure 6). Therefore, the edge with the more perfect or best prepared surface, projects outwards, while the ‘rough’ edges are orientated towards the centre of the wall. If the wall is left unplastered it also creates a smooth surface with no outstanding sharp points, which is of particular significance for unplastered interior walling (figure 7). This is the method most often used for building walls as laying the flat sides on top of each other ensures a better stability. It is also used in this way for paving when elevated surfaces such as a *stoep* or veranda has a prominent edge that would be exposed to the public eye (figure 8).

It is only applied on its edge (standing up) when used as a wall cladding or as headstones (graves). Thin tiles are usually used as roof tiles but not in semi-cut form.

It is used for different purposes in its semi-cut form. Semi-cut form implies that it is not cut into perfect square or rectangular tiles of a standard size and thickness. The plates were merely lifted from the slate bed and either used in its 'natural' shape or slightly chipped along the edges to get a roughly rectangular shape, as in the case of headstones.

Slate is not often used for the construction of complete dwellings. Granite and sandstone are preferred instead. The reason perhaps being, that granite and sandstone can be 'tailor-made' to fit any needs by cutting, dressing and chipping to different sizes suitable for the individual building. Larger chunks would also speed-up construction and secure better stability.



Figure 6

The Preller dwelling on the farm Pelindaba west of Pretoria. The base - up to the windowsill - was done with other stone types while sills and lintels were executed with slate (photograph: M. Naudé).

Slate is a well-known and common material for paving surfaces such as floors and exterior walkways. Because of its smooth surfaces along the planes it can either be left uncured or treated with varnish and polish. This explains why it is often used as flooring material for *stoeps*, verandahs and on staircases.

It is unknown whether the early pioneers were in the habit of laying a single slab of slate at front doors of farmhouses. The question was raised when the National Cultural History Museum restored the farmhouse (ca. 1848) on the farm Hartebeestpoort in Silverton (east of Pretoria). A slab of about 100 x 150 cm was found outside of the front door. The logic of having a solid and less muddy "door mat" at the front door does make sense as it is usually at this point where residents have to wait when it rains. It seems to be an isolated case as no similar examples have been recorded.

On many farms it was used to pave the entrance to the farmhouse as well as the driveway and other pedestrian routes around the residence and sometimes in front of the entrances to the outbuildings (it is sometimes used to define flower beds or the general garden layout, by 'planting' the slate vertically into the ground).



Figure 7

Interior wall of the Preller dwelling with wall shelving also done with slate (photograph: M. Naudé).

The houses on the farms Diepkloof and Eendragt in the Heidelberg district (southern Gauteng, formerly known as southern Transvaal), both had paved front *stoeps*.²⁰ The front *stoep* of the 1860 farmhouse on the farm Garsfontein (residential area with the same name in Pretoria), is paved with slate. When the house was demolished for reconstruction elsewhere on the site, the individual slabs were numbered and placed back into their original positions.²¹ On the farm Zwartkoppies in the Pretoria district the farmhouse is completely surrounded by a verandah. The *stoep* is paved with slate slabs of about 35 mm thick (figure 8). They were neatly cut into rectangles ranging in size from 100 cm by 120 cm to 120 cm by 180 cm. They were laid on a sand- and cement-bed and the edges were bevelled. This was not the rule of thumb for Victorian farmhouses and definitely an exception as this grand house belonged to the former industrialist Samuel Marks. The farmhouse (Erasmus castle, 1901-1903) on the farm Garsfontein also had a slate *stoep* with the stone masonry executed in the same fashion as the *stoep* at the Zwartkoppies house.



Figure 8

Slate with neatly cut edges of the Victorian dwelling on the farm Zwartkoppies, Pretoria (photograph: M. Naudé).



Figure 9
Detail of exterior and buttressing wall on the top storey of the Preller house (Pelindaba, Pretoria), constructed with slate. Finishing of diagonal buttress was done with long bars of slate (photograph: M. Naudé).

At the Erasmus residence, the slate was cut into large slabs but the projecting eaves were not bevelled. Whether the bevelling was changed during the restoration is unknown. At both Zwartkoppies and the Erasmus ‘castle’ the curved steps from the gardens to the *stoeps* were done in triangularly cut slate.²² The front verandah and back *stoep* of the homestead on the farm Randjesfontein (another farm of the Erasmus family on which the municipal area of Midrand was established) were also covered with large slabs of slate.

Slate was also used for constructing buildings even as principal building material. The historic dwelling of Gustav Preller on the farm Pelindaba west of Pretoria was partially constructed with slate. Walls were left unplastered and the slate was left exposed towards both the exterior and interior of the dwelling (figures. 6, 7 and 9).

Slate was used as lintels above windows and doors, as thresholds for doors and as wall plates in dwellings, *waenhuisse* and stables. At the Erasmus castle (farm Garsfontein) slate was used for the window sills on the ground floor. On the farm Brakfontein (municipality of Centurion) solid ‘bars’ of slate were used as steps at the entrances to the house. In the early settler dwelling on the farm Hartebeestpoort (now the Pioneer Museum in Silverton, Pretoria) two triangular slabs (figure 10) were mounted in the corners of the kitchen next to the hearth and used as storage-work surfaces. They are set into the wall at a height of about 120 cm from floor level.



Figure 10
Triangular slab of slate mounted in the corner of the kitchen and used as an open shelf directly adjacent to the hearth, dwelling at the Pioneer Museum, Silverton (photograph: M. Naudé).



Figure 11
Railing (long bar of slate) on top of the porte-cochere along the front (northern) façade of the Preller dwelling (photograph: M. Naudé).



Figure 12

Fireplace in the lounge of the Preller dwelling. Slate was extensively used along the edges of the fireplace, as mantelpiece and as quoining around the small alcove above the fireplace (photograph: M. Naudé).



Figure 13

Bathroom in the Preller house. Note the use of single slabs of slate as a narrow shelf and for the windowsill (photograph: M. Naudé)



Figure 14

Front elevation of workers' dwelling on the farm Bankdrift, Koster (photograph: M. Naudé).

On the farms Bankdrif and Doornpoort in the Koster district (Northwest Province) African labourers have constructed their own dwellings (workers' housing) with the available slate on the farms.²³ The owner of the farms had his own quarries and the workers used the off-cuts as construction material. Slabs were laid flat with clay mortar in between. The facades of the dwellings were left unplastered exposing the rich but subtle variety of colour tones of the stone. The sides and back were plastered and washed with yellow ochre clays (Figure 14).



Figure 15

Side and back of a workers' dwelling on the farm Bankdrift, Koster (photograph: M. Naudé).

During the pioneering years, rising damp was countered without the assistance and backing of scientists. Slate was used as a non-flexible damp course. It was commonly used by white pioneers and farmers in building construction since the early years of the Transvaal and as late as 1940. Slate is chemically inert and has relatively little potential for decay, which makes it an excellent material to use as a damp course. These qualities have been realised in Europe and the United States and slate has been used for this purpose in these countries.²⁴



Figure 16

Thin layer of slate used as damp course between the foundation and the first brick layers (photograph: M. Naudé).

Specialists at *Boutech* (CSIR) are of the opinion that the use of slate as a damp course is effective when two layers are laid on top of each other (one-over-two and two-over-one method). It must be embedded in a thick layer of sand and cement using a 1:3 mixture (1 cement x 3 sand). According to the CSIR this will be an effective damp course to prevent the upward and sideways movement of damp. It will, however, be of little use for water moving downwards. They suggest that it should not be used for parapet walls, *dekstroke* (cover strips) and windowsills.²⁵ However,

the latter application (construction of window sills) has been used successfully in the Edwardian farmhouse (1902) on the farm Garsfontein (also known as the *spookhuis*).

On the farm Doornhoek in the Pilgrim's Rest district, the *waenhuis* (Wagon-shed) was constructed with slate. It was a later addition to the farmhouse and only differs in scale and material from the residence. The *waenhuis* has no windows and the walls reach a height of approximately 3 metres. The stone layers were laid with clay mortar and the walls are still unplastered.

On an adjacent farmyard also on the farm Doornhoek (Pilgrim's Rest district) the stables were constructed with two layers²⁶ of slate as a damp course between the foundation (stone) and the bottom layer of bricks (Figure 17). The walls were built with sun dried bricks, on top. It was probably used to create a level plane to lay the first layer of bricks on. The layer of slate also served as a primitive damp course as the bricks were only dried in the sun and not baked. On the neighbouring division of the same farm a small stable (about 8 m by 5 m) was constructed completely with slate. It is still used as a stable.



Figure 17

Stables partially constructed with shale and slate on the farm Doornhoek in the Pilgrim's Rest district, Mpumalanga Province. Thin sheets of slate were used as damp course between the foundation and the brick walling (photograph: M. Naudé).



Figure 18

Wide plates of cut slate covering the stairs of the Victorian dwelling on the farm Zwartkoppies, Pretoria (photograph: M. Naudé)



Figure 19

Narrow plates of slate were used to cover the individual stairs leading to the verandah of the Victorian dwelling on the farm Zwartkoppies, Pretoria (photograph: M. Naudé)

Slate was used as the prime building material on the farm Enkeldoorns in the Lydenburg district (figure 20). The sheds or *skure* used for fruit packing are constructed with slate. The first layers of slate were laid in foundation furrows and the walls project directly upwards without any plinth or back stepping towards the roof. There are only a few windows about 300 mm in height and width for light and ventilation.



Figure 20

Large shed on the farm Enkeldoorns, Lydenburg district Mpumalanga Province (photograph: M. Naudé).

On the farm Rooidraai in the Lydenburg district, a rondavel was constructed with slate as walling material. It was used as an outdoor kitchen (also referred to as a ‘detached’ kitchen²⁷). It had to be well-ventilated and the wall does not extend the full length to the roof and are not load-bearing. The conical roof structure is held in position by wooden posts. The space between the top of the stone wall and the roof is covered with a fine wire mesh to allow air to ventilate through the room. The single door consists of a wooden frame and is also covered with mesh.

Slate is not used for the construction of outdoor ovens (detached ovens) as the heat generated inside would cause cracks in the vaulted roof. In its primitive form some pioneer settlers used a slab of slate to seal off the front opening when baking bread. A square slab of slate is used to seal the oven opening, while the bread is inside (figure 21). When not in use, it is stored behind the oven. The slab is placed vertically, against the opening and sealed along the edges with wet clay. It is held in position by resting a timber pole or any other light weight support diagonally against it. It is only removed when the bread is ready.



Figure 21

Detached oven without a door. A slab of slate is used to seal the opening as soon as the dough has been placed inside the hot oven. The opening is sealed with wet clay (photograph: M. Naudé).



Figure 22

Large plate of slate used as table top supported by wooden legs of an outdoor table at the Pioneer Museum, Pretoria (photograph: M. Naudé).

On the farm Enkeldoorns in the Lydenburg district a mill was built with slate. None of the machine's working parts were left inside but the building is intact and used as a shed for fruit packing. It is a one-and-a-half volume building with a sheet iron roof. None of the walls are plastered and the slate is completely exposed. According to the current owner the buildings date back to the early 1920s.²⁸

For the construction of cattle and stock kraals, other stone types of a more 'chunky' character are preferred for building material. However, the same principle regarding the selective use of slate slabs applicable to dwellings and other buildings apply to their use in kraal construction. On the farm Goedehoop in the Middelburg district (Mpumalanga Province) slate slabs were used to finish the kraal wall and were laid on top of the structure (figure 23). Forming part of the same kraal is a space with a single wall with small 'holes' that may have been used to fire a rifle through. These openings are too small to operate as windows and may have been used either for ventilation or as a way to use the stone enclosure and walling as part of a fortification ('embrasure') (figure 24).



Figure 23

Stone kraal wall with slabs of slate laid on top, on the farm Goedehoop, Middelburg district, Mpumalanga Province (photograph: M. Naudé).



Figure 24

Stone wall with three small holes possibly used to shoot from. Slate slabs were used as lintels spanning the openings (photograph: M. Naudé).



Figure 25

One of the small openings in the kraal wall on the farm Goedehoop, district of Middelburg (photograph: M. Naudé).

Slate was a popular stone to use as headstones on graves. These material types were often used as headstones and are common occurrences in small family cemeteries on farms. On the farm Boekenhoutskloof in the Bronkhorstpruit district (Mpumalanga Province) headstones are the only remains of the graves of the well-known Erasmus family of the Pretoria-Delmas area. The names of the deceased were scratched into the slate by the family members and are still recognisable. On the farm Garsfontein (Pretoria) the headstones have been planted vertically into the ground. The negative aspect of planting slate in this position is that water can penetrate the exposed thin cleavages. The combination of water penetration and changes in day and night temperatures cause the stone to split along the hair-thin natural cleavages and to chip off at the corners.



Figure 26

Broken headstone with engraved pattern in the family cemetery on the farm Goedehoop (photograph: M. Naudé).



Figure 27

Stone constructed base for a water reservoir on the farm Enkeldoorns - Lydenburg district, Mpumalanga Province (photograph: M. Naudé).

The water reservoir on the farm Enkeldoorns in the Lydenburg district is supported by a pedestal constructed with shale (figure 27). The tanks are elevated to a height of about 3 metres above the ground by the shale constructed building. However, in the case of the buildings on the farm Enkeldoorns the shale is such a high quality that it becomes difficult to distinguish whether it is slate or shale. This water reservoir structure is only one of a number of structures and outbuildings on the farm, constructed with this material.

Chickens are still kept by landowners and farm labourers to supply the households with fresh eggs and meat. 'Formal' laying structures are often constructed inside the chicken pens where eggs can be collected. Laying nests are usually built near the residence. Slate is used as roofing for these insignificant 'pigeonhole' structures. The floors of the nests are raised above the ground (a single layer of unburnt bricks) and are about 350 mm wide and 300 mm high. Slabs of slate are placed on top of the structure without any mortar. Examples of these nests were found on farms in the Waterberg region (farm: Weidhoek) and at villages of South Ndebele families in the south-eastern districts of Mpumalanga Province.

On the farm Roodepoort (Middelburg district) slate was used as paving at the sheep dipping tank. It was not used as construction material for the dip itself but only along the exit from the dipping tank.

Although slate is seldom used to pave walkways on the extended farmyard it is often used to bridge water-furrows. On the farm Doornhoek in the Pilgrim's Rest district a slab of about 2.5 metres in length was used to span the water-furrow (figure 28). It was also used all along the furrow that supplied the town of Lydenburg with water. Thicker slabs of slate are used when water-furrows have to be crossed by vehicles. The slabs are placed across the furrow for the entire width of the road and covered with soil and gravel.



Figure 28

Large slab of slate bridging a water-furrow on the farm Doornhoek near Pilgrim's Rest (photograph: National Cultural History Museum, Pretoria).

Water-furrows are usually not paved but where the banks are too steep and are in danger of caving, the sides are clad by sheets of slate. The water furrow on the farm Hartebeestpoort in Silverton is clad in such a way. The sides slope more than 90° and are funnel shaped. Slate is also used as pedestrian or vehicle ‘bridge’ over water furrows as it is quite strong when used in the right thickness. Solid slabs about 10 cm thick and 2 m long are often suitable for bridging ditches and small streams. These slabs are very strong and even when subjected to a live load roughly equal to their own weight are rarely stressed beyond a tenth of their capacity.²⁹

When Church Street (in Pretoria) was pedestrianised (started in 1994), some of the storm-water drainage canals were exposed. A canal of about 1200 mm deep and 600 mm wide was uncovered. The floor consisted of large slabs of slate, paved without using mortar. It also served as a foundation layer for the sides of the furrow. The top of the canal was covered with cut slate slabs resting on a layer of lime-and-sand mortar. Remnants of the original water-furrow taking water from the Fountains (south of Pretoria) can still be seen today. It is also paved with slate.³⁰

Use in cut form (such as tiles)

The use of slate roof tiles is not a vernacular building tradition. Most of the houses in Pietermaritzburg (KwaZulu-Natal) associated with the Voortrekkers (1842), had baked clay tile roofs.³¹ Unfortunately, the tradition was not continued in the Transvaal. Slate roof tiles have never been used as a roofing material in the vernacular architecture of the Transvaal.



Figure 29
Slate tiles cut to standard sizes with an electric saw (photograph: M. Naudé).

Today, tiles are cut at slate quarries on the farms Doornpoort and Bankdrif in the Koster district. The different quarries offer a variety in quality and colours. The tiles are used mainly for building, paving, cladding and roof covering. The slate needed as building material is usually of irregular shape and thicker than the average tile.

These tiles are mined and cut for the commercial market. Definite sizes are marketed according to the needs of the larger market or the individual needs or tastes of the client. These tiles are seldom used only on the farm where they are mined and are transported to clients or larger markets in urban centres.

Conclusion

In vernacular architecture, slate is not a common material used for construction but selectively used to solve particular problems while also serving decorative purposes. Most of the published material on the use of stone in South Africa reflects on buildings in urban settings and buildings designed by architects. Literature on the use of slate and shale in the vernacular architecture of this region is almost non-existent and the topic is not exhausted yet. Little information on the use of slate in our vernacular architecture has been published, most probably because dimension stone like sandstone and granites were more popular for the construction of farmhouses. Outbuildings were most of the time built with materials of a lesser quality. Slate is one of these 'lesser' stone types and even in the construction of outbuildings, slate seems to be selectively used. The fact that slate is not commonly used may be due to a general perception of slate being the 'wrong' material for construction.

Notes

1. The same materials must have been elsewhere in South Africa but because of a lack of ample examples and supporting fieldwork research in the regions where European settlers originated from, such as the Karoo and Orange Free State, a discussion on similar occurrences in these regions are excluded. However, the author assumes that the history and use of slate and shale has its roots further south and that the preference for these materials was not incidental but has strong historical roots in the areas mentioned above.
2. These farms were visited in May 1988 as part of a larger study on the vernacular farm architecture and farmstead layouts associated with early pioneers who settled in the Transvaal as Voortrekkers. The results of this research were eventually compiled in a report that was submitted (1988) to the Human Sciences Research Council: *Opname van volksboukuns in enkele Transvaalse distrikte*.
3. In 2006 work on drafting a conservation management plan for the site and buildings on the site, was initiated by the Department of Public Works.
4. Or rather the lack of any published material on vernacular architecture of the Transvaal.
5. *Nasionale Bounavorsingsinstituut*, p. 19.
6. The use of slate slabs tables (Pelindaba, Preller farmstead) and Hartebeestpoort is not discussed in this paper. However, slate was often used to create a horizontal surface on which objects could be stacked such as wall shelves (Preller house), or as narrow strips protruding from walls in order to be used for displaying artifacts for decorative purposes.
7. Wyberg, pp. 32-33.
8. Coetzee, p. 352.
9. At the time of publication it was still done under this name.
10. *Nasionale Bounavorsingsinstituut*, p. 29.
11. According to G. Balkwill, geologist at the National Cultural History Museum, slate in the United Kingdom and elsewhere is a much harder rock type than the slate in South Africa. The hardness is due to 'real' slate being metamorphosized to a harder compound than the South African slate types.
12. Strahler and Strahler, p. 312.
13. Mountain, p. 24.
14. Strahler and Strahler, p. 213.

15. Mountain, p. 24.
16. While the shale and slate is still located in situ and part of the original bedrock, it is referred to as 'plates'. It refers to the horizontal character of the stone type and strong layered character of both materials. As soon as a section has been removed from the bedrock and has been lifted from its original position it is referred to as a 'slab'.
17. *Farming in South Africa*, p. 157.
18. *Nasionale Bounavorsingsinstituut*, p. 102.
19. Research in Taiwan (former island of Formosa) has indicated the extensive use of large slabs of slate (2 m by 1 m rectangular slabs) as solid walling material for dwellings and other shelters. Here, holes were drilled into the slabs all along the sides of each slab and separate slabs were tied together with wet 'rottang lote'. When dry, these strips became tight and hard, though retained some flexibility to allow for any movement of the walls or the structure as a whole – especially useful in areas where earthquakes are common (authors observations 1993).
20. Labuschagne, p. 195.
21. The use of slate to pave *stoeps* may not have been the original solution but occurs elsewhere on other farms in the vicinity such as the old farmhouse now located in the suburb of Les Marais in Pretoria – Erf 275, Res. Booysen Street 468.
22. Naudé 2003, p. 157.
23. These farms were visited in May 1994 while investigating the possibility of using slate tiles for the construction of roofs on new buildings.
24. London, p. 190.
25. *Nasionale Bounavorsings Instituut*, p. 62.
26. London, p. 191. The author also mentions that two layers of slate are best if used as damp course. The one-over-two and two-over-one method is the best method.
27. Radford, p. 18.
28. The author visited the farm in July 1988 as part of fieldwork research in the Lydenburg district.
29. Siegel, p. 77.
30. Van Schalkwyk et al, p.
31. Hartdegen, p. 197.

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