The Nubian village of Balle: Social and spatial structure explained using a virtual model

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Abstract

Our ethnoarchaeological investigation of the Nubian island of Bijje in southern Egypt made special methodological demands on the integration of ethnological and architectural research data. Evaluation and analysis of the architectural heritage under study was conducted on the basis of classical building research methods and interviews with former inhabitants. The results can be presented only in context. We aimed at linkage of all data in a single data model. In this paper, the methodological approach of data management is described in detail.

Keywords

Architecture, ethnoarchaeology, Nubia

1. Introduction

The present paper deals with the Nubian village of Balle and investigates its ethnological and architectural dimensions. Balle offers an example of vernacular architecture. *Vernacular* means that the settlement draws on the local conditions, the climate of the site, the available building materials, and traditional construction methods. Over generations, vernacular settlements were repeatedly modified, reused and adapted to the changing needs of the inhabitants. Vernacular settlements appear to be characterised by perfect correspondence between spatial and social structure. Better understanding of these processes is one of the aims of the larger project, 'Nubian Architecture', financed by the Deutsche Forschungsgemeinschaft and carried out jointly by the Chair for History of Architecture and Urbanism at the Technische Universität Berlin (Berlin Institute of Technology) and the Deutsches Archäologisches Institut Kairo (German Archaeological Institute, Cairo).

To investigate the correspondence between spatial structure and social structure, the Nubian villages on the island of Bijje are particularly good examples, because they still represent the state they had reached when they were abandoned in the late 1980s. Through interviews with former inhabitants, changes in social and spatial structure

can be traced back over several generations. After briefly explaining the context of the Nubian villages, the paper presents a part of the research concerning the village of Balle. The CAD plans of the village and information on the use of individual houses and on their inhabitants were integrated into a single data model. Changes over several generations were mapped and all sources were fitted as a scientific base into the model according to the sense of the London Charter for the computer-based visualisation of cultural heritage (Denard, 2009).

Other spellings of Bijje in literature are *Bigeh-Senem* (Baedecker, 1892), *Bîgeh* (Blackmann, 1915), *Bidge* (Burckhardt, 1819), *Biggeh* (Edwards, 1888), *Biǵǵe·n_arti* (Junker, & Schäfer, 1932), *Senmut* (Lepsius, 1853). In this text the spelling *Bijje* is used, following the Kenzi word for the island found in Massenbach (1933).

2. The Nubian villages on the island of Bijje

The objective of the project, entitled in its first phase (2015-2017) 'Abandoned Nubian Villages of Bijje' and in its second phase (2018-2020) called 'Nubian Architecture' is the documentation and the analysis of the principles of spatial organisation and the constructive characteristics of Nubian vernacular architecture in a combi-

nation of the disciplines of building history and ethnology.

The island of Bijje is associated with the first cataract of the Nile (Fig. 1). To the north of Bijje lies the island of Agilkia, home to the translocated temples of Philae. Along with Bijje and Philae, two other islands, Hesa and Awad, are entrapped in the basin between the two Aswan Dams. On the banks of the basin lie the villages of Tingaar and Shellal. Among all of these settlements, the villages of Bijje are exceptional. While other still-inhabited villages undergo constant changes and modifications, the architecture of Bijje remains frozen in the state that had been reached prior to the village's abandonment in the late 1980s. This truly unique situation enabled us to study, in an exemplary manner, processes guiding the developments inherent in vernacular architecture.[1]

The investigation necessarily covers aspects of architectural analysis of space, form and construction, anthropological studies of daily life and social structures, all set against the background of history of Egypt and developments in the natural environment.

The entire area around Aswan represents the northern offshoots of a once complexly structured Nubian settlement area that originally comprised 42 village districts and extended for about 320 kilometres south of the Aswan Dam. The villages spread out intermittently on both sides of the river, stretching up to 30 kilometres, were divided into more than 500 hamlets. The Nubian ethnic group is characterised by its distinctive language, which belongs not to the Semitic language group but to that of the Eastern Sudan. The history of the Nubian minority in Egypt during the twentieth century was determined by the erection and subsequent heightenings of the Aswan Dam, initially intended to control the water supply for the cotton plantations. Around 1902, the first dam (the Old English Dam) was erected, raising the waters of the Nile more than 20 metres. Soon afterwards, from 1907 to 1912, the dam was heightened. After the second heightening in 1933, the Egyptian part of Nubia became inundated far into the south. The final High Dam, located about 10 km to the south of the Old Dam, resulted in the accumulation of a permanent reservoir stretching more than 600 km to the south from Aswan.

This succession of the dams led to the gradual submersion of the lands and threatened the livelihood of the Nubians. The villages and houses that had been destroyed after each heightening were rebuilt each time on higher ground. Date plantations and agricultural land were flooded. Prior to the erection of the Old Dam, the agriculture could still support the Nubian population; afterwards, the men had to migrate to find labour.
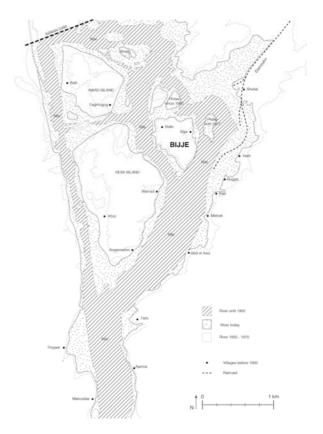

Fig. 1: Map of the reservoir between the two dams of Aswan (Zenker, 2016)

The construction of the High Dam in the 1960s led to the complete erasure of Old Nubia. The villages were inundated; the inhabitants resettled in 'New Nubia', an area north of Aswan, in new uniform houses that had nothing in common with the traditional architecture of the old villages.

3. The state of research on Nubian vernacular architecture

The traditional vernacular architecture of Nubia did not enjoy great academic interest while

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[1] Currently new developments take place, and since 2018 some of the houses on Bijje are being reused as an eco-logde and restaurant.

it still existed, and only a few papers (El-Hakim, 1997; Jaritz, 1973; Junker, & Schäfer, 1932; Fathy, 1973) have been published on the topic. The in-depth case study of the dwellings of the two villages on the island of Bijje will enable a deeper understanding of the Nubian vernacular architecture of all Lower Nubia as it existed in the first half of the twentieth century, before the construction of the High Dam.

No rural settlement should be investigated without looking at it in its entirety: the natural setting, the agricultural land, dwellings and farm buildings, and commonly used service facilities. The living space of the inhabitants of the two villages on Bijje was clearly determined by the shoreline of the island. Altogether, 29 homesteads and 22 service buildings are clustered in the two settlements today.

The larger hamlet, called, like the island itself, were spread over the entire island and provided the spatial frame of life for the small community.

The most obvious difference between the two villages, apart from their size, is the fact that Bijje is loosely scattered around the rock formation in its centre, while Balle is a dense structure evoking an impression of one big house. After leaving the island, the inhabitants did not lose their connection to their homeland, but continued to visit it regularly. Thanks to this, the houses and even their equipment and furniture were quite well preserved at the moment we started our research. The fabric of the houses includes a record of more than 50 years of development in building materials, space structure, and usage.

We combined the classical investigation methods of building archaeology with interviews with the former inhabitants. In this way, we were able to quickly verify our findings and theories.
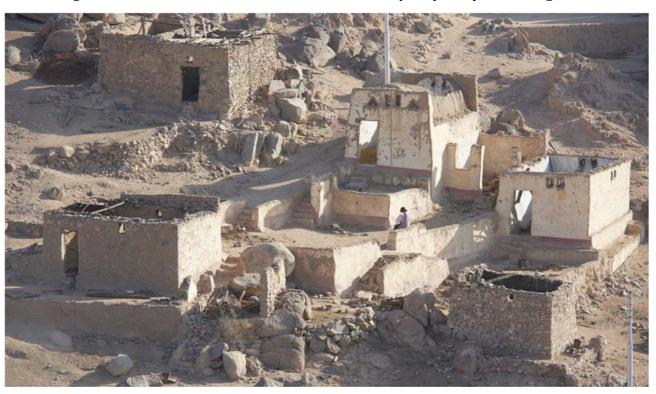

Fig. 2: A fragment of the village of Bijje (Foto: M. Kačičnik, 2017)

Bijje, and numbering 21 houses, stretches across the central part of the island on its eastern side (Fig. 2), while the smaller, Balle, with only 8 homesteads, lies in the north-west (Fig. 3). Some walled storage spaces and animal enclosures scattered all over the island complement the stock of structures. Paths and tracks, open spaces between the houses, agri-cultural land, threshing sites, cemeteries, and other commonly used areas

In our research, we aim to see architecture as a frame of life, meaning that we concentrate not only on the fabric but also on the space created by this fabric. Moreover, we try to understand and to reconstruct the cultural activity that took place in this space. Some of the questions concerning life on the island can be answered thorough architectural analysis of space. In the first place, what do we actually understand by a *house*? What

kind of layout characterises a house? How were the boundaries between the exterior and interior defined? How were the boundaries between households within one house established and maintained? Were private areas important within the household?

A wider range of methods and considerations are needed to answer questions concerning cultural aspects. What does a house reveal about the social and economic structure of the community? What can the layout of a house tell us about the culture? Were certain behavioural codes in force? What kind of tasks and uses are associated with a house? How many buildings and what type of human groupings constitute a household? What kind of activities do these groups perform together?

To answer these questions, we needed to gather and analyse information from various sources, using diverse methods.

settlement has all the facilities needed in a village. At the outset of the documentation work, a numbering system had to be defined in order to record all existing buildings in a systematically, enabling clear identification of the material to be collected, such as plans, photos, point clouds, etc. The only point of reference available to identify a spatial unit was the actual building itself, i.e. spaces defined by a continuous sequence of walls.

A simple aerial photograph served to generate the initial overview plan. Subsequently, a tachymetric survey was carried out; particularly amorphous components of the buildings were measured via structure from motion (SFM) and the generated point clouds were integrated into the measurement grid.

Photographic documentation was prepared room by room and details of the construction and the material were recorded separately. Finally, the ground plans and sections were completed by

Fig. 3: The village of Balle (Foto: M. Kačičnik, 2016)

4. Case study in the village of Balle

The village of Balle consists of just 8 houses built on a steep slope very close to each other, as the available space is limited. Due to the extreme topography, access is only possible via steep stairs.

Although the size of the whole village is comparable to the size of a single house in Bijje, the

hand in order to be able to respond in the best possible way to the organic shapes of the buildings.

5. Defining the room type

Along with the documentation, initial interpretations of functions were carried out. Only

through analysis of the architectural characteristics of the rooms did the following functional units emerge: guest rooms, living spaces, kitchens, baking rooms, courtyards, stables, storerooms, and entrance halls (Fig. 4).

Using the example of guest rooms, it is possible to classify the rooms purely according to their architecture. Use and form are interconnected here. A guest room includes the following essential components. In contrast to all other rooms, the guest room has between 2 and 4 windows, all facing north if possible. It is always accessible from the main entrance via an entrance hall or directly from outside. All windows are facing north if possible. In relation to the other rooms of the house, it is always the largest and highest room with the most attractive entrance, usually painted inside and outside.

Kitchens can also be identified quite easily, but the definitive characteristics are not necessarily always present. The kitchen is always a smaller, and often the smallest, room in relation to the other rooms in a house. The following characteristics are explicit but not always present. The room has a fireplace; on one side or in one corner is a low bench with a maximum width of 50 cm; objects that are parts of kitchen equipment have been left in the room; the room can be accessed only from the courtyard; the roof is only for shade and allows ventilation.

In order to define the essential components of a house, the former inhabitants of the villages were interviewed about their life on the island. A total of 38 interviews were conducted – if possible, directly on site – with 11 people, 4 of whom had lived in Balle and 7 who had grown up in the other village, Bijje.

At present the people are still closely connected with their former houses. Through participating in the interviews, they were motivated to tell us about all of the details of their former daily life, without any order. Systematic work was impossible. Important information about the architecture and its use was mentioned only occasionally and had to be filtered out afterwards. Nevertheless, all interviews were transcribed and edited. They constitute a very important source for understanding the spaces and their use.

This is an excerpt of an interview with a man who lived in Bijje as a young boy. He explains, in addition to the architectural design, some reasons
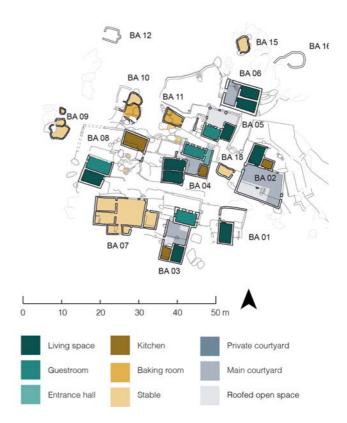

Fig. 4: Distribution of space in Balle (Zenker, 2019)

for the design of the guest room and how the people used it.

'Generally, it had to be the biggest room. It was full of Dekaks (kind of pillow) to host guests (men) or other relatives because they (men) do not sleep in the same place with the family members and the number of Dekaks depends on how many the family can afford. It should face the north because of the wind direction. In the old days, if the door was open, anyone from the village could come and sleep over'.
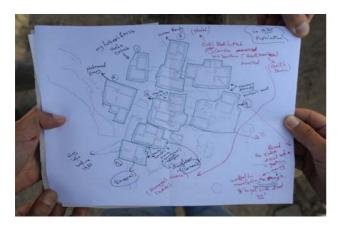
In order to be able to associate important oral statements with the relevant site, a mapping system that could display the kind of source as well as the kind and quality of information had to be developed.

6. Data collection in CAD and text

To illustrate the complexity of the correlations between space, house, use, and inhabitants, it was necessary to combine all the collected data into one single model. The cartographic base, an AutoCAD file containing all survey measurements, seemed to represent the best way to add more information to this vector based file and to annotate and analyse the immaterial information along with its spatial distribution. The sustainability of choosing AutoCAD for implement-

ting the virtual working model lies less in the complexity of the tool, but rather in the long-term availability and wide spread of AutoCAD. As all houses consist of only a single story, it was possible to explain spatial relationships in only two dimensions. The creation of a complex 3-dimensional model was therefore unnecessary. Thus, the internal data structure continued to follow the numbering system defined at the beginning of the project. The corresponding ID of each house, room, door, or wall never changed during the investigation process.

The interviews permit conclusions only about the last generation who lived in the village before

Fig. 5: Map made in 2016 by H. A. explaining the situation of inhabitants in 1970-1980

it was abandoned between 1980 and 1984. Most of those interviewed remember the time around or after 1964.

To be able to comprehend the oral statements in combination with the place they deal concern, related parts of the interviews were linked into the CAD file via the word *reference* inside the rooms. House BA03, for example, consists of a guest room and a courtyard divided into two different levels connected by a staircase, a kitchen, and a living room. There is also a terrace in front of the house and several outdoor open spaces next to it. According to the interview with H. A.[2], who was born in this house in 1966, he lived there together with his parents and five siblings. In one interview, he speaks about the actual domicile of his siblings, while naming all of his relatives.
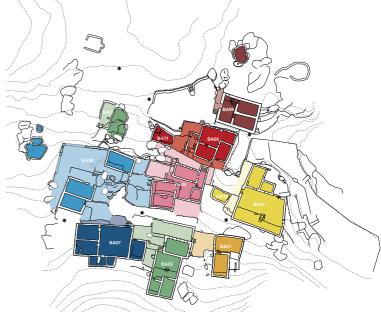
'My oldest sister is living in El Khazan. My elder brother is living in Hasaya. My brother M. is living next door to me. The third one is living in Sahary. The forth and the fifth brothers are married and are

[2] Due to data protection, the names of the interview partners are not published.

living in Hesa. We are still in touch and visit each other'. During the same interview H. A. illustrates the relationships of the inhabitants on a map (Fig. 5). Later on, we linked these relationships within in the model.

In the map, he named the inhabitants of all the houses in Balle according to the numbering system defined at the beginning of the documentation work.

After many more discussions, it became clear that the house units determined by the building itself (Fig. 6) often failed to match the number of rooms inhabited or used by a family, i.e. the spatial design failed to correspond to the social distribution. In another interview, it became clear that the grandmother of the family living in house BA03 lived in a room of the house BA04, while sharing the kitchen and the courtyard of the house BA03. A sister of the grandmother therefore lived in house BA01, which consisted of a single room.
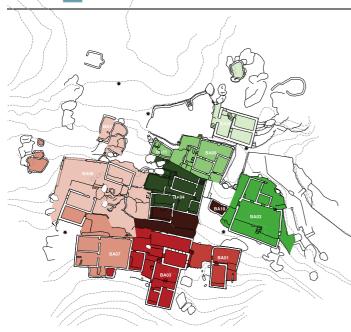
7. Social distribution in Balle

In general, two families or clans can be identified in the village; these clans each inhabited more or less one half of the village (Fig. 7). The rooms occupied by the members of the two clans were not grouped in separate buildings. Members of both families lived in the same house, sharing, for example, the building BA04.

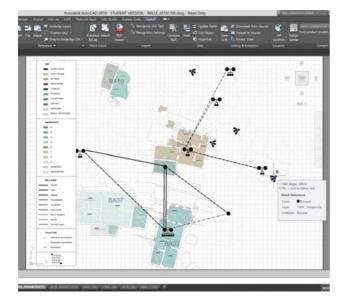**Fig. 6:** Distribution of built units analised by measurement (Zenker, 2016)

Fig. 7: Distribution of social units as explained by inhabitants (Zenker, 2017)

The space inhabited by the green clan living in BA03, BA01, BA04, BA07, and BA08 also includes house BA10 in the north of the village, where the baking room for all members of this clan is located.

To the question who was living in house BA07, M., the brother of H. A., answered *'Actually, I grew up when it was vacant, without any inhabitants.* **Q: So, did you use it afterwards, for instance, for animals or for any other purpose?** *A.: This house was closed. The owner left it and there was even some furniture in it. He gave us the keys. We kept the animals in the other side of the house'.*

Fig. 8: CAD model displaying ethnological, kinship structures and architectonical data (Bieber, 2018)

In the map made by H. A., he marked that this house had been inhabited by his aunt, which is contradictory. Later on, his sister clarified the situation, explaining that the house was built or owned by a person who left at a very early point in time.

The rooms were used afterwards by the families from houses BA03 and BA08, who were also related to each other (Fig. 8). Therefore, the owner was not the inhabitant, and the rooms of the house were shared with members of the same family.

We followed this last explanation by defining the distribution of the families, but we marked the inconsistency of the information with the colour of the hyperlink. This will help us to address specific questions regarding specific parts of the village in further consultations.

The service areas in the village were distributed so that each member of a family had access at least to one living room, one guest room, one kitchen, and one oven. However, the number of people sharing the rooms could vary greatly. An inhabitant of the house BA05 who was related to the inhabitant of house BA04 answered the following question: *'Where did you use to cook? A: We used to cook and eat with H. D.'s household (R04.04); in the old days we used to eat all together. M. D. (BA02) was living here. After he left, his sister married and lived here'.*

The absence of a kitchen in a house therefore can be explained only, if the social relationships and cultural behaviour of the inhabitants are considered.

The pictures taken by Armgard Goo-Grauer in 1964 essentially helped to reconstruct the type of use of the depicted rooms (Fig. 9). The position of the pictures is marked by a symbol; the original file of the picture is linked to this position (Fig. 10). These images show the inhabited houses, along with the former residents, especially the women and children, in domestic situations. They show how the rooms were used and which objects belonged to their interior.

Although nobody was living in the buildings in 2016, complete documentation was made at this time. By following the hyperlink connected with the ID of every room, the corresponding part of the documentation will open.

The complete documentation of this guest room with some explanations and interpretation showing the state of the room in 2016 can be
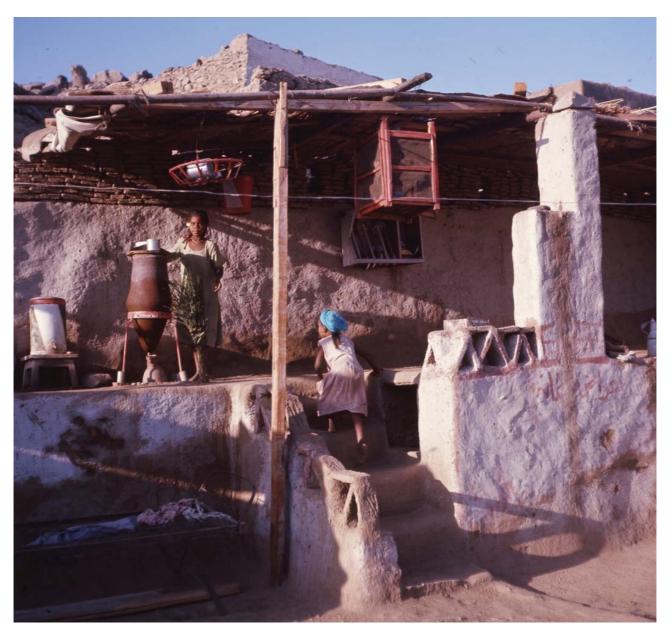
Fig. 9: Inside of the inhabited courtyard of BA02 (Foto: Goo-Grauer, 1964)

extracted by following the hyperlinks inside the rooms. The finished documentation is a scientific interpretation ready for immediate printing. Displayed intersection lines are linked to the corresponding plan.

8. Conclusion: Potential and limitations of the virtual model

The model has an open character, i.e. it is possible to process more and more information by fitting it into the structure of the model. Transcription of the interviews took a grat deal of time, as they were conducted in four different languages, Nubian, Arabic, English, and German, in many cases mixed within one conversation. The work can be continued in future, with no claims to completeness or finality

The model was developed especially for this specific research project but within the project wide data management limited to the spatial aspects of social and built structure. It shows the socio-spatial distribution along with types of relationships between former inhabitants and makes it possible to spatially organise the plans, the contents of the interviews, and the photographic material. The model provides the opportunity not only to obtain an overview about the distribution of the families, but also to clearly present missing or contradictory information about spaces and their use. The structure was developed to organise the written material and works using common programs. The following files are referenced in the model: .doc, .pdf, .jpg, .tiff, and .dwg files.

The common character of the file formats enables all those operating in the field of architectural research to use the model and represents a sustainable choice. It can be exported and sent as a packed folder containing all referenced files along the file structure and is capable of serving as a mode of digital publication

of research results. It also represents a way to visualise the origin of information as a basis for further interpretation, entirely in line with the requirements of the London Charter for the computer-based visualisation of cultural heritage.In this paper a virtual working model for ordering, annotating and analysing material and immaterial sources alongside with its spatial distribution was presented. The limitations of the model lie in the reduced performance due to the complexity of the information. This can be considered fine for a working model. The potential of the presented model lies in the order of the material and the synoptical possibilities and in having the sources immediately accessible. In
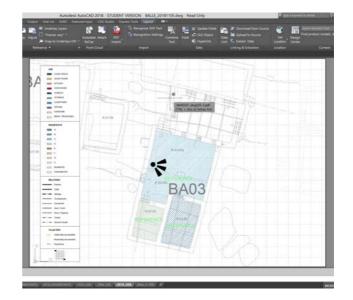

Fig. 10: Hyperlink connecting the fotos and drawings with the model (Bieber, 2018

addition, the scientific interpretation within the virtual model produces results ready for printing and publishing, especially as far as the kinship structures are concerned.

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