

# Modern Vernacular Architecture and Settlements Organization at the Fourth Nile Cataract between Dar el-Arab and Dar el-Waraaq

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# Modern Vernacular Architecture and Settlements Organization at the Fourth Nile Cataract between Dar el-Arab and Dar el-Waraaq

*Nadejda Reshetnikova*

## *Introduction*

This article is based on material gathered during the operations of the MDASP-SARS Anglo-German Mission during seasons 2003 through 2005.<sup>1</sup> Survey and excavation took place in the district between the villages of Dar el-Arab and Dar el-Waraaq (Figure 1, Plate 1).

nomads. Most of the settled people belong to the Manasir tribe although some of them, such as the villagers of Gerif, are Shaigiya. Nomads were not interviewed about their ethnic affiliation, but reports indicated that they belonged to the el-Hawawir or el-Hassaniya.

The natural environment, consisting of rocky Nile banks



*Plate 1. General view of the investigated area.*

The basic information was collected in the villages and other occupied areas of the islands Umm Deras, el-Tamra, Kandi, a group of smaller islets located between these larger islands and the main course of the Nile, and in the settlements on the southern (left) bank of the Nile between Dar el-Arab and Dar el-Waraaq, mostly in the villages el-Gways, Turkab, Amri and nomads' living areas in nearby *wadis*. In addition, we gathered information from archaeological sites distributed in the same area. Records made during the field seasons included photographs, GPS points, measurements, formal drawings, schematic plans and descriptions of sites as well as interviews with the local people.

## *Social groups and the natural environment in the research area*

The people of the Nile Valley in the Fourth Cataract region can be considered in two main groups, settled people and

with narrow bands of level alluvium on the mainland and the islands, and long *wadis* with semi-desert and savanna vegetation farther inland was perfectly adapted to the coexistence of these two cultural groups.

Building activity in the research area. Use of the land and its natural resources.

## **Classification and distribution of settlements**

The two main groups in the society of the Fourth Cataract, nomads and settled people, have different types of settlement in different locations (Figure 2).

Nomads live mostly in *wadis*, and their habitations usually consist of a single house or several buildings that belong to one family.

The houses of settled people form villages at the edges of the fertile areas along the Nile. They are distributed so densely along the river that it is sometimes difficult to determine where one settlement ends and the next begins.

## **Development of settlements. Influence of the landscape, natural and other conditions on the organisation of settlements and architecture**

Nomads in the research area have a mobile, or rather, semi-mobile way of life. Everything in and around nomads' dwellings is organised according to the requirements of a mobile life. In particular, because of the seasonal migration of their animals, nomads organise their dwellings according to the cycle of migration. In most

<sup>1</sup> Although an excellent ethnographic study of contemporary life in the region was undertaken by Rebecca Bradley, no special studies of modern architecture were planned in the area between the villages of Dar el-Arab and Dar el-Waraaq. The data here presented should be considered mostly as a review of notes about vernacular architecture of this region made by the author in the course of her other, core activities. More systematic and detailed work would have been desirable but time and money constraints made this impossible. A complimentary investigation in the region around et-Tereif in the central part of the SARS concession was undertaken by Frances Welsh (see Welsh 2013).

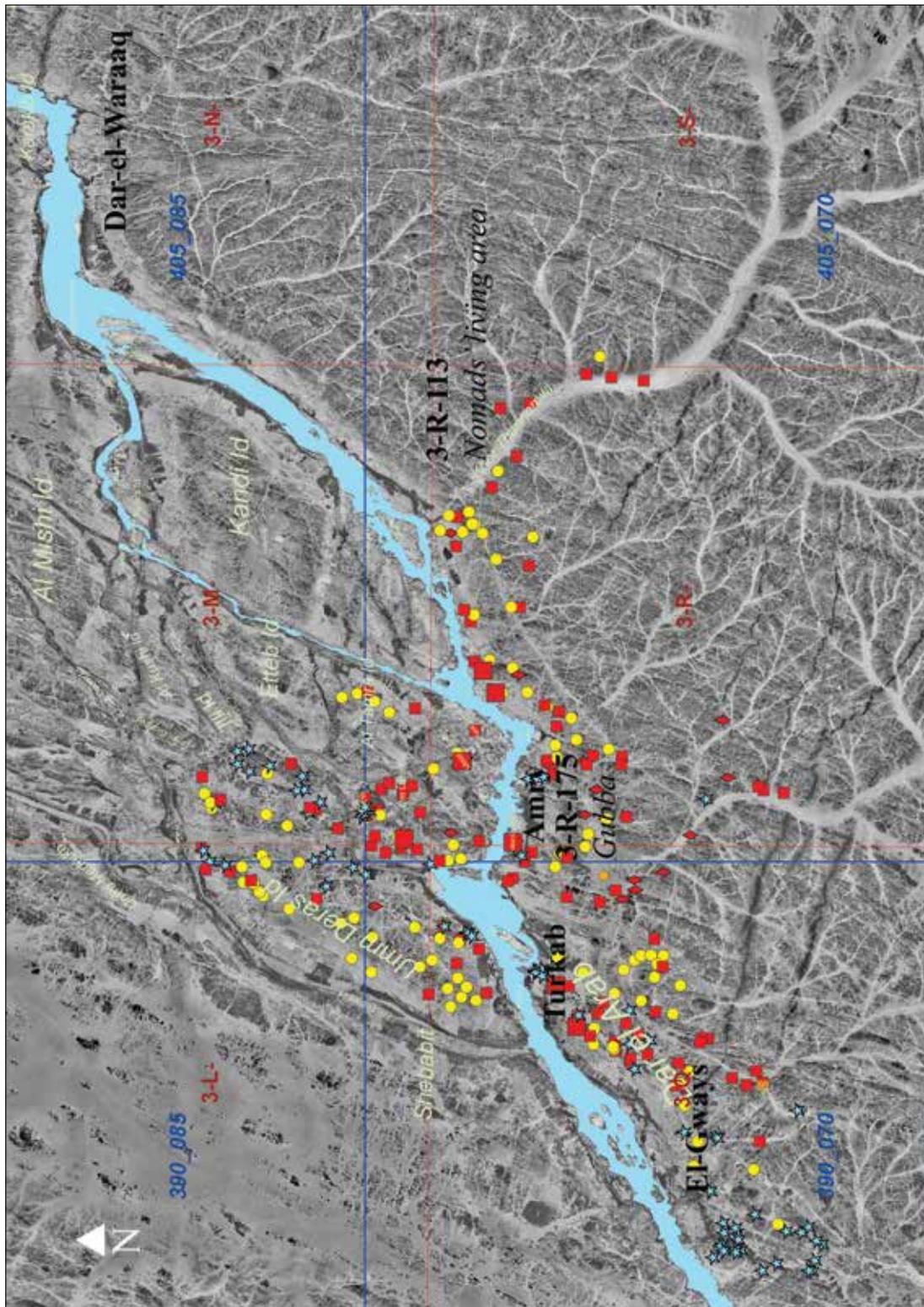


Figure 1. General map of the investigated area with indications of modern and archaeological sites.

cases, migration follows the *wadis*. The nomads take their animals closer to the Nile or farther into the desert, depending on the seasonal growth of vegetation. To support this life style, they build a relatively substantial house surrounded by animal pens and other auxiliary structures at the end of a *wadi* close to the Nile and create more temporary places to live farther out in the desert (Figure 3). Normally, all the buildings are located on the flat beds of *wadis* or on the adjacent terraces. The arrangement of the larger and smaller complexes is made to suite environmental conditions: the orientation of houses is

related to the path of the sun, entrances and fireplaces are arranged according to prevailing winds, and so on. It is very probable that these arrangements were derived from continuing empirical experience rather than old custom or tradition (Plate 2).

The siting and development of sedentary villages also have characteristics that closely depend on the landscape. As noted above, they are mostly located near places most suitable for farming and expanded naturally outward (Figure 4, Plate 3). The oldest part of the village was usually situated in a rocky area as close to the Nile as possible for

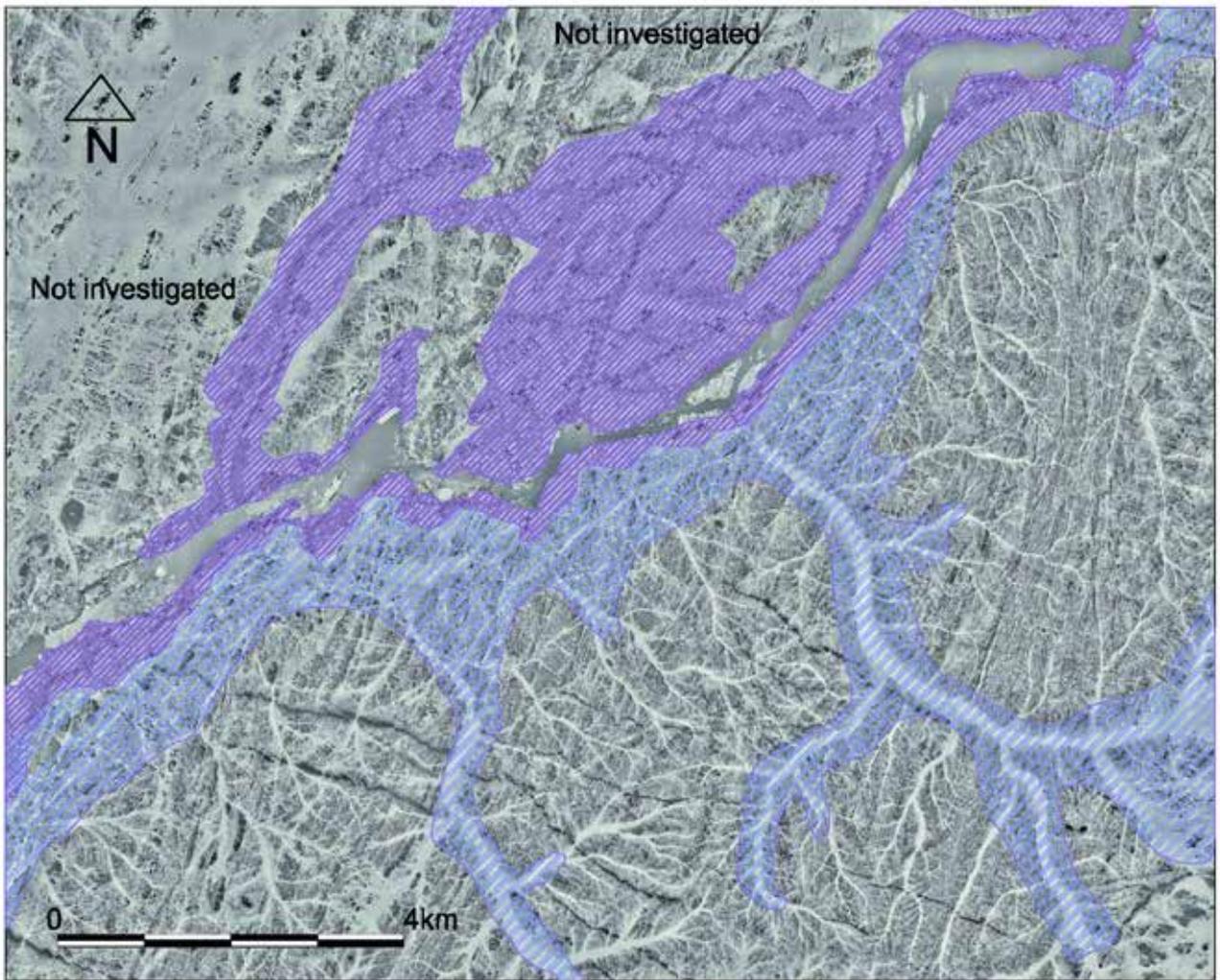


Figure 2. General map of the investigated area. Location of social groups.

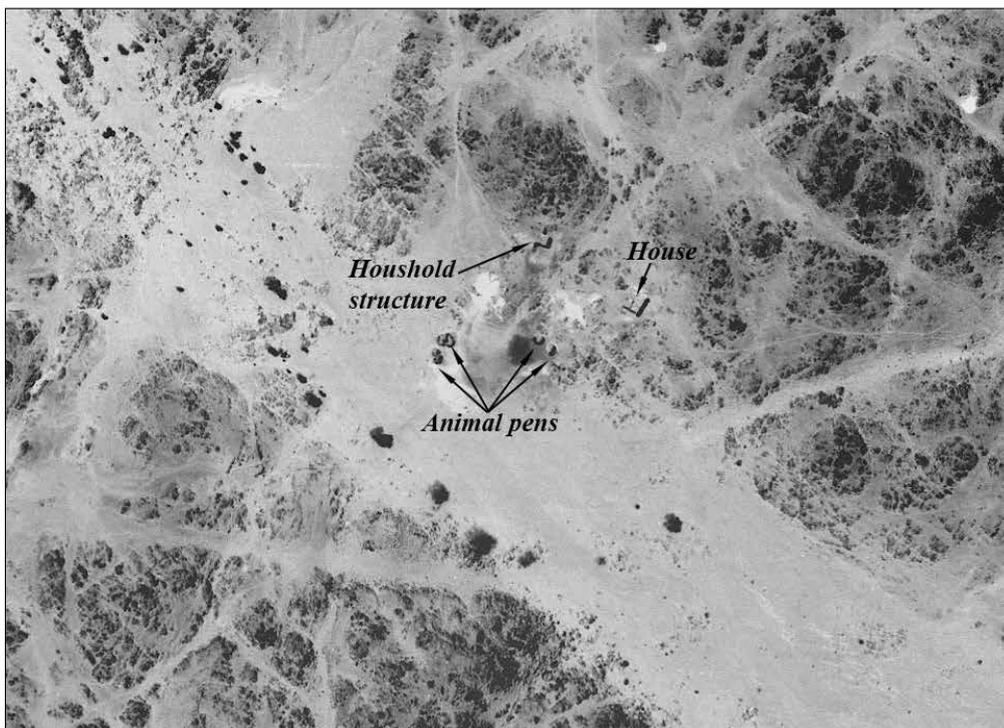


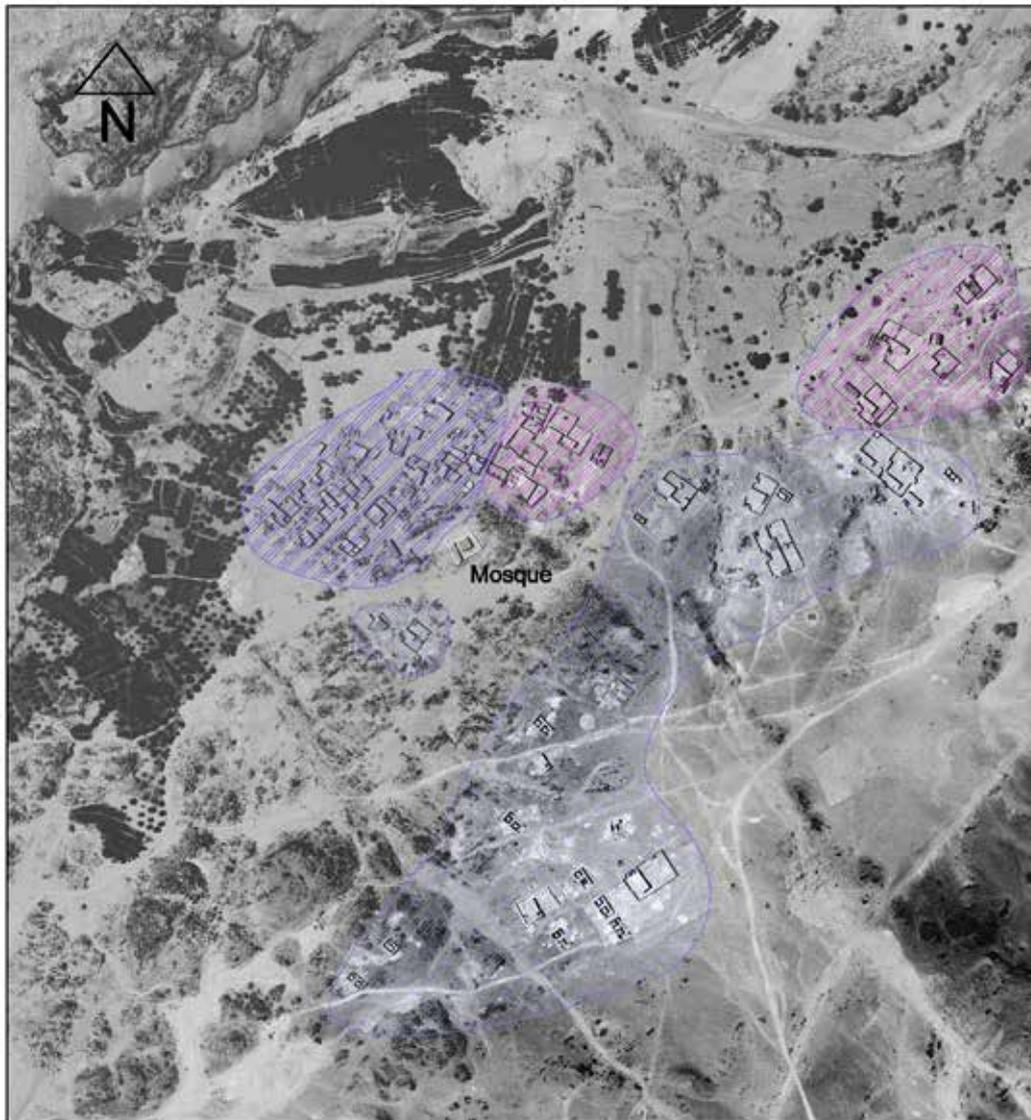
Figure 3. Map of the nomads' living area.



Plate 2. Nomads' living area, general view.



Plate 3. Settlements of settled people, general view.



Type a
  Type b
  Type c

Figure 4. Village of settled people. Types of dwellings at Dar el-Arab.

convenient access to water (Figure 5a, Plate 4). Houses of different families clustered between larger and smaller boulders very close to each other. Large rocks or boulders and cliffs were often incorporated into the structures and even affected the plan. There are no separate courts. The living space of the household was formed by the natural rocks, houses, small enclosures for cattle, sheep, and goats, and sometimes free-standing walls. As the settlements developed, newcomers or newly organized families



Plate 4. Dwellings type a.

occupied flat, barren areas closer to the desert, and that dramatically affected the layout of the houses (Figure 5c, Plate 5). Dwellings belonging to the latest phase were larger and separated from each other by some distance. They had spacious courts and clear, unified plans that reflected local traditions and rules of family life. A third



Plate 5. Dwellings type c.

type of dwelling represents a transitional type between the two just described (Figure 5b, Plate 6). Usually in this third type, a household of one family is located apart from, or at the edge of a village on a partly rocky and partly level area. Structures were grouped without any definite system around a central courtyard. The main motive for the disposition of the buildings was the comfort of the owners and the landscape accommodated this better than locations closer to the Nile. Other courts could be added to the primary one and used by the household or populated with houses and other structures when the family expanded, as for example, when children married.

### Local natural resources and their influence on the building process and architectural forms

The Fourth Cataract region had a wide variety of natural resources that could be used for building materials, including stones, Nile mud, sand, gravel, lime, wood, straw, and other organic materials. However, availability and quality of some materials varied from place to place in ways that limited their use. That in turn affected the architectural forms and solutions to structural problems. For example, quite hard local stone and the absence of good stone-working tools led to the use of unworked fieldstones from surrounding areas to produce rough walls. Local wood was often weak, crooked, and small limiting the size of ceilings or roofs and thereby determining certain room dimensions. The relative availability of water needed to produce *jalous* and mud bricks resulted in their widespread use in the architecture of settled people and restricted their use in nomads' buildings. However, the



Plate 6. Dwellings type b.

architecture of both the nomads and settled people was mostly built with the same materials. The major difference that can be seen in the architectural forms created by the two groups was mostly engendered by their different lifestyles, technical resources and attitudes toward the environment and nature.

### Architecture, building varieties and typology

In reviewing the types of buildings used by the nomads and settled people, we should note that the greatest difference is found in the houses. Structures used for domestic animals are mostly the same for both groups. A very special type of building constitutes religious architecture.

#### Nomads' houses

As noted above, the houses of the nomads are of two general types, light, temporary structures used during

the seasonal migration of the animals and more solid and substantial buildings erected in *wadis* close to the Nile.

Round, or almost round light, temporary structures were made with branches, stones, and other readily available material (Plate 7). When mats were used as a covering, the huts could have a plan with two straight walls and one rounded end opposite the opening, a shape well adapted to covering with straw mats (Plate 8). Roofed structures were used mostly for sleeping (Plate 9). Utility spaces were open, bounded with low freestanding walls or walls abutting on the main structure. The purpose of these walls was not to define or enclose space but to provide protection from wind and blowing sand (Plate 10).

More solid rectangular buildings were constructed using stones in the lower part of the walls and mud brick or *jalous* above (Plate 11). In shape, these houses resembled those of the settled people, but the structure and the types of rooms inside were identical to the rounded, temporary structures (Plate 12). As a rule, the house contained one living room and an auxiliary room, some kind of veranda, which was sometimes used as a kitchen. Very frequently, people prepared food outside the house, in a special place protected from the prevailing wind only by a small wall, as was the case with the round structures (Plate 13). The size of the living room was sufficient only for sleeping. Windows in these houses were as small as possible (Plate 14). Not far from the houses, the nomads erected small



Plate 9. a and b – Interior of nomads' dwellings.



Plate 7. Round-shaped nomad's hut.



Plate 8. Small, semi-oval nomad's hut.  
Wooden wireframe, covered with mats



Plate 10. a and b – Utility spaces in nomads' living area.



Plate 11. Rectangular house in a permanent nomad's camp.



Plate 12. Interior of more substantial nomads' buildings.



Plate 13. Cooking place near a substantial nomads' building.

animal pens framed by complex branches filled in with thorn bushes (Plate 15).

The nomads did not normally get experienced builders to erect houses. As a rule, they built everything themselves. In addition, the house was not a permanent property, but a place that could easily be abandoned. In this they are unlike the nomadic tribes of Central Asia, who developed well-organized and elaborate types of mobile architecture (yurt), but they prefer to build temporary houses at each camp. These places are usually, but not necessarily the same during successive migrations. Thus, the nomads of the Fourth Cataract do not invest artistic talent or heavy labour in construction, but instead need to



Plate 14. Façade of a substantial nomads' building.



Plate 15. a and b – Animal pens in nomads' living area.

build without great effort or specialized skills. Rather than considering these buildings as a product of some special technique it seems more appropriate to consider them the result of finding the easiest and most rapid method of building protection from the elements. The organization of living space was due not to tradition, but the nomad's sense of nature.

### Houses of settled people

As discussed above, the houses of settled people can be divided into three types, here simply called a, b, and c (Figure 5). The types originated at different times and they were closely connected with land use.

The houses of type a, located in the oldest part of the villages were most affected by the rocky landscape, a circumstance reflected in their smaller sizes and unsystematic arrangement of living quarters.

Houses of type c were the latest and least dependent on the landscape. Normally, broad, level spaces were chosen

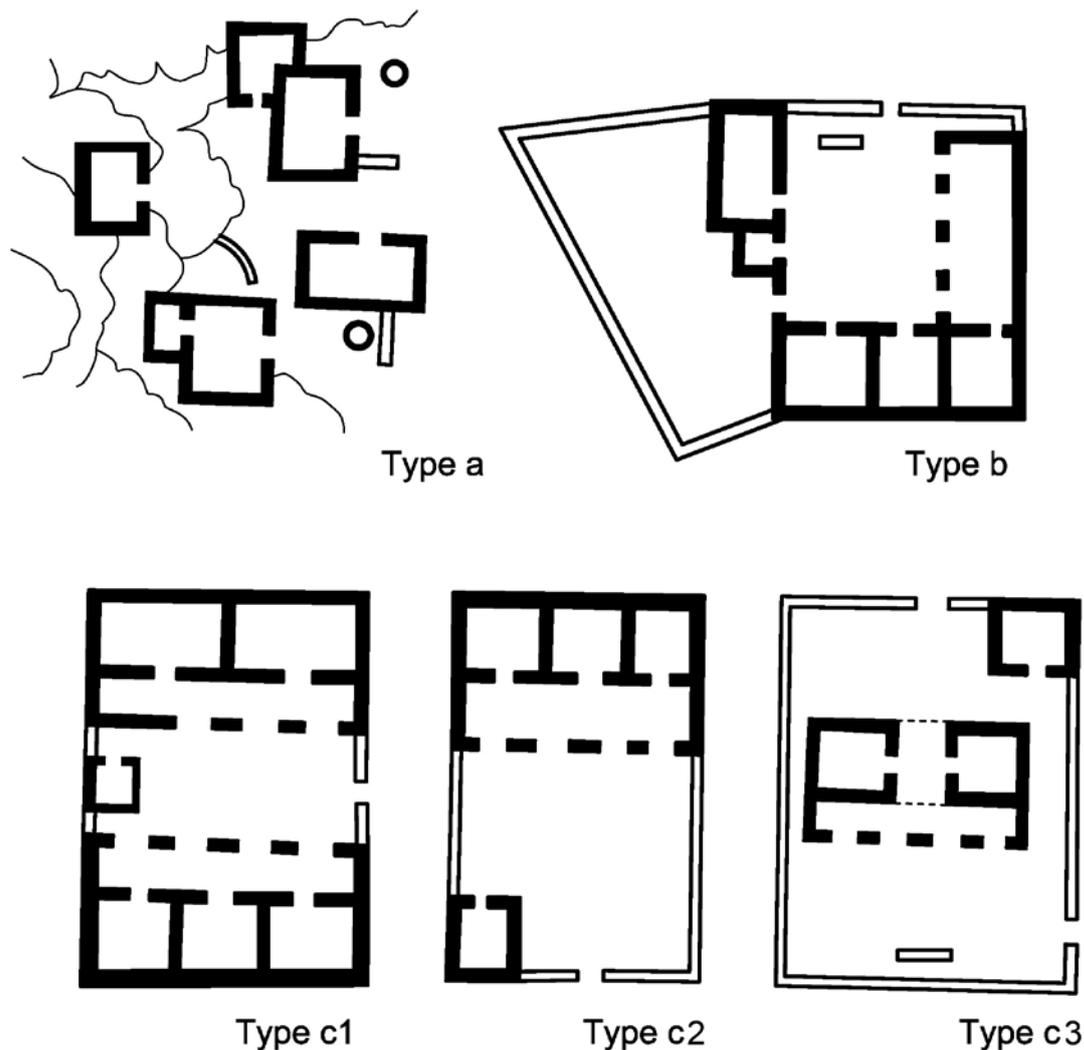


Figure 5. Organization of living space in villages of settled people (not to scale).  
 a) houses integrated into the relief  
 b) courtyard surrounded with living and household structures  
 c) regular houses with courtyards

for these buildings. There were three variants:

1. Two houses with galleries or verandas faced each other to form an inner courtyard (Plate 16).
2. A house with a courtyard built on the side with a gallery-façade (Plate 17).
3. The main type – a free-standing house with a passage through or beside it was built to divide a courtyard into two parts, front and back. Usually, some household structures were built in the back courtyard such as a kitchen, a shed, or a *hamam* (Plate 18).

Despite this variability, the designs of type c houses were the most consistent. The living units all consisted of house(s) and enclosed courtyards, where the house could be completely within the courtyard or form part of the enclosure. The buildings all had clear rectangular plans, and the houses included an open arcade along one façade (Plate 19). Some variations appeared due to inaccuracies in construction or peculiarities in the

landscape. The organization of space in these dwellings clearly reflected Muslim rules and traditions of family life. Space was enclosed, with separate public and private areas, the household hidden as much as possible from the public areas. Entries and other openings were organized so that it was difficult to see into the private space. With some variations, this type of dwelling is widespread in



Plate 16. Dwelling of type c1. Two houses with galleries or verandas facing each other.



Plate 17. Dwelling of type c2. A house with a courtyard built on the side with a gallery-façade.



Plate 18. Dwelling of type c3. A house with a front and back courtyard.



Plate 19. House with arched gallery.

northern and central Sudan. This distribution, as well as the fact that the architecture of this type differs from the older types of building in this region indicates that the idea behind type c structures and the organization of space within them was not derived from local tradition but imported from other regions.

Type b combined features of types a and c, in a sense making it a transitional variant. It does not indicate a development from a to c, however, but is an adaptation

of the new type c to local conditions and preferences.

### *Household structures and outdoor amenities*

A number of buildings designed to serve various household needs deserve attention in addition to the architectural forms described above.

Round structures, including ovens, granaries and poultry houses were probably the most traditional of these constructions (Plate 20). It is possible that their shapes were derived from the rounded forms of large jars, initially used for storing food and other goods. The shape is particularly suitable for such purposes because it allows equal access to the internal space and provides an even distribution of weight and temperature.



Plate 20. a and b – Round structures.

Storage of drinking water was one of the main requirements and the local people kept water in large, low-fired, porous jars with thick sides, wide mouths and spherical bottoms (*zirs*) (Plate 21). Jars of this kind effectively cooled water by means of capillary action through the porous fabric which could also function as a ceramic filter. To ensure and even intensify this feature, *zirs* were kept off the ground in the shade, where there was good ventilation. Elevation was accomplished with special metal frames or wooden slabs built into mud-brick walls (Plate 22). In some cases, large stones were used for the purpose. When possible, *zirs* were placed in the shade of large trees or in well-ventilated open galleries. Sometimes, light sheds were built to accommodate them. However, in



Plate 21. Zir – vessel for water.

most cases, *zirs* were housed in specially-built structures with mud-brick walls, roofing, and vent holes that could be either freestanding or built against the courtyard enclosure walls (Plates 23 and 24). Nomads kept water in a similar way, just slightly adapted to their conditions (Plate 25).

In addition to these a wide variety of light household structures such as tents and fences, were improvised from seemingly useless materials. Often, they were simply masterpieces (Plate 26).

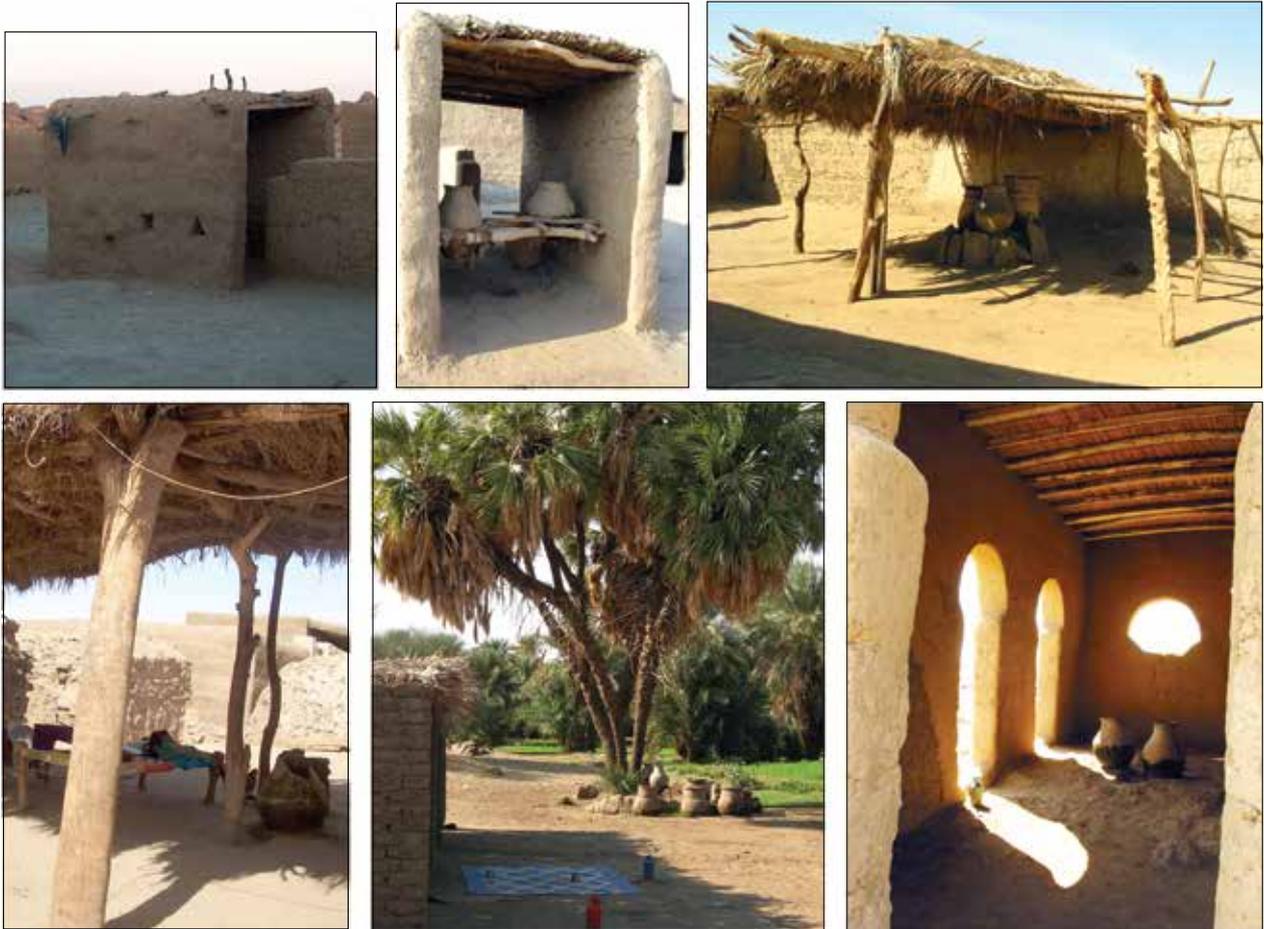
### *Religious buildings and other structures*

Islam is the primary and official religion in Sudan and most of the people are raised in this culture. However, at the same time, old local traditions and beliefs remain strong and have a remarkable influence on Islamic rituals and the way ordinary people understand Islamic philosophy. It is clearly reflected in cult architecture.

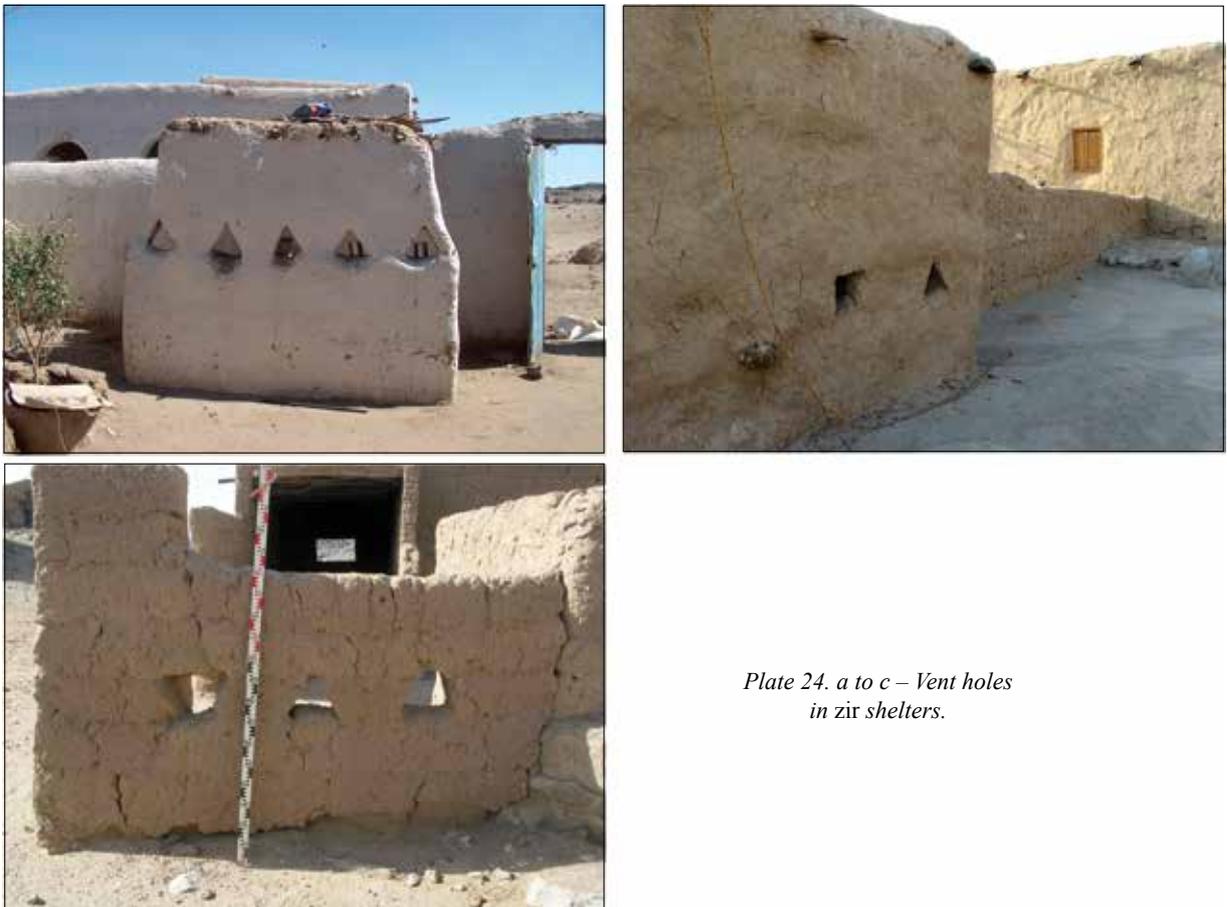
In this region, mosques were built only in the largest villages. They were rectangular structures with no significant differences from other buildings in the village, except that they were slightly taller (Plate 17, background). Like domestic structures, mosques were surrounded by a wall, providing a courtyard where believers could prepare themselves to pray. As reported by the local people, the interior of the mosque was very simple and had no *mihrab* (the niche showing the direction to Mecca or *qiblah*), as it was in the earliest mosques. Mosques in this area were oriented not like the other buildings. They occupied a special place in the village and their corners were shifted a little from the cardinal points, but it was not possible to determine if



Plate 22. a to d – Different kinds of zirs' installations.



*Plate 23. a to f – Arrangement of zirs' shelters.*



*Plate 24. a to c – Vent holes in zir shelters.*



Plate 25. a dn b – Storage of water in nomads' dwellings.

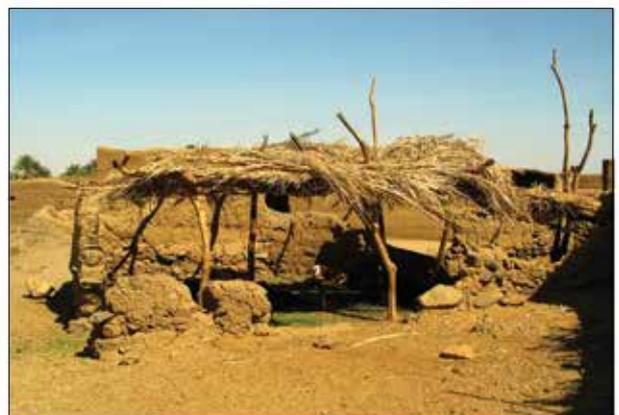


Plate 26. a to f – Light household structures.

they faced Mecca. The building itself just indicates a space that brings people together for praying. This reflects one of the main features of Islamic architecture - function is subordinated to an ideal form, which can serve different purposes and be a house, mosque, caravanserai, tomb, or anything else. No minarets were found in the area investigated, and no call to prayer was performed.

The veneration of holy men or outstanding people is a very interesting example of merging Islamic rules and local traditions. It is expressed in architecture by building *qubbas* and *baniyas* - special structures built around or over the graves or significant places associated with holy men. Buildings of this type were exceptional and built only in special cases, requiring a high level of skill in construction. For such buildings, the local inhabitants usually invited professional builders from elsewhere. An excellent example of such a structure was found near Amri village, about 3km downstream from Dar el-Arab (18° 50.970' N, 32° 7.966' E), a *baniya* built around the grave of a sheikh (holy man in Islamic-Arab culture) (Plate 27).

The *baniya* was a rectangular structure, 16.9 x 8.5m in size and 3.75m high, constructed of mud brick, symmetrical in plan both along the north west-south east and south west-north east axes as are the façades (relatively to the central axis). The north-east and south-west walls were not parallel and diverged from each other to the north west, probably a mistake of the builders. The building consisted of three rectangular rooms. The south-east room contains the shrine, which was situated in the middle of the room so that a narrow passage (about 1m wide) ran around the shrine. The north-west room was similar to that previously described, but had no structure inside. According to the information given us by the locals, this room was used for some offering rituals and praying. The central room was an entrance hall with two entrances from the north-east and south-west sides and gave access to the flanking rooms. There were five graves inside, but they seem to be later burials (Figure 6). Bricks at the tops of

the walls, in the pilasters at the entrances and in the arches were laid in an artistic arrangement, making patterns of alternating projecting and recessed bricks (diaper work) (Plate 28). Unfortunately, the walls were much damaged by weathering and wind erosion.

The brickwork technique of the *baniya* consisted of alternating rows of headers and stretchers, with two headers and one stretcher or two stretchers forming the thickness of the wall (about 550mm). The thickness of the north-east and south-west walls of the central part is about 670mm (two stretchers and one header). It was caused by the skintled brickwork<sup>2</sup> in this part of the building. The shrine in the south-east room was also built of mud brick, one row of stretchers. Its height was about 1.5m, with an openwork brick decoration in the upper part. Probably originally the shrine had a wooden covering. The size of mud bricks was 260 x 130 x 90mm, later restoration was done with bricks 260 x 120 x 75mm, both are different from the local brick sizes used today. The building was decorated with a diaper work both inside and out, especially the central part. The doorways of the central part also were flanked outside with two pilasters from both sides. The pilasters originally had a decorative expansion in the lower part. All arches were decorated with an ornamental bond (Plate 29). Certainly, the brick decoration of the façades shows the unsurpassed craftsmanship of master builders. Some other particular details also point to their great experience. For example, the weak points of arches, the abutments or springers, and keystones were strengthened with one or several small flat stones placed upright (Plate 30). Small stone slabs were also used in the construction of thresholds and as a protecting (and probably also decorative) upper layer of the shrine walls. Instead of using voussoir bricks, each fourth brick in an arch was placed on edge to form the angle requisite for the next ones (Plate 31). In the brickwork a clay mortar was used with a sparse admixture of small stones 3-30mm in diameter. The whole structure was plastered with mud and painted

in a pale yellow or white colour. These features, show, that the building technique of the *baniya* does not belong to the local traditions. The size of bricks is different from local ones; arches have no horseshoe form; the main decoration of the *baniya*, a diaper work none of which are found elsewhere in this area. Also in local buildings stones are crudely used as voussoirs and the thickness of bricks used to form arches was corrected by mortar (not bricks placed edgewise). No similar structures were found in the investigated region.

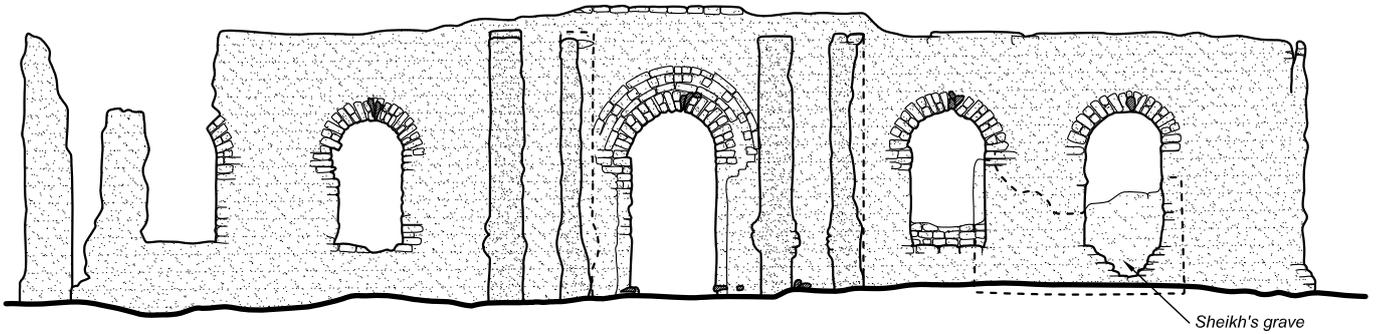
The local people told us that the *baniya* was built about 100 years ago in honour of Sheikh Warragga Abdulrahman Wethage,



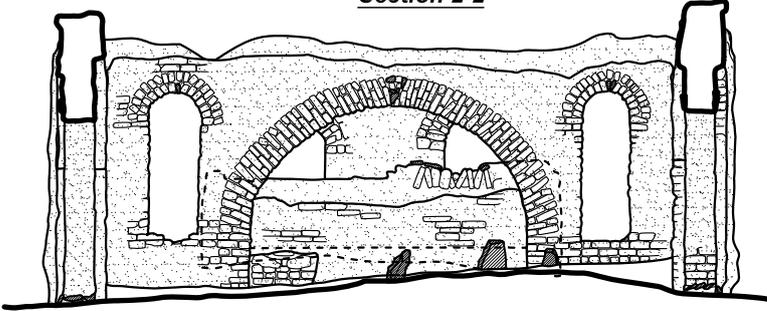
Plate 27. Baniya. View from the west.

<sup>2</sup> Brickwork laid to form a wall with an irregular face.

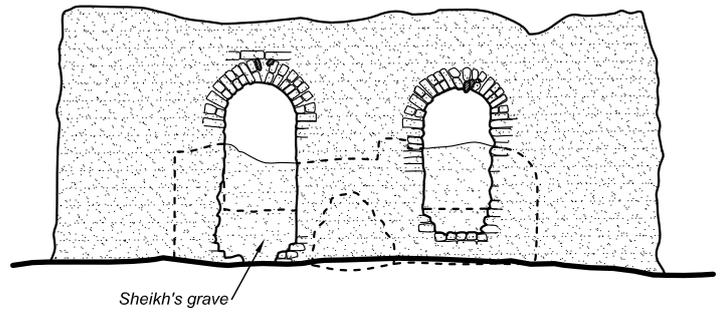
**Section 1-1 (N-W Façade)**



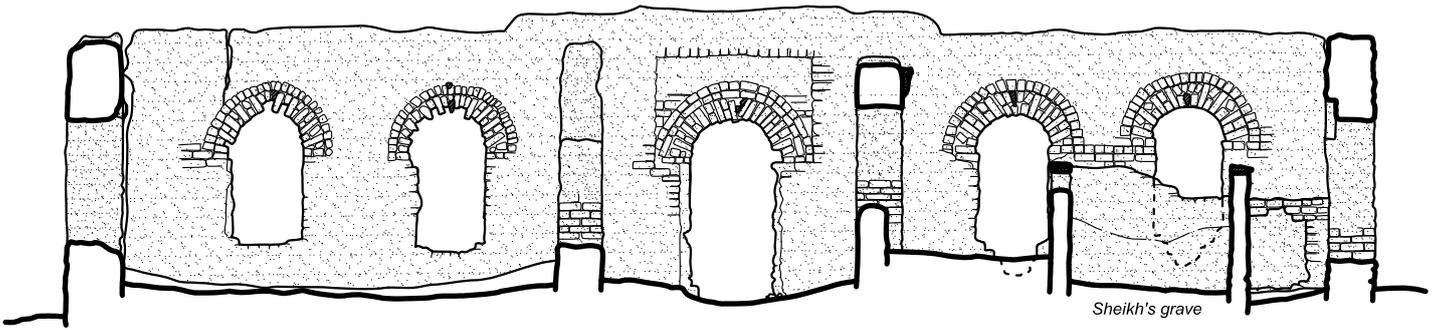
**Section 2-2**



**Section 3-3 (N-E Façade)**



**Section 4-4**



**Plan**

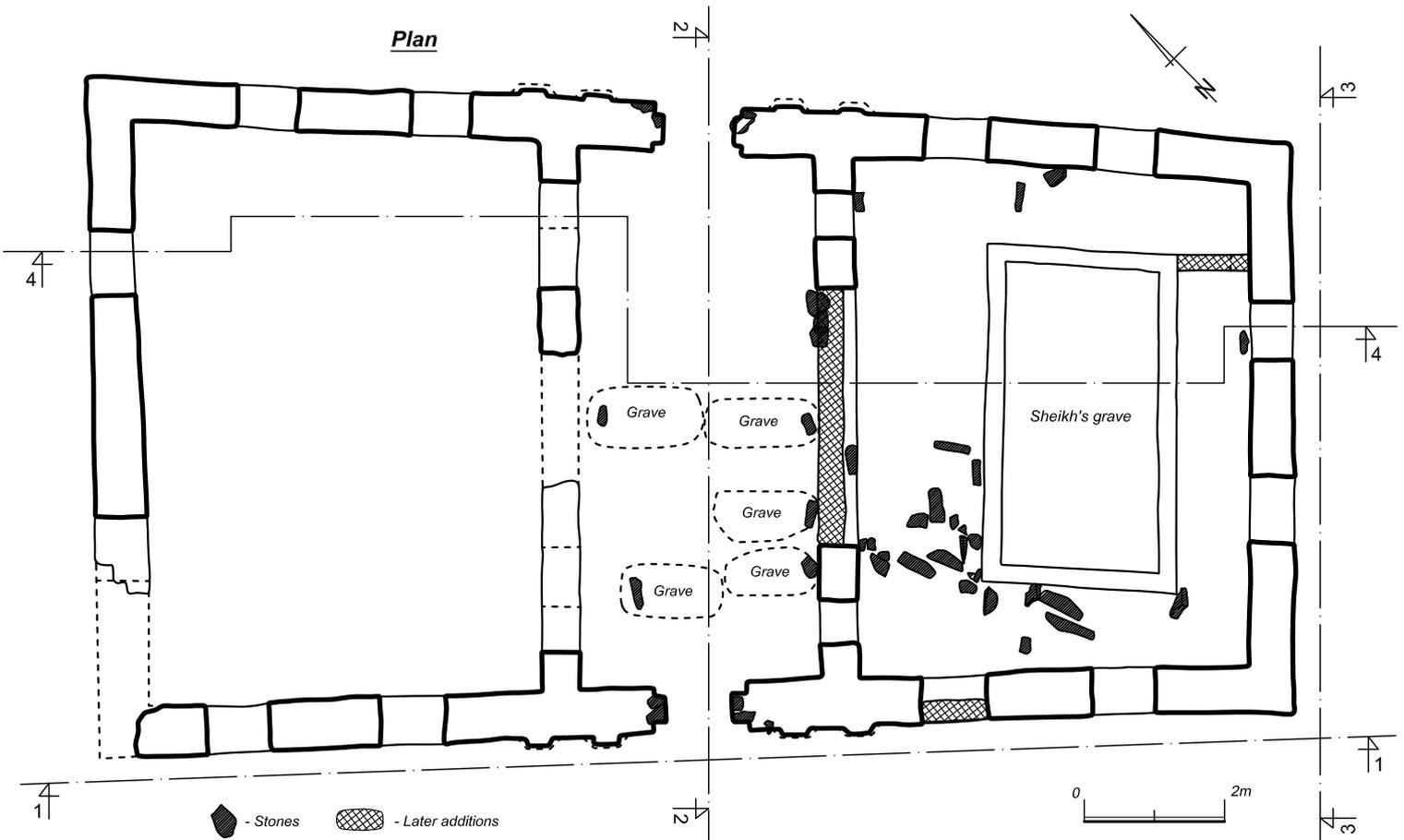
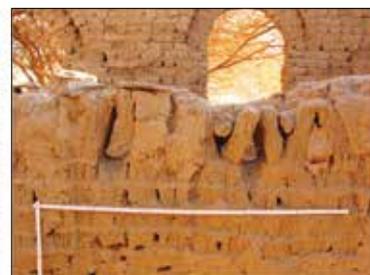
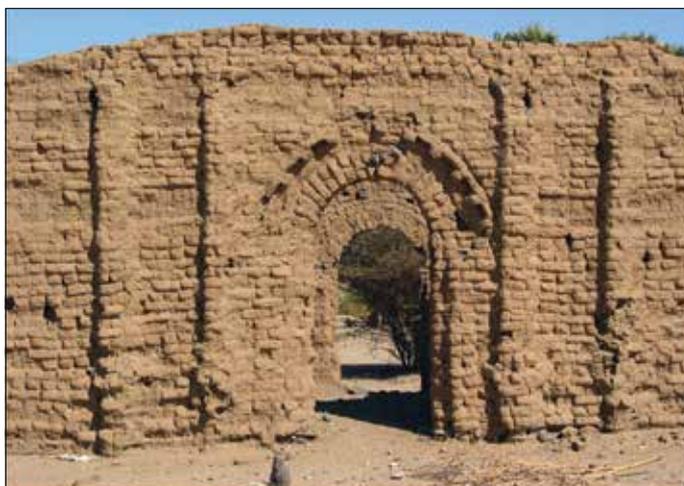


Figure 6. Baniya at Site 3-R-075 (scale 1:100).



*Plate 28. a to c – Baniya. General views and façades.*



*Plate 29. a to e – Baniya. Examples of the artistic brickwork.*



Plate 30. a to c – Stones used to strengthen weak points of brickwork in the *baniya*.

by architect Dendraui el-Monasir. According to the legend, the sheikh visited this place and its beauty, with trees, the sound of running water and birds, reminded him of the sacred image of Paradise so much that he asked to be buried here (Plate 32). Despite the fact that it is forbidden to worship any person or thing except Allah, the tradition of making places to worship at the graves of saints is still alive. So, the *baniya* was erected at the request of the local people to house the relics of the Sheikh. The people could not

Plate 32. View of the *baniya* and its surroundings.

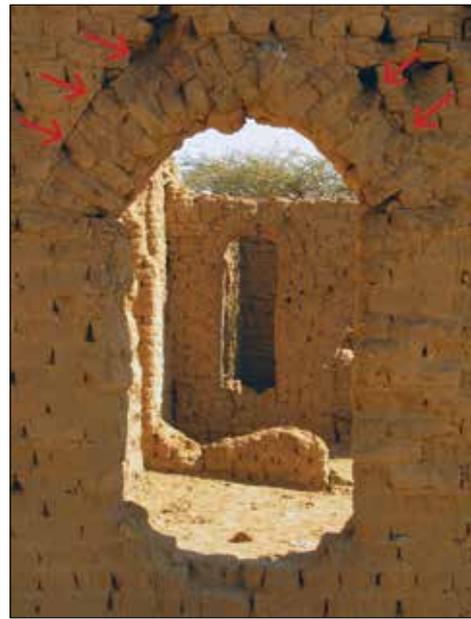


Plate 31. Alternation of arch bricks in the *baniya*'s brickwork.

tell us anything about the builders except for the facts that they belonged to the Manasir tribe, originating from the same place as the Sheikh's mother and that they were especially invited to erect the *baniya*.

The *baniya* has many features that are not characteristic of local architecture, but are peculiar to Islamic architecture in general. The legend about the last wish of the Sheikh to be buried in a beautiful place has a close connection with the idea of a funerary garden, one of the most profound and satisfying symbols of Islam. In essence, it is the Garden of Paradise, itself the symbol of the Primordial Garden which man lost through sin. There is a cemetery around the *baniya* (Plate 33), corresponding to the Islamic tradition of burying people close to sacred places, which all exude *baraka*, the invisible psychic force in Islam that emanates from any sacred object. A tomb of a saint is considered to be one of the most powerful sources of *baraka*. This *baniya* and the *tarkibeh* of the Sheikh (rectangular structure above a burial in Islamic culture) (Plate 34) are oriented diagonally, with their



Plate 33. Cemetery on north-east and south-west sides of the baniya.

corners facing the cardinal points of the compass. It replicates the orientation of the Ka'aba, a hollow cube of stone in the center of Mecca that symbolizes the center of the world. Like the Ka'aba, the Sheikh's *tarkibeh* has a path around it, which is related to the Islamic tradition of sevenfold circumambulation at a sacred place in order to achieve the maximum possible exposure to *baraka*. The empty room built opposite the room with the Sheikh's grave most probably is a *musalla* or *namazgah* (Arabic: "place of prayer")—a special oratory attached to the cemetery. In Islamic cemeteries, it is an open structure with an uncarpeted floor used for funerary praying. There is no evidence that the *baniya* had a roof, except for the presence of arched windows in the façades. However, the large distance between the walls serves to indicate the open character of the building, where the windows played only a decorative role. The open sky was a fitting vault for a tomb in Islamic tradition, leaving it exposed to



Plate 34. *Tarkibeh* – rectangular structure above the Sheikh's burial.

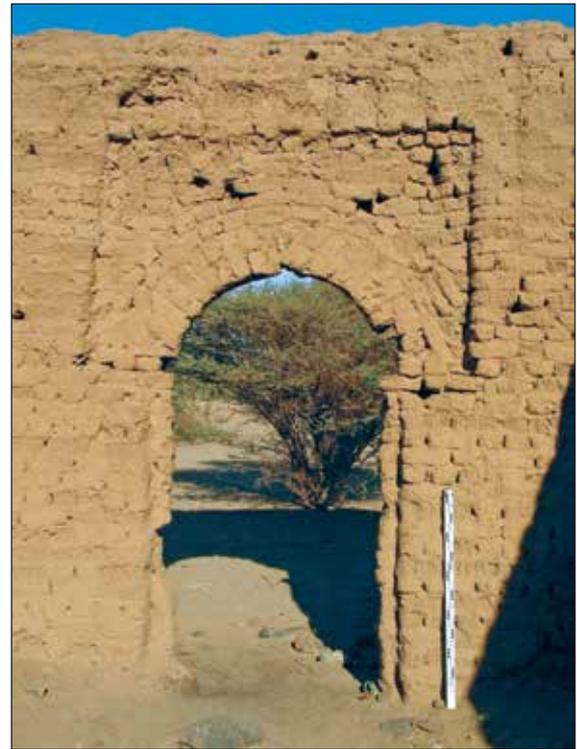


Plate 35. Arch in a rectangle – the most significant element of Islamic design.

the blessing rain and dew. There are other characteristic features of Islamic architecture in this *baniya*, such as its strict symmetry relative to both the longitudinal and transverse axes of its plan, the higher walls above the entrances, and, the most significant element of Islamic design, arches in a rectangle (Plate 35). All of the elements described above show this *baniya* to be an outstanding example of symbolic Islamic architecture. The existence of such a building is a very interesting example of the development and dissemination of Islamic sacred architecture in Sudan.

## Engineering

### Building materials

Although the people of the Fourth Cataract used almost every available natural resource, for construction, they mainly used Nile mud and earth to produce sun-dried bricks and *jalous*, field stone for the foundations and lower parts of walls, and wood, for support and to span spaces.

As noted above, stones were used for construction without any treatment, the need for special shapes such as lintels and doorjambs being filled by selecting appropriate stones (Plate 36).

Because wood was rather scarce in the Fourth Cataract, the people there tried to use it as efficiently as possible. The larger trunks of palm trees and acacia, were very valuable and used to make beams, while poles were made mainly of acacia. Palm trunks were cut into three or four pieces lengthwise. Acacia was often used with its branches, which in some cases actually reinforced the construction. The smaller branches of various trees and bushes were also used wherever possible (Plates 37 and 38).



Plate 36. a to f – Use of stones in the building process.

Mud bricks and *jalous* were generally produced by simply mixing earth and water in appropriate proportions. Since the earth or mud was collected in the immediate vicinity of the construction site, there were slight differences in the texture of bricks in different places. In some cases, when it was necessary to increase the brick's flexibility, tensile, or compressive strength, some straw or animal dung might be added (Plate 39).

For mortar and plaster, builders used Nile clay, but the plaster often had admixtures of lime or organic materials, especially ground straw or animal dung (Plate 40).

In modern times, concrete and metal beams have recently been introduced as building materials in this region (Plate 41).

### Building technology and construction

As a rule, houses were built without any preliminary drawings. Builders draw the layout directly on the ground. The people of the Fourth Cataract preferred to make the most of natural contours in the landscape, so the surface was not commonly levelled. Buildings usually had no foundation.

Local builders were equally adept in the use of mud brick and *jalous*. They took clay (earth) for building from

close proximity to the building site to produce mud bricks there. *Jalous* was more often used for enclosures or in cases where it was not critical that walls be too strong or carry much weight (Plate 42).

In general, stonework was used in the parts of buildings that needed to be stronger, such as wall-bases, thresholds, platforms, and sometimes lintels and even as keystones in arches. For the same reason animal pens were often made of stone either set in a clay matrix or as dry masonry. Nomads built walls by placing stones between horizontal wooden beams with the upper part made of *jalous*, to distribute the weight of the beams and protect the soft clay. It also helped to protect wood from termites and other wood-destroying insects (Plates 43, 36 and 38).

Beams, lintels and posts were made mostly of wood. Posts could be set into the ground or rested on a packed earth surface. Jambs, window frames and light fences were also mostly made of wood (Plates 37 and 38).

To protect mud-brick or *jalous* walls from weathering and erosion, the local people usually coated them with clay mixed with some organic material and whitewashed (Plate 40).

All substantial buildings had flat roofs made of wooden



Plate 37. a to i – Use of wood in buildings of settled people.

or metal beams covered with palm fronds and a top layer of clay some 20-30mm thick (Plates 37 and 41). Roofs made in this way are very good insulators, protecting from the burning rays of the sun in daytime, but retaining warmth in the house that lasts during the night. In light structures, the roof could be made of mats, palm fronds or bundles of straw (Plate 38).

It is interesting that the local people never used vaults in domestic architecture despite the scarcity of wood suitable for flat-roof construction. It may be that the construction techniques used in the Fourth Cataract were brought from places where wood is more plentiful. It may also be that vaulted construction was not used in this area because the erection of vaults requires special skills and cannot be done without assistance, an unacceptable condition in local circumstances.

Although houses and other buildings in this area were made in the simplest possible way, one can note some very interesting building techniques, as described below.

As a rule, one or two master builders led the entire construction process, with the help of several assistants (the assistants were owners of the new built house or members

of their families). Even so, construction was not the main occupation, even for the experts, for generally they were all engaged in farming. When some specialized work was required experts were normally invited from elsewhere.

In discussing the nomads' building technique, we should note that all of the types of nomads' dwellings described above had their origins in shelters of branches, which have a light wooden frame fixed on the ground by stones and covered by mats or straw bundles. Their methods of building both light, rounded structures and more solid square buildings are also very similar. The lower part of the walls, about 1m to 1.5m in height was made of dry-stone construction or stones in a mud matrix. The upper parts of substantial buildings were made of *jalous* or mud brick while light structures continued to be built of mats, palm-fronds, or straw on a wooden framework. Thus the stones fixing a wooden frame to the ground became the stonework acting as a base for brick or clay walls in solid structures. In addition, and for their permanent buildings, nomads used the building techniques of the settled people.

It is interesting that the oldest mode of organizing living space among the settled people in this area, type a—in



Plate 38. a to d – Wood in nomads' structures.



Plate 39. Lintel made of mud brick.

which houses are most closely integrated with the relief and make maximum use of it—could be described in technique as a more sophisticated version of constructing stationary nomads' houses. Like the nomads' houses, type a houses were built with the most convenient and easily-used materials, making maximum use of the landscape, but the houses were more regular and substantial, and the builders more frequently used mud brick. The confluence of architecture and landscape in this type of building occasioned very interesting variations in architectural solutions and design philosophy. A notable example of such architecture was an abandoned village found during the survey of Umm Duras Island (Plate 44). Besides a very practical and ingenious use of relief in this settlement, we

found numerous unusual solutions to structural problems and curious architectural details. Some of them, such as pillars built of stones and clay and specially-designed windows were also characteristic of nomad architecture.

### Climate and ventilation

The climate in the region of the Fourth Cataract is quite harsh. For the most part it is quite hot, but in the wintertime, nighttime temperatures can approach zero. Thus controlling exposure to temperature extremes is very important. Using mud brick for walls and palm fronds covered by thick layers of mud for roofs was a solution to the problem because such materials protected internal space from overheating during the day and accumulated warmth that was released during cool nights. Also the organization of types b and c was designed to solve this problem by incorporating two types of space, enclosed rooms with small windows and an open, well-ventilated terrace allowing for a change of location according to the season (Plate 45). Houses of type a had small windows for ventilation, sometimes high in the wall, sometimes about a metre from the ground, similar to the holes provided to ventilate structures for *zirs* (Plate 46). Small windows in nomads' houses also functioned more like air-vents. Sometimes, the nomads simply built the roof about half a metre above the wall top, to provide light and ventilation. In lightweight tents ventilation was provided by a gap between the ground and the tent's covering (Plate 47).

### Solutions to particular problems

At this point, we can review some interesting structural



Plate 40. a to d – Mortar and plaster in the local architecture.

Plate 41. Metal beams used for roof construction in a shop at Dar el-Arab.



Plate 42. a to d – Use of jalous and mud brick.



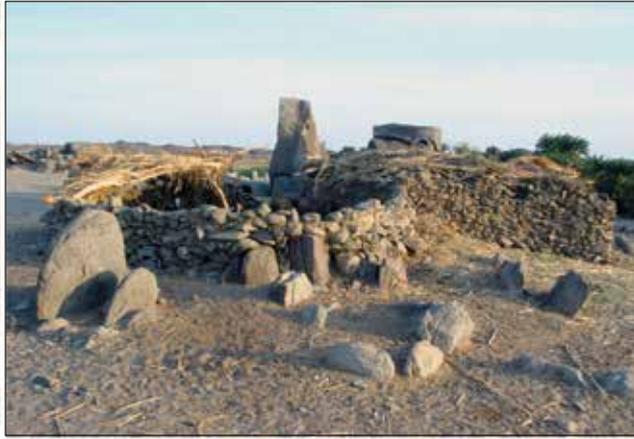
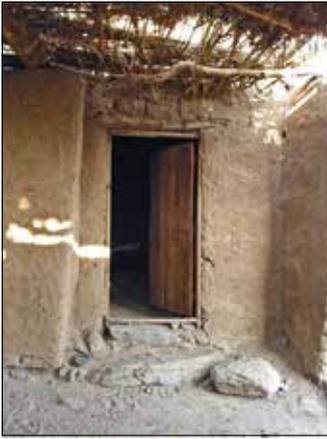


Plate 43. a to e – Stones used to strength and protect some parts of buildings.



Plate 44. a to k – Abandoned village on Umm Duras Island.





Plate 45. Two types of space in the houses of types b, c - arched terrace and an enclosed room.



Plate 46. Ventilation windows.



details and solutions to particular structural problems observed in the domestic architecture of this region.

In a sense, the process of building with *jalous* and mud brick in this area reminded one more of sculpture than architecture or building. Brickwork or layers of *jalous* followed the relief. Builders leveled only when they need to



Plate 48. *Jalous*. Connection to the relief.

increase the height of a wall or to make a roof (Plate 48).

Arched openings or gateways are made only in galleries or in cases when there is no need to make a door that closed. If a gate or door had to be closed, it was built as a rectangle with a wooden lintel and doorframe (Plate 45).

In some cases, the bottom of a gate or door was set at the level of the first or second course of bricks, making a threshold, which was sometimes strengthened with wood or stone. Such thresholds helped to protect the inner space

Plate 47. a to d – Ventilation in nomads' houses.



from scorpions, other creeping insects, snakes, and blown sand (Plates 37 and 49).

Local builders used a simple, but original way to set up formwork to make arches. They rested the formwork directly on the wall, and this arrangement produced an arch with a characteristic drop-shaped silhouette. This construction technique created the appearance of the horseshoe arches common in Islamic architecture (Plate 50).



Plate 49. Thresholds of arched doorways in modern houses.



Plate 50. Arch. Building process.

Sometimes, the builders inserted small, wedge-shaped stones between the voussoirs in mud-brick arches; the same technique as used by the builders of the *baniya* described below. Possibly local builders adopted this technique from the *baniya*, because it was not regularly used in the architecture of this region and when used, it was executed with less skill (Plate 51).

Local builders used different techniques and materials, especially stone or wood, to make lintels, although in both cases they use the same method of construction. An unusual type of lintel found in one abandoned village was

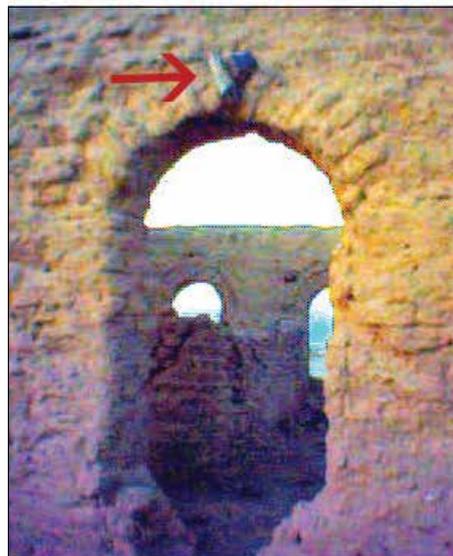
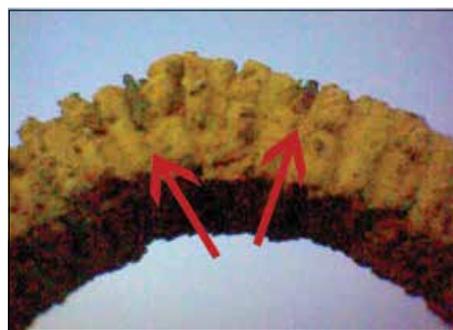


Plate 51. Strengthening of quoin with stones in mud-brick arches. Arch of erecting house; window of the *baniya*.

made of clay, with a large quantity of straw and probably some special binder. Small windows or air vents could be made using bricks placed on edge, and this became a feature of local design (Plates 24, 36, 37 and 39).

A number of methods could be used to strengthen mud-brick walls, but one technique is of special interest. To prevent walls from being washed away near the ground, builders created a small *mastaba* along the outer wall (Plate 52). The corners of mud-brick structures were often thickened so that they looked like pilasters (Plates 43 and 53). A particularly original method of protecting a wall can be seen in Plate 54: many small pointed stones were fixed in the wall

surface up to a height of about 1m. Local people reported that they did this to protect the walls from animals such as donkeys and sheep.

Wooden structures were sometimes protected by thin metal sheets which were made from cut-up cans, and these cans were also used to make drain spouts. Flat stones were placed on them to keep them from becoming clogged (Plate 55).

Clay was not only the favourite building material in the Fourth Cataract it was often used to build such things as kitchen furniture (Plate 56).



Plate 52. Protective mastaba at the wall base.



Plate 54. Protection of a wall against animals.

### Decorative elements in the architecture and their origin

In general, decorative elements were quite rare in the architecture of this area. Details all had their practical meaning and function, for example, the horseshoe arches or corner pilasters described above (Plate 50). Sometimes gates could be emphasized with a lintel projecting above the wall and pillars, which were needed to affix a door or doorframe (Plate 58). A element of decoration could be seen in the alternation of triangular and square air-vents (Plate 24). In some ways it is the simplicity and clarity of forms and their completely functional nature created the primary charm of local architecture.



Plate 53. Strengthening of corners.

### Design

#### Colour in the architecture

Unfortunately, not much can be said about colours in house decoration. As a rule, decoration consisted only of whitewashing of walls, painting the lower part of an interior wall, and outlining doors or windows in blue and yellow. Doors and shutters were brightly painted everywhere. The decoration of walls with painted ornaments or other images, so widespread in other parts of Sudan, practically did not appear in this region (Plate 57).

#### Modern architecture and archaeology

Finally, we can note some connection between modern rural architecture and the archaeological remains found in the area we investigated.

During the archaeological surveys many early Christian and Post-Medieval settlements<sup>3</sup> were found. The devel-

<sup>3</sup> For examples of these see [http://www.sudarchrs.org.uk/wp-content/uploads/2013/09/SARS\\_draft\\_Gazetteer\\_4-L.pdf](http://www.sudarchrs.org.uk/wp-content/uploads/2013/09/SARS_draft_Gazetteer_4-L.pdf) sites 4-L-119 pg. XLVII-L, 4-L-140 pg. LV-LVI, 4-L-156 pg. LXI and [http://www.sudarchrs.org.uk/wp-content/uploads/2013/09/SARS\\_draft\\_Gazetteer\\_4-M.pdf](http://www.sudarchrs.org.uk/wp-content/uploads/2013/09/SARS_draft_Gazetteer_4-M.pdf) site 4-M-79 pg. XXXVI-XXXVIII.

Plate 55. a to b  
– Protection of  
wooden beams  
and drain  
spouts made  
from cut-up  
cans.



Plate 56. a to  
e – Clay  
furniture.



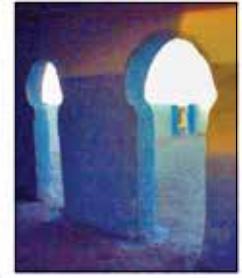


Plate 57. a to i – Colour in the architecture.

opment of these sites, their planning, and peculiarities of dwellings structures reflect the historical situation and social customs within which they were constructed and used while their connection with the landscape is directly

related to the geomorphology of the localities where they were built. These issues require special studies which are beyond the scope of this article. Nevertheless, it is possible to note some parallels, in their constructions and spatial



Plate 58. a to d – Design of gateways.

organization with the modern houses. The remains of houses in all the investigated settlements were mainly of stone, with oval, circular or rectangular plans. The coursing of the stonework, remains of washed-out clay, and decayed wood made it possible to suggest that the shapes and construction methods used were much the same as those employed more recently. The most characteristic feature of these settlements - use of boulders and rock outcrops in building construction, is also widespread in this area today (Plate 59).

In connection with the above-mentioned data, it is interesting to highlight some particular features which can help with our understanding of archaeological sites and artefacts.

Remains of nomadic camps found in the research area were not very different from modern examples. They clearly had a wooden frame set into the ground or set on stones and walls made of straw bundles, mats, and clay (Plate 60).

In considering details, I should mention the construction of doorways in modern buildings at some distance above ground level. During excavations, we usually have to deal with remains of mud-brick structures only one or two-brick courses high. In cases where doors were installed above ground level, it was impossible to find evidence for doorways, and reconstruction was a matter of logic and comparison with modern analogs as described above (Plates 49 and 57).

Also, as described above, the small mastaba built at the base of a wall (Plate 52) could be considered as part of the wall thickness if the wall was not preserved above the thickening. So, to make a more accurate reconstruction of *jalous* or mud-brick architecture, it is necessary to consider not only the thickness of remaining walls, but the size and function of the structure as a whole.

The list of similarities and analogies could be continued, but these examples serve to highlight that the study of modern traditional architecture is important not only for

the purpose of recording and analyzing old customs and new tendencies in the recent development of architecture, but it can be quite helpful in understanding architecture in archaeological contexts.

### Summary

In general the local architecture can be divided into two main types:

Temporary buildings of nomads—light huts that were easy to erect, built in the sites of their seasonal camps (Plates 7, 8, 10 and 11).

Houses of settled people—strong, permanent constructions situated close to water sources in areas convenient for farming (Plates 4 and 5).

The building techniques used by the settled inhabitants were most probably brought into the area at different periods. The most characteristic of the oldest civil architecture was integration with the landscape. This was probably because people need to build their houses themselves and it was important to make use of anything that would possibly lighten the work.

The houses and building techniques of the modern inhabitants are more unified and belong to the architecture which is common to Arab culture in Sudan generally. Although such forms were imported, adapted to local peculiarities and conditions and acquired some original features, in general, the main trends of development in civil architecture were unification, simplification of forms, and decreasing individuality (Plate 18). Architecture lost its organic connection to the landscape.

The nomad's way of living is less dependent on modern society and technologies. The architecture of nomads does not change much over time. Down to the present, it utilised the easiest and most practical way of building under the hard conditions of the nomadic life, even though there is some borrowing of building technique and



*Plate 59. Buildings of settled peoples in the archaeological record and modern examples.  
a – Site 3-Q-83; b – Site 3-Q-186; c – Site 3-R-218; d – Site 3-Q-186.*



*Plate 60. Buildings of nomads, in the archaeological record and modern examples.  
a – Site 3-Q-187; b – Site 3-R-103; c – Site 3-R-218; d – Site 3-R-113.*

forms between nomads and the settled population.

In general, the domestic architecture in the area or the Fourth Cataract studied employed similar building techniques and had similar designs, and comparable layouts. Even so, the style of each village was individual, and this was even more the case for each single building within them.

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