INGRID ADENSTEDT

RECONSTRUCTING PHARAONIC ARCHITECTURE IN NUBIA: THE CASE STUDY OF SAV1, SAI ISLAND

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RECONSTRUCTING PHARAONIC ARCHITECTURE IN NUBIA

The Case Study of SAV1, Sai Island

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PREFACE

Traditionally Egyptian archaeology has focused on stone monuments, tombs and temples, with little attention paid to domestic architecture made of unfired mudbrick. The need to explore the domestic settlement sites along the Nile Valley has been addressed only since the 1970s[1] and even today, Egyptian settlement archaeology is still in its infancy.[2] Nevertheless, the Egyptian "Wohnhaus" was subject of Egyptological research since the early times of Flinders Petrie, Ludwig Borchardt and Herbert Ricke.[3] In more recent years, Felix Arnold, Manfred Bietak and Cornelius von Pilgrim (among others) complemented the study of domestic buildings with new results from fresh fieldwork.[4]

Apart from novel ideas about the "Wohnhaus", much progress has been made in recent decades in Egyptian settlement archaeology with ongoing research at sites like Amarna, Elephantine, Abydos and Tell el-Dabᶜa/Qantir.[5] In their seminal publications "Busy Lives at Amarna", Barry Kemp and Anna Stevens have highlighted the rich potential of a contextual approach with interdisciplinary measures, including aspects of the environment, the landscape and the material culture.[6] In general, during the last decade, Egyptological studies have begun to stress social aspects of domestic architecture[7] as well as social and cultural identities of the occupants.[8]

The latter approach nicely coincides with the current goals of the *European Research Council project* AcrossBorders (ERC Starting grant no. 313668 "*AcrossBorders – Settlement patterns in Egypt and Nubia in the 2nd Millennium BC*" and FWF START Prize Y-615). Sai Island, as one of the most important New Kingdom sites in Upper Nubia (Northern Sudan), can be understood as the prime example for settlement policy of New Kingdom Egypt in the area between the Second and Third Cataracts. The AcrossBorders project aims to provide new insights on the lifestyle and the living conditions in New Kingdom Nubia, thanks to new fieldwork and multi-layered research on Sai Island. A data-based approach – focusing on the architecture and material culture, as well as investigating how environmental conditions affected daily life – will help achieve a more complete understanding of the New Kingdom town of Sai, in both its regional setting and its historical context.

In general, Egyptian towns founded in Upper Nubia during the period of the New Kingdom (c. 1539–1077 BCE) offer the unique chance to conduct a detailed analysis of domestic life at the junction of Egyptian and Nubian culture. In direct opposition to sites located within the borders of modern Egypt, these sites in Northern Sudan are better preserved and more accessible because they have not been superimposed by modern houses or cities.[9]

For many years, in line with traditional Egyptology, only temples and tombs were the focus of studies on the Pharaonic architecture in Nubia – this has changed dramatically in the last decade with resumed excavations at Amara West, Sesebi, Tombos and Sai Island.[10] There is still a considerable lack of knowledge about the social stratification, population and structure within

1 E.g. Kemp 1972; Bietak 1979.

2 Cf. Forstner-Müller/Müller 2011.

3 Petrie 1890; Ricke 1932; Borchardt/Ricke 1980.

4 Arnold 1989; Bietak 1996; von Pilgrim 1996a.

5 E.g. Kemp/Stevens 2010; Kemp/Stevens 2011; Koltsida 2007, 1; Spence 2010; Bietak/Czerny/Forstner-Müller 2010. For a recent summary of urban life in Egypt, see also Snape 2014.

6 Kemp/Stevens 2010; Kemp/Stevens 2011. See also Kemp 2012.

7 E.g. Koltsida 2007.

8 E.g. Shaw 2004; Spence 2010.

9 Cf. Forstner-Müller/Müller 2011, 209; Budka/Doyen 2013, 167.

10 Cf. Spencer/Stevens/Binder 2014; Spence/Rose et al. 2009; Spence/Rose et al. 2011; Smith/Buzon 2014; Budka/Doyen 2013.

Pharaonic towns in Nubia, but these questions are now being addressed from various perspectives and with diverse methods.[11] To recreate a snapshot of everyday life in New Kingdom Upper Nubia, a well preserved settlement like Sai offers rich data of various quality and character.

The Pharaonic town of Sai Island has the shape of a fortified settlement with an orthogonal layout in a south-north direction.[12] As highlighted by recent excavations, there are several different sectors within the town, which contrast regarding their layout and dating.[13] Whereas the southern part (SAV1, see below) reflects the orthogonal planning of the town, with building units organised along north-south and east-west axes, other areas (SAV1 North and SAV1 East) show a more diverse plan in earlier levels. The earliest remains from these two sectors date to the early 18th Dynasty and find a close parallel in the Kerma site Gism el-Arba.[14] From the mid-18th Dynasty, the domestic features in all parts of the fortified town fall into the category of Egyptian-style architecture in Nubia, well attested in the neighboring Pharaonic towns.[15]

The present volume deals with the internal structure of this town at Sai Island, concentrating on the organization of the living space, the architectural outline and features of the individual buildings in the southern part of the site. This study of the domestic architecture by Ingrid Adenstedt, as part of the FWF START project Y-615 "Across ancient borders and cultures",[16] is based on research and documentation work undertaken on Sai Island in 2013 and 2014. The architectural remains of the southern area within the town, named SAV1 (label by Jean Vercoutter for: Sai Adou Ville 1) and dateable to the 18th Dynasty,[17] have been revisited. They are the best preserved ruins within the town area and it seemed logical to start a 3-D reconstruction with these remains, especially with the excellent documentation by Michel Azim as a base to build from.[18]

The remains in SAV1 seem to illustrate the heyday of Sai during the mid-18th Dynasty, and it is clear that from the time of Thutmose III onwards, the site was an important administrative centre for the region.[19] A stone temple (Temple A) and large magazines (SAF5) are core features of the southern town area, as is a large administrative building, the so-called governor's residence (SAF2). Together with small houses of Egyptian types and various streets, the architecture of SAV1 nicely illustrates key elements of a typical "temple-town" of New Kingdom Nubia, including an orthogonal layout.

This volume is the first of a series of monographs as outcome of the START and ERC project AcrossBorders, and the architecture of SAV1 can serve as a sound basis for a deeper understanding of settlement patterns in Sai during the 18th Dynasty. The reassessment of SAV1, the southern part of the New Kingdom town of Sai Island, has produced several new results, which are relevant for a better understanding of the town layout.

I hope that the high efforts, meticulous plans and 3-D reconstruction by Ingrid Adenstedt will be not only recognized, but will fulfil their desired outcome: to illustrate as one specific case study living conditions in respect to domestic space and Egyptian architecture in New Kingdom Nubia.

Acknowledgments

Funds by the Austrian Science Fund (FWF START project Y615-G19) enabled the research for this study. First of all, we are very grateful for the permission by the French Mission as concession holders of Sai Island (until 2015: UMR 8164 HALMA-IPEL, University Charles-de-Gaulle Lille 3, France) to work on this subject; thanks go in particular to Didier Devauchelle (head of the Sai Is-

11 See, as an exemplary volume with a variety of relevant papers: Spencer/Stevens/Binder 2016. For a general assessment of domestic architecture in ancient Sudan (from Prehistoric to medieval and recent times) see Fitzenreiter 1999.

12 Cf. Azim 1975; Doyen 2009; Budka/Doyen 2013; Budka 2014b; Budka 2015a.

13 See Budka 2015a.

14 Budka 2014b, 61 (with further literature in footnote 70).

15 Cf. Fitzenreiter 1999, 119–120.

16 See Budka 2014a; Budka 2014b; Budka 2015a.

17 Six levels of occupation were recorded by M. Azim. These levels were only roughly dated and assigned to the Pharaonic, Meroitic and post-Meroitic periods as well as to two phases within medieval times and finally to the Islamic period (Ottoman fortress). See Azim 1975, 93–95; Geus 2004, 115; Francigny 2014, 798–799. AcrossBorders and the present study focus on the Pharaonic remains only.

18 Azim 1975.

19 Cf. Budka 2014b; Budka 2015a.

land Archaeological Mission until 2014) and Florence Doyen (field director prior to AcrossBorders until 2012). Work at the site would not have been possible without the support of the Sudanese authorities (NCAM), and here we would like to thank especially Abdelrahman Ali, El-Hassan Ahmed und Huda Magzoub.

The terrestrial 3-D laser scanning campaign on Sai Island, realized thanks to a cooperation with Robert Kalasek from the Vienna University of Technology, Department of Spatial Development, Infrastructure and Environmental Planning, was financed by the FWF and provided the necessary data for the present volume.

Martin Fera created the digital landscape model (Pls. 52.1 and 59) in 2015, based on kite photography. Last but not least, I would like to thank all people on Sai, who made our work not only successful but also really enjoyable, despite the curse of the black flies, the "*nimiti*".

Julia Budka
Vienna, December 2015

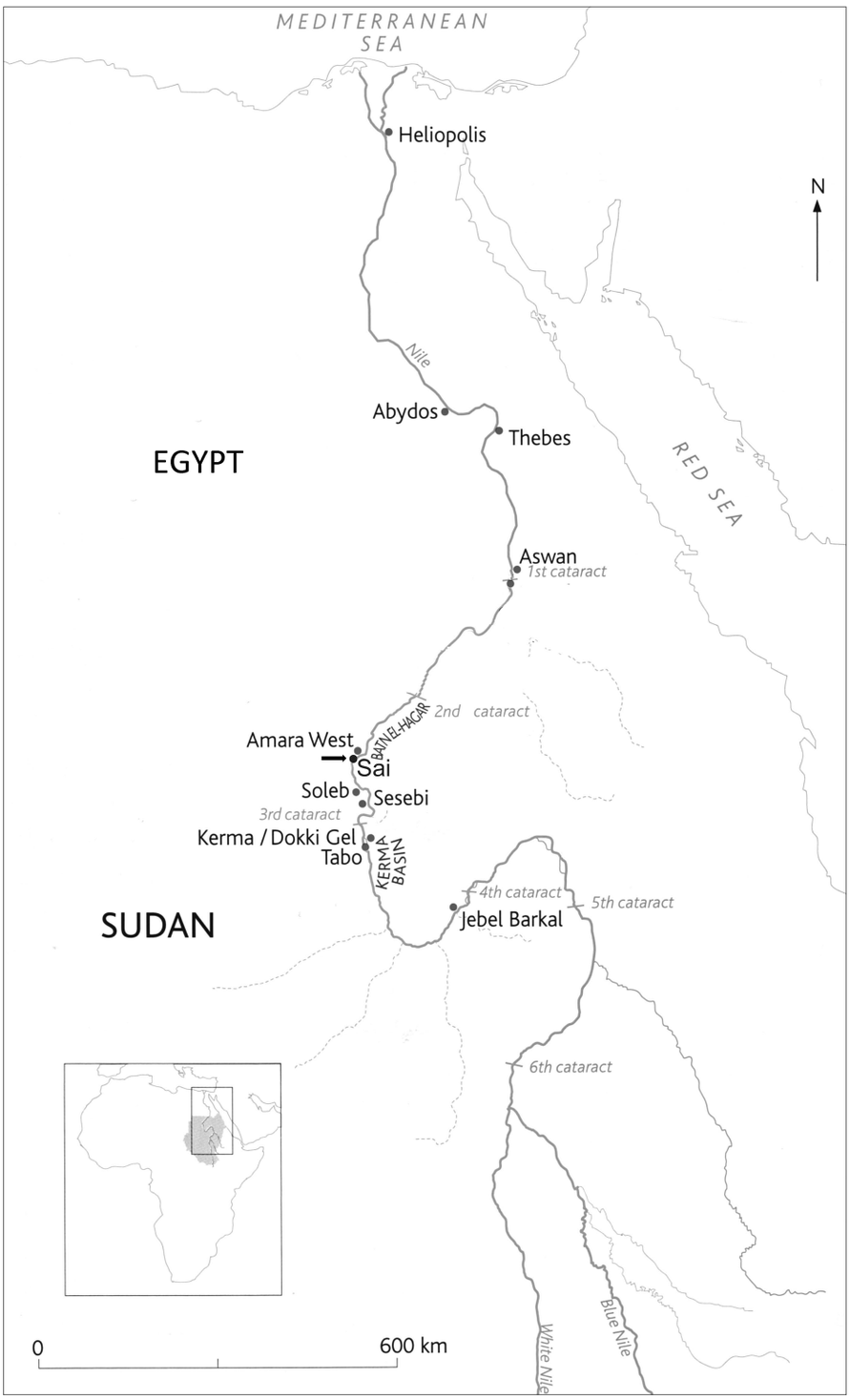

Fig. 1. Location of Sai Island along the Nile Valley. After: Welsby/Anderson (eds.) 2004, 93, fig. 68

1. INTRODUCTION

This publication is based on the research and documentation work undertaken on Sai Island, Sudan, in the years 2013 and 2014 by the author and is part of the FWF START project Y-615 "Across ancient borders and cultures" (Fig. 1).[20] The goal is a reassessment of the architectural remains of the southern area of the New Kingdom fortified town on Sai Island, named SAV1 (Pls. 52.1 and 54). This part of the settlement, which makes up about one third of the entire town, was excavated in the 1950s and 1970s by a French Mission.[21] The main publication, with the results of the excavations carried out in the years 1970–1973, was published in 1975 by Michel Azim.[22] While he provides an overview of the excavated areas, with occasional detailed observations, the present publication shall provide more solid in-depth documentation and analysis, by reexamining the former results and putting them into a wider context. A major objective of the current work is the provision of new plan material, since Azim's plan of the town while being an important source of information, is unsatisfactory in that the distinction between the actual state of the ruins and a suggested reconstruction is often not clear.[23]

As already described by Azim, six occupational phases can be identified for this area, ranging from the 18th Dynasty Pharaonic town up to the Ottoman fortress, erected in 1560 and lasting until 1820. Apart from the prominent ruins of this fortress and the remains of the New Kingdom settlement, most notable are the Meroitic ruins – primarily small dwellings – and structures from the Late Middle Ages, which seem to have been refugee shelters with a spiral-form ground plan.[24] The other occupational phases manifest themselves through the pottery finds. The present study, like Azim's work, concentrates solely on the remains from the New Kingdom period, in accordance with the topic of "Across ancient borders and cultures".

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[20] The FWF START Prize Y-615 is complemented by the ERC Starting grant no. 313668 "*AcrossBorders – Settlement patterns in Egypt and Nubia in the 2nd Millennium BC"* (principle investigator Julia Budka). This project commenced in 2012 and is projected for five years. The project blog with further information and literature references can be found at: http://acrossborders.oeaw.ac.at. My thanks go to Julia Budka for having given me the opportunity to become a member of the team and for all the help and valuable information she has provided me with in the past years. I would also like to express my thanks to Meg Gundlach, for proofreading and critically assessing my text.

[21] Directed by Jean Vercoutter. Since that time the island has been a French concession supervised by the University Charles-de-Gaulle – Lille 3.

[22] Azim 1975. See also Geus 2004.

[23] Cf. Azim 1975, 98, pl. IV. For example, there are six columns depicted in the main room of SAF2, even though only the two northern ones actually exist *in situ*, while the other four are reconstructed.

[24] Azim 1975, 93–95; for the Meroitic ruins see Geus 1994, 141–150.

2. METHODOLOGY

The first campaign for the work presented here took place over three weeks in 2013. It entailed a basic architectural survey of the area, in order to gain an overview and to assess what can be done in the future. During this campaign, the entire area was measured and sketched in a scale of 1:50 in order to get a grasp of the structures and their specifics, such as construction joints, thresholds and interior installations.[25] In addition, a so-called room book, i.e. a catalogue of all the rooms, was compiled, with the more detailed information, for example the overall measurements and the square meters of the room and the length, width and preserved height of the wall. Other specifications are listed as well, including any door openings, possible thresholds, remains of floors or installations, and the size of the bricks etc.[26] Together with the sketches, the room book served as a basic tool for further work, as one could easily look up and compare the various details. The main result of this first campaign was the compilation of a new preliminary plan based on the hand-measurements.

This plan was already very useful, especially concerning the details, however it lacked exact geometric parameters. Therefore, the need for an accurate survey arose and a second campaign was undertaken in 2014 with the goal of obtaining complete documentation of SAV1 with the help of a 3-D laser scanner. As a partner for this endeavor, Robert Kalasek from the Vienna University of Technology, Department of Spatial Development, Infrastructure and Environmental Planning was responsible for the scanning process.[27] An Image Laser Scanner Riegl VZ-1000 was used for the scanning and a Nikon D800 camera with a 14mm lens was mounted on the scanner in order to record the texture. During the scanning process, a grid of three dimensional points is automatically measured in the surveyed area. So-called point clouds result from this process, including xyz-coordinates and an intensity value depending on the surveyed material.

The complete scan of the remains of the Pharaonic town required 155 different scan positions, whereby the maximum distance of the measured points ranged between 200 and 400m, according to the angle of incidence and the reflectivity of the material (Pl. 53). The result of each scan is a point cloud in a local coordinate system. In a next step the scans can be joined (registered) with the help of a multitude of reflector points, which had been distributed throughout the ruins. Generally, at least five overlapping points are needed in order to put two scans together. These reflector points were additionally measured with a total station so that the registered scans can be placed into a georeferenced net.[28]

In addition to the standing remains of SAV1, the newly excavated trenches SAV1 East and SAV1 West were also scanned and georeferenced, as was SAV1 North, the area excavated from 2008 to 2012. In order to collect data for the topographic understanding of the surroundings, four long-range scans (range of 1.2km) from elevated points were undertaken as well (Fig. 2). From these, together with an aerial photograph, a digital terrain model was compiled by R. Kalasek (Pl. 52.2).

For the actual core area, namely the area of SAV1, several post-processing steps were undertaken for generating new ground plans and sections through key areas of the site. The post-processing includes steps such as registering the single scans together and then cleaning the resulting 3-D point cloud, removing any unwanted information. After carry-

[25] These elements are mostly missing or only depicted in a very perfunctory manner on Azim's plan of the 1970s. See Azim 1975, 98, pl. IV.

[26] Cf. Chapter 14.

[27] See http://www.srf.tuwien.ac.at/kalasek/ for further 3-D laser scanning projects by R. Kalasek.

[28] The geographical data was provided by Florence Doyen and the Sai Island Archaeological Mission and is currently a local "Sai Island" coordinate system that still needs to be transferred into the global coordinate system.

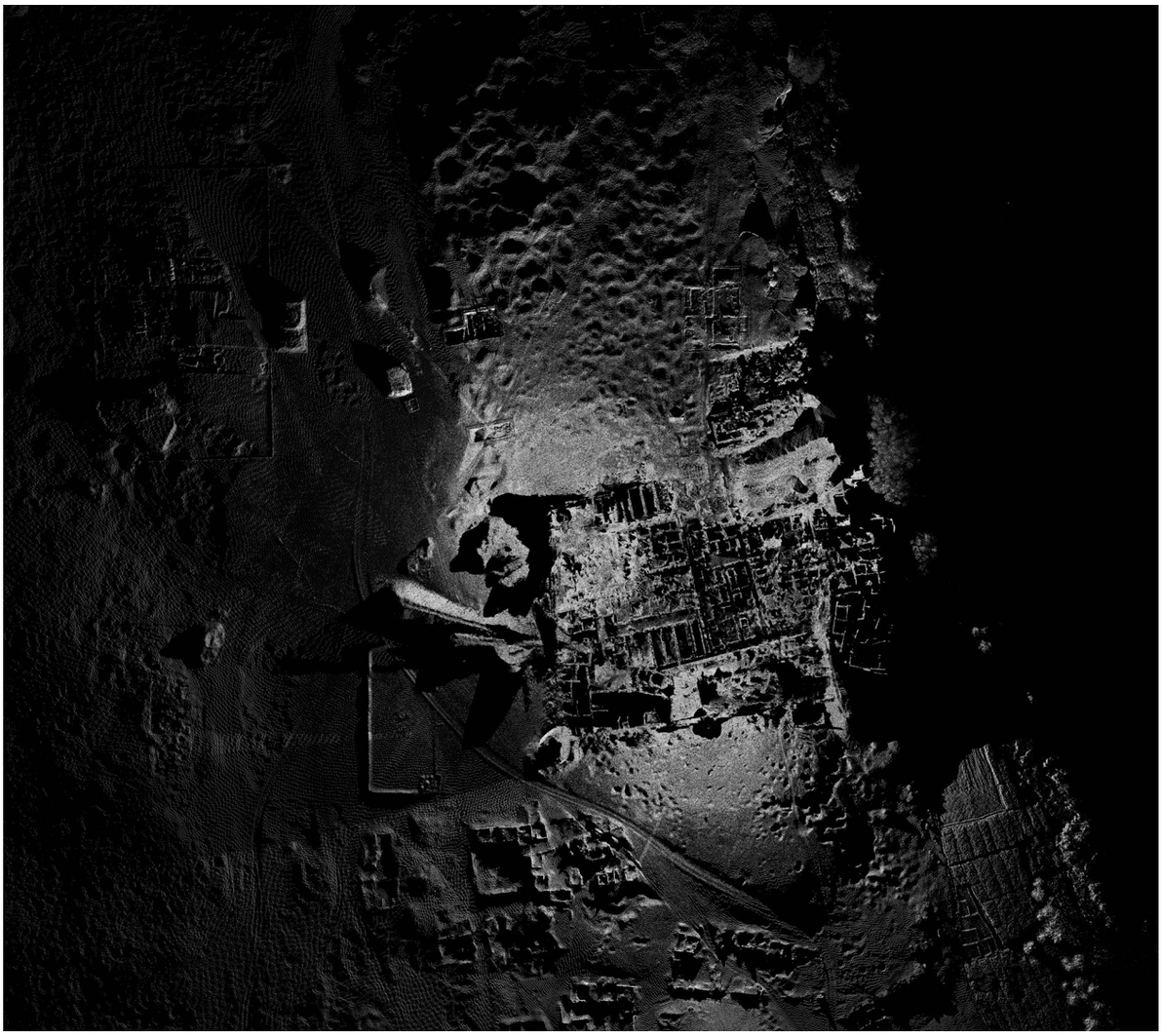

Fig. 2. Long-range 3-D laser scan plan (R. Kalasek)

ing out these steps and taking certain vital settings into consideration, such as deviation, the range and the reflectance, a smooth data transfer into a further post-processing software was possible. In our case, the software program PointCab[29] seemed to be the best solution for creating plans (Pls. 1–12) and sections directly from the 3-D point cloud, which can then be further worked out in AutoCad (Plans 1–4).

With all this new information, the ground plan was once again revised, this time as a georeferenced ground plan of the Pharaonic town with all the details available from the laser scanning results, as well as from the hand measurements and observations made on site. This seems to be the best possible combination for an analytical ground plan. In addition, sections through the main areas of the settlement were generated (Plans 5–7).

Apart from the fact that the new plan is now georeferenced, one of the unsatisfactory points of the older plans is that often the distinction between the actual state of the remains and an interpretation or reconstruction is not clear, since everything is compiled into one plan (Fig. 3). Therefore, the need arose for the production of two plans, one

[29] http://www.pointcab-software.com/.

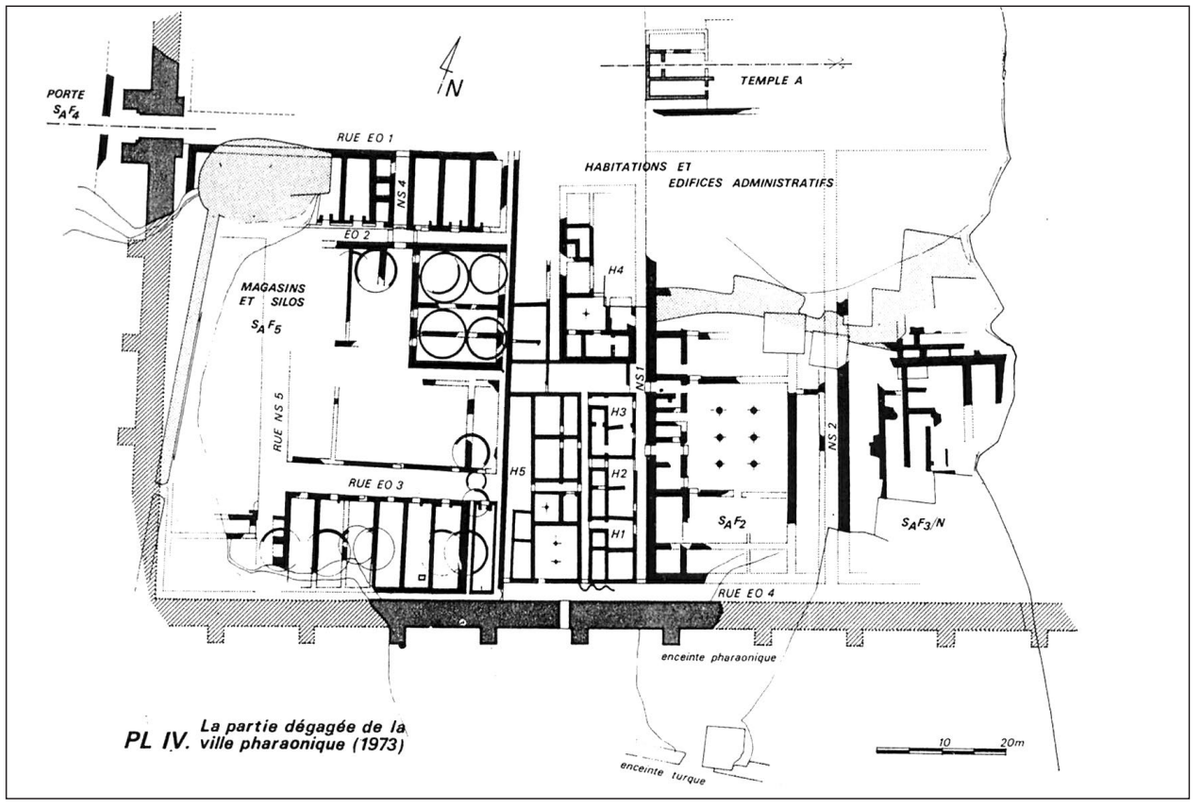

Fig. 3. Plan of SAV1 by M. Azim (Azim 1975, 98, pl. IV)

with the actual state of the ruins and one with a reconstruction of the settlement, particularly SAV1 (Figs. 4 and 5). As a further step – and from the beginning one of the goals of the project – a 3-D reconstruction of the area SAV1 was attempted (Pl. 62). Due to the state of the ruins, a lot of the reconstruction must however remain hypothetical, especially when going into the third dimension, determining building elevations and adding possible upper stories. For the most part, the considerations can only be based on comparisons with other similar sites and buildings.[30] Other clues with regard to the third dimension are to a certain extent given by the thickness of the walls, deliberations on the possible weight they could carry and therefore the height of a building. In any case, the aim of the 3-D reconstruction is to offer an idea of what the town could have possibly looked like, always keeping in mind that it is merely a suggestion and not a definite answer.

[30] So far, not very many comprehensive reconstructions, based on extensive scientific background work exist for Egyptian cities. The most progress so far has been made for Amarna, where a physical model of the city was made for an exhibition in 1999. See http://www.amarnaproject.com/pages/model_of_the_city/. Another project, illustrating parts of the city is still in progress and can be found at http://www.amarna3d.com/. More models exist for singular houses, e.g. http://www.ucl.ac.uk/museums-static/digitalegypt/3d/houses.html, where basic reconstructions of different house types are illustrated. A main guide for considerations on the third dimension of domestic buildings is certainly Spence 2004, 123–152. See also Kemp 1995, 146–168 for the reconstruction of House P46.33 in Amarna; Kemp/Stevens 2010, 509, fig. 10.13 for the Grid 12 houses in Amarna; Snape 2014, 90 for the House of Ranefer (N49.18) at Amarna. For comparisons regarding fortifications, 3-D reconstruction drawings for the Nubian forts of the Middle Kingdom can be found in Dunham 1960 and 1967 and Emery/Smith/Willard 1979. A virtual 3-D reconstruction exists at http://www.vizin.org/projects/buhen/gallery.html resp. http://www.learningsites.com/EarlyWork/buhen-2.htm.

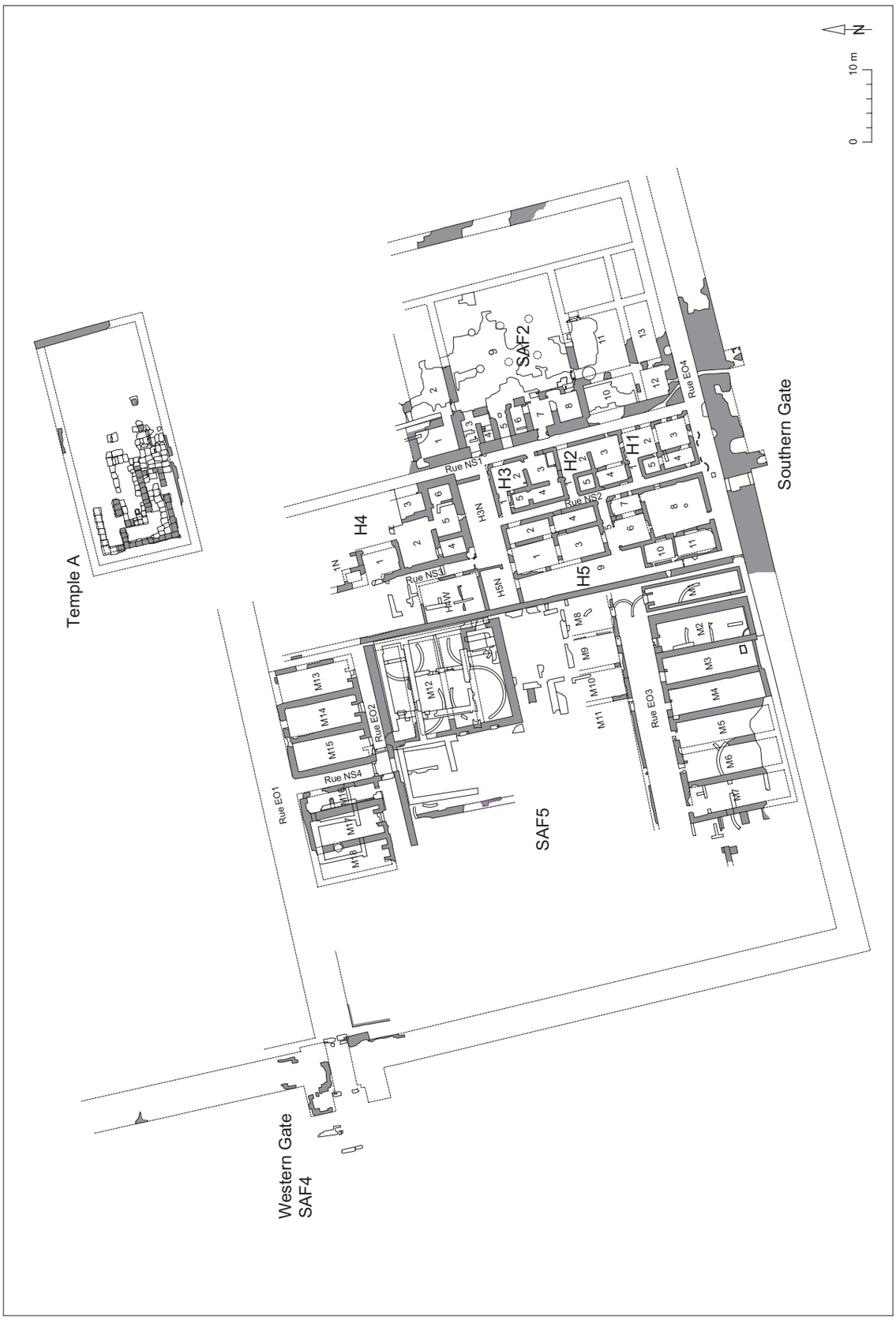

Fig. 4. Plan of the remains of SAV1 based on the 3-D laser scan

Fig. 5. Reconstruction plan of SAV1

Fig. 6. The different sectors of SAV1

3. OVERVIEW OF SAV1

(Fig. 6; Plans 1–4; Pl. 54)[31]

The New Kingdom town of Sai Island, situated on a sandstone outcrop bordering the eastern branch of the Nile, follows the typical form of an Egyptian fortified town.[32] While the western and central areas were relatively flat, the eastern part of the town slopes first gently downwards for about 2.0m and then steeply drops off towards the Nile with a height difference of about 8.0m. A c. 4.40m wide enclosure wall surrounded the approximately 240 × 120m large settlement.[33] The southern part of the town, SAV1, underlies a strict perpendicularity with roughly north-south and east-west oriented streets and large rectangular buildings. In contrast, the excavations in the northern and the western parts of the town present a different picture with a rather irregular layout of the streets and small, mostly domestic houses.[34] The central part (about two-thirds) of the settlement has so far not been thoroughly examined, though to the north of the small sandstone Temple A on the eastern side of the town, Building A has been excavated since 2013.[35] This building, similar to SAF2 to the south of the temple, proves to be very important for the internal structure of the town, since it shows that the orthogonal layout known from the southern part of the town extended further to the north.[36]

The southern part of the town was bordered in the north by the east-west oriented street Rue EO1. On its western side was the presumed main entrance into the settlement, labelled Gate SAF4.[37] From this gate the aforementioned street, thought to be one of the main thoroughfares of the town, led to the sandstone Temple A, which lies directly to the north of the street on the eastern side of the town. To the south of Rue EO1, three distinct sectors can be identified: in the west is the quarter SAF5 with silos and several rows of rectangular storage rooms, in the center a domestic quarter consisting of five houses (H1 to H5) and in the east the so-called governor's residence, SAF2. The storage area SAF5 is separated from the residential area by a north-south oriented dividing wall, with no passageway connecting the two city quarters. On the northern, southern and western sides, SAV1 was enclosed by fortification walls. A second known gate is situated in the southern enclosure wall, to the south of House H5.

When looking at the city map of the southern part of the New Kingdom town, a slight difference in alignment of the buildings between SAF5 in the west and the residential quarters in the east is noticeable. The reason for this is not clear, but perhaps it is an indication of different building phases between the eastern and western parts of the town. For the town in general, recent research has established three main phases for the development of the settlement,beginning in the early 18th Dynasty when Sai was probably a simple landing place and supply base, though the size and internal structure of this early settlement is not known.[38] The town enclosure was definitely established during the reign of Thutmose III,[39] together with Temple A,[40] Building A[41] and presumably the buildings of SAV1. As is exemplified by Temple A,[42] there were several building phases during the reign of Thutmose III, as well as under his successors Amenhotep II, Thutmose IV

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31 The naming of the different areas and the main streets derive from the excavation by M. Azim, while specific room numbers were assigned during the reexamination by the author.

32 Cf. Kemp 1972a, 651–656.

33 For the reconstruction of the enclosure wall and the expansion of the town see Chapter 5.

34 For SAV1 North see Doyen 2009, 17–20; Budka/Doyen 2013, 167–208; Doyen 2014, 367–375; for SAV1 West see Budka 2014b, 63–65; Budka 2015a, 45–46.

35 Budka 2014b, 61–63; Budka 2015a, 43–45; Budka 2016.

36 Budka 2015a, 51.

37 Cf. Azim 1975, 120.

38 This is supported by archaeological evidence from SAV1 East and around Temple A. Budka 2015a, 51.

39 Results from the excavation at SAV1 West confirm this dating. Budka 2015a, 45–46.

40 Thill 1997, 105–117, Azim/Carlotti 2011–2012, 39, 45; Budka 2014b, 60.

41 Budka 2014b, 61–63; Budka 2015a, 43–45.

42 Cf. Chapter 7.