Chapter 5: The environmental remains

As mentioned above (Chapter 1), work task 6 of the AcrossBorders project concentrated on landscape archaeology and environmental remains at Sai. Whereas the environmental settings of New Kingdom Sai were presented in Chapter 2, the present chapter focuses on various types of environmental remains. Botanical samples, zooarchaeological remains, in particular faunal remains (vertebrates and molluscs) as well as human remains from the New Kingdom town are presented here as contribution for reconstructing the living conditions on Sai in antiquity.[954]

Similar to the other work tasks of the AcrossBorders project, this line of research could also build upon recent advances in the field. In particular, research on agriculture, animal husbandry and food production has made much progress at most New Kingdom sites in Nubia in the last years and is still ongoing.[955] In the following, selected data, partly of preliminary character, about environmental remains from Sai Island will be presented. The botanical remains have been analysed with samples from SAV1 North, SAV1 East and SAV1 West as well as selected samples from the southern part of the New Kingdom town. The faunal remains are presented here as an overview, based on the collections of bones from SAV1 North and the large cellars at SAV1 East. The inventories of the latter will be published in detail elsewhere.[956] Molluscs have been identified from contexts at SAV1 East and SAV1 West and are presented by taxa in Chapter 5.3 (including very few specimens from SAC 5). Finally, human remains from the town area were investigated in 2015. Although the date of most of these bones seems to postdate the New Kingdom, the anthropological findings are presented here to complement the assessment of the environmental remains from the New Kingdom town of Sai (Chapter 5.4).

5.1 Mud bricks, cereals and the agricultural economy. Archaeobotanical investigations at the New Kingdom Town

by Frits Heinrich and Annette M. Hansen[957]

5.1.1 Introduction

Archaeobotany, or paleoethnobotany, is the study of subfossil plant materials, most notably seeds and fruits, from archaeological contexts in order to reconstruct past human – plant relationships. It is sometimes referred to as macro-archaeobotany to distinguish it from other disciplines that study plant remains, such as dendrology (the study of wood), anthracology (the study of charcoal), palynology (the study of pollen), phytolith analysis and starch grain analysis. Archaeobotanists study plant remains pre-

954 For recent work on the Holocene climate and environment and respective changes on Sai, including results from pollen analysis, see Hildebrand et al. 2018; Florenzano et al. 2019.

955 See, e.g., Cartwright and Ryan 2017.

956 Budka forthcoming b.

957 Frits Heinrich would like to thank Jaime van der Heul, who accompanied him as assistant during the 2015 field season. The authors also would like to thank Merit Hondelink (University of Groningen) for her assistance with microscopic photography and Remco Bronkhorst (University of Groningen) for photo-editing. Lastly, the authors wish to thank Julia Budka and the ERC AcrossBorders project for the logistical and financial support that made the participation in the project and this publication possible.

sent in anthropogenic contexts and as such archaeobotanical assemblages are directly related to human action: typically they are indicative of activities and behaviour regarding production and consumption, although signals from the wider environment may also be discerned. Ethnographic research (ethnobotany or ethnoarchaeobotany) aimed at documenting traditional agricultural practices is also a common element in archaeobotanical research.

During the 2015 field season archaeobotanical investigations were carried out at both the New Kingdom town on Sai Island and the Ottoman fortress that was later built on top of part of it (see Chapter 1.1). An ethnobotanical survey of wider Sai Island was also carried out. In this chapter we focus on the New Kingdom results, while the Ottoman period results and ethnobotanical study will be largely presented elsewhere, as will a study on the wood and charcoal remains.[958] Our primary aim is to characterise the agricultural and food economy of Sai during the New Kingdom and provide an insight into which crops were cultivated at the settlement and which wild plants were used. In addition to plant use for food, we will also reflect on other applications, such as fodder or fuel and construction materials. In line with the aims of the AcrossBorders project and this volume, we will also assess if the assemblage at New Kingdom Sai is typical when compared to contemporary Egyptian settlements, or if it discernibly reflects other influences. The Sai Island New Kingdom town was after all originally established as an Egyptian foothold in Nubia during the 18th Dynasty. It served as a springboard during the expansive wars into Kush and then quickly developed into a temple town.[959] While the social organisation of Nubian culture has often been interpreted from the perspective of connections with Egypt and sometimes led to an interpretation in favour of Egyptian technological superiority,[960] the agricultural and ecological realities of (Upper) Egypt and Nubia were indeed very similar.[961] On the other hand, it also has long been recognised that Nubia throughout history was an important corridor for the spread of various crops within Africa and between Africa, the wider Mediterranean and India;[962] it can, therefore, be envisioned that agricultural change through diffusion, provided it occurs, might well be visible in border regions such as at Sai Island.

Within our investigations we placed a focus on the study of mud or adobe architecture (besides mud bricks comprised of mud plasters and mortars). In Sudan and Egypt, as in many other arid regions throughout the world, the use of sundried mud bricks for construction has been ubiquitous for millennia and remains of importance today. The material has received considerable attention from archaeologists to study a variety of socioeconomic and technological aspects of early civilisations, including natural resource allocation, labour input, and social dynamics. Analyses of clay, loam, and other materials in mud bricks has added further insights into the logistics and economics of mud bricks and construction in general.[963] Analogous to pottery, a tempering agent is typically added to mud bricks in order to strengthen structural integrity. Besides products such as sand and ash, agricultural rest products (such as threshing remains) and domestic waste were (and are) commonly used for that purpose. Therefore, mud bricks may provide invaluable insights into agricultural production and domestic consumption, but also shed light on the weed ecology of arable fields and irrigation practices; thus making these architectural elements a proxy for the study of arable fields.[964] Mud bricks also have the advantage that they represent a more or less sealed context: although over time wind erosion will occur, and while some material might stick to the outside and a small degree of burrowing by insects is possible in the outer layers, the mud brick is uncontaminated on the inside. Therefore, the study of mud bricks has a rich tradition in archaeobotany.[965] Another interesting aspect of mud brick architecture is that the deposition of the bo-

[958] See Heinrich et al. forthcoming and Hansen et al. forthcoming a respectively.
[959] Budka 2017c; Budka 2017h, 15; see also Chapter 1.1.
[960] Cf. Fuller 1997 on Meroitic Nubia.
[961] Cf. Van Zeist 1987; Rowley-Conwy 1989; Fuller 1999; Fuller and Edwards 2001; Fahmy 2005; Ryan et al. 2012.
[962] Germer 1985; Fuller and Boivin 2009; Zohary et al. 2012; cf. Watson 1983.
[963] For Egypt, Kemp 2000 is seminal; for the Levant, see Homsher 2012 and Politis 1999; for Turkey, see Love 2012.
[964] Cappers 2008.
[965] E.g. Hopf 1983; Cartwright 1991; Chaix and Grant 1993; Smith 2003; Newton 2004; Cappers 2006; Cappers 2008; Cappers et al. 2009; Marinova et al. 2011; Ryan et al. 2012; Cappers and Neef 2012; Cappers et al. 2016.

tanical materials is largely intentional. The deposition of many other botanical materials in the archaeobotanical assemblage, even though they come from anthropogenic contexts and are ultimately the result of human action, is dependent on chance. Some materials are carelessly discarded (e.g. a date seed after the fleshy fruit is eaten), while many others survive because of minor accidents or economic inefficiencies. Chaff and finely chopped straw (together as a fraction referred to as *tibn* in Arabic), however, have a long tradition of being purposely added as a tempering agent, besides various other economic uses.[966] As tempering a mud brick with botanical materials is a deliberate action, it adds an additional dimension to studying agricultural decision making.[967] We will, therefore, investigate if meaningful differences between mud bricks and mud plasters and mortars exist between different structures within the Pharaonic settlement, while we will also make a preliminary comparison with the Ottoman mud brick architecture.

5.1.2 Sampling strategy

Archaeobotanical sampling at the Pharaonic settlement at Sai focused on three main types of samples: mud brick architecture (mud bricks, plasters, and mortars) from the main walls (from sectors SAV1, SAV1 West and SAV1 North), soil samples and loose/surface finds. Most loose/surface finds had been collected by the AcrossBorders fieldwork team over the previous seasons, while the soil samples were taken from domestic contexts during the 2015 field season. The mud brick material was collected by the archaeobotanical team in 2015. The focus on mud brick architecture allowed us to sample more or less evenly throughout the New Kingdom town as the architecture was still in place in previously excavated areas. Sample and context information for each sample is presented in Tabs. 28–30. For reasons of comparison, similar data on the Ottoman mud architecture is also provided in Tab. 28.

5.1.3 Sample processing

While loose/surface finds require no processing, mud bricks and soil samples do in order to separate the botanical materials from clay and soil. The volumes of the soil samples were measured and their weights were taken, after which they were dry-sieved over a 0.5mm sieve. Non-botanical archaeological remains (e.g. pottery) were kept for their respective specialists, while stones and sand were discarded; of the botanical residues the weights and volumes were taken. All mud bricks were photographed in situ and their locations were documented prior to removal from the walls; the visible sides were also brushed to avoid including potentially foreign material. Care was taken to, where possible, select complete mud bricks without damaging the structural integrity of the walls (Pls. 129, 130). The weight and dimensions of each mud brick were registered; of broken bricks only the dimensions that could be established with certainty were recorded (e.g. the width and height but not the length of a brick that had clearly broken in two pieces). Cut-offs were taken from complete mud bricks; they were removed with a saw and were then photographed, weighed and placed in storage for future reference or other types of research. The mud bricks were then placed in buckets filled with water and covered with fine-meshed cloth to prevent foreign materials from blowing in, after which they were left to soak overnight. The next day they were carefully poured over a 0.5mm sieve. Through the careful application of water under low pressure from above the entire brick could be processed. Pottery and other archaeological non-botanical materials that were visible were removed at this stage and stored for the relevant specialists. Subsequently, the residues were placed in fine-meshed cloth pouches and left to dry. When completely dried, the residues were dry-sieved over a 0.5mm sieve to remove the last sand and clay, after which the samples were weighed again and their volumes were taken. Mud brick mortars were only taken from in between in situ mud bricks,

966 Van der Veen 1999.

967 Some exceptions remain, however. A cereal kernel, for instance, is intended for human consumption, but often during processing some specimens are lost or farmers may deem it inefficient to collect every last specimen from the threshing remains. Incidental cereal kernels and florets are, therefore, encountered in mud architecture and ceramics, see Hansen et al. 2017.

Mud brick ID	Dimensions*			Weight MB	Weight botanics	Density or % botanics	Vol. botanics	Area	Feature/Quarter	Context type	Relative dating
	L	W	H								
MB1	41.5	21.0	12.0	11660.0	29.00	0.25	162.0	SAV1W	Feature 100, Enclosure Wall	Wall	New Kingdom
MB2	43.0	24.5	11.5	13420.0	46.00	0.34	160.0	SAV1W	Feature 100, Enclosure Wall	Wall	New Kingdom
MB3	40.0	21.5	9.0	9740.0	29.00	0.30	102.0	SAV1W	Feature behind 100	Wall	New Kingdom
MB4	21.5	18.5	10.0	4960.0	20.73	0.42	12.0	SAV1W	Feature behind 100	Wall	New Kingdom
MB5	39.0			9980.0	4.60	0.05	4.0	SAV1N	N4 Enclosure Wall	Wall	New Kingdom
MB6	41.0			4740.0	21.02	0.44	20.0	SAV1N	N4 Enclosure Wall	Wall	New Kingdom
MB7	39.0	18.0	10.0	8770.0	8.01	0.09	7.0	SAV1N	N3 Small Tower	Tower	New Kingdom
MB8	40.0	19.0	10.05	9110.0	5.71	0.06	6.0	SAV1N	N3 Small Tower	Tower	New Kingdom
MB9	31.0		8.0	5700.0	5.00	0.09	6.0	SAV1N	N2 Large Tower	Tower	New Kingdom
MB10	34.0	17.0	6.0	5800.0	6.85	0.12	12.0	SAV1N	N2 Large Tower, Tumble N	Tower	New Kingdom
MB11	41.0	16.0	7.0	6800.0	6.35	0.09	10.0	SAV1N	N2 Large Tower, Extension	Tower	New Kingdom
MB12	30.0	18.0	9.0	4710.0	20.00	0.42	50.0	SAV1N	1 Curve	Wall	New Kingdom
MB13	35.0	17.0	8.0	5220.0	32.00	0.61	74.0	SAV1N	1 Curve	Wall	New Kingdom
MB14	36.0	16.0	9.0	6400.0	12.49	0.20	15.0	SAV1N	22 (Round Wall)	Wall	New Kingdom
MB15	34.0	17.0	8.0	6470.0	64.00	0.99	110.0	SAV1N	27	Wall	New Kingdom
MB16	40.5	16.0	6.0	5740.0	15.45	0.27	45.0	SAV1N	N8, 34N	Wall	New Kingdom
MB17			10.5	7270.0	3.55	0.05	5.0	SAV1N	42S	Wall	New Kingdom
MB18	36.0	16.0	9.0	7770.0	1.53	0.02	1.50	SAV1N	11	Wall	New Kingdom
MB19	33.0	16.0	10.5	6570.0	0.88	0.01	1.0	SAV1N	N/A	N/A	Uncertain date

* Dimensions = cm; Weight MB = kilo*1000=gram; Weight botanics = gram; Density or % botanics=Weight botanics (g) /Weight MB (g)*100; Vol. botanics=ml

Tab. 28 Dimensions and context data for mud brick samples

Mud brick ID	Dimensions*			Weight MB	Weight botanics	Density or % botanics	Vol. botanics	Area	Feature/Quarter	Context type	Relative dating
	L	W	H								
MB20	33.0	17.0	10.5	4990.0	4.10	0.08	5.0	SAV1N	N/A	N/A	Uncertain date
MB21	33.0	16.0	10.0	5170.0	1.08	0.02	1.50	SAV1N	N/A	N/A	Uncertain date
MB22	33.0	16.0	10.0	6400.0	0.87	0.01	3.0	SAV1N	N/A	N/A	Uncertain date
MB23	32.0	15.0	9.0	5280.0	13.17	0.25	10.0	SAV1N	N/A	N/A	Uncertain date
MB24	36.0	18.5	9.0	7750.0	105.00	1.35	550.0	Ottoman Fortress	Interior Wall, Southern Area	Wall	Ottoman
MB25	39.0	23.0	9.0	9390.0	338.00	3.60	120.0	Ottoman Fortress	Southern Outer Wall	Wall	Ottoman
MB26	38.0	20.0	9.5	6980.0	3.67	0.05	15.0	SAV1	Southern Pharaonic Enclosure Wall	Wall	New Kingdom
MB27	40.0	16.5	8.0	6680.0	4.81	0.07	5.0	SAF2	Western Side, in Doorway	Wall	New Kingdom
MB28	40.0	18.0	9.0	8740.0	12.00	0.14	18.0	SAV1 Sur. Temple A	Structure N of Temple A	Wall	New Kingdom
MB29	31.0	16.0	11.0	5160.0	13.58	0.26	20.0	SAV1 Sur. Temple A	Temenos S of Temple A	Wall	New Kingdom
MB30	41.5	22.0	8.0	8620.0	355.00	4.12	1150.0	Ottoman Fortress	South-West Tower	Tower	Ottoman
MB31	39.0	26.0	10.5	11950.0	15.78	0.13	20.0	SAV1	1st Southern Magazine, Eastern wall	Wall	New Kingdom
MB32	36.0	16.5	10.0	8420.0	263.00	3.12	1000.0	Ottoman Fortress	North-West Tower	Tower	Ottoman
MB33	37.0	17.5	8.0	6400.0	10.14	0.16	10.0	SAV1	Northern Magazine	Wall	New Kingdom
MB34	Storage	Storage	Storage	4700.0	8.47	0.18	10.0	SAV1N	Eboulement A; Square 190/2260	Wall	New Kingdom

* Dimensions = cm; Weight MB = kilo*1000=gram; Weight botanics = gram; Density or % botanics = Weight botanics (g) /Weight MB (g)*100; Vol. botanics = ml

Tab. 28 *continued* Dimensions and context data for mud brick samples.

Mortar/ Plaster ID	Weight Mortar*	Weight botanics	Density or % botanics	Vol. botanics	Area	Feature/Quarter	Context type	Assoc. Mud bricks	Relative dating
MO1	1800.00	2.09	0.12	2.5	SAV1W	Feature 100, Enclosure Wall	Wall	MB1, MB2	New Kingdom
MO2	2820.00	3.33	0.12	3.0	SAV1N	N2 Large Tower, Tumble N	Tower	MB10	New Kingdom
MO3	1620.00	3.02	0.19	3.0	SAV1N	N2 Large Tower, Extension	Tower	MB11	New Kingdom
MO4	6000.00	2.99	0.05	5.0	SAV1N	1 Curve	Wall	MB12, MB13	New Kingdom
MO5	1380.00	80.0	5.80	106.0	SAV1N	27	Wall	MB15	New Kingdom
MO6	1310.00	4.43	0.34	5.0	SAV1N	N8, 34N	Wall	MB16	New Kingdom
MO7	920.00	3.27	0.36	3.0	SAV1N	11	Wall	MB18	New Kingdom
MO8	1860.00	42.0	2.26	150.0	Ottoman Fortress	Interior Wall, Southern Area	Wall	MB24	Ottoman
MO9	1181.00	130.0	11.01	350.0	Ottoman Fortress	Southern Outer Wall	Wall	MB25	Ottoman
MO10	1370.00	1.61	0.12	0.5	SAF2	Western Side, in Doorway	Wall	MB27	New Kingdom
MO11	1450.00	1.23	0.08	1.0	SAV1 Sur. Temple A	Structure N of Temple A	Wall	MB28	New Kingdom
MO12	1110.00	33.0	2.97	74.0	Ottoman Fortress	South-West Tower	Tower	MB30	Ottoman
MO13	2110.00	13.73	0.65	20.0	SAV1	1st Southern Magazine, Eastern wall	Wall	MB31	New Kingdom
MO14	750.00	1.50	0.20	1.0	SAV1	Northern Magazine	Wall	N/A	New Kingdom
P1	400.00	2.0	0.5	2.0	SAV1N	34S	Wall	N/A	New Kingdom
P2	1130.00	1.0	0.1	1.0	SAV1N	N17	Pit	N/A	New Kingdom
P3	300.00	1.0	0.3	1.0	SAV1 Sur. Temple A	Silo below Temple A	Plaster	N/A	New Kingdom
P4	1020.00	41.0	4.0	200.0	Ottoman Fortress	Interior Wall, near SW Tower	Wall	N/A	Ottoman

* Weight Mortar = g=kilo*1000; Weight botanics = gram; Density or % botanics = Weight botanics (g) /Weight MB (g)*100; Vol. botanics = ml

Tab. 29 Weight and context data for mortar and plaster samples

ID	Area	Location	SU	Find no.	Relative dating	Context function / feature*	Vol. soil	Vol. botanics	Weight sample	Weight botanics
S1	SAV1W	around Feature 100	N/A	N/A	Post-New Kingdom/Ottoman	Feature 100 = Enclosure Wall in SAV1 West	N/A	N/A	N/A	N/A
S2	SAV1W	SQ1	587	1366/2014	New Kingdom	Organic finds from loose debris	N/A	N/A	N/A	N/A
S3	SAV1W	SQ1	590	1376/2014	New Kingdom	Organic finds from loose sandy debris	N/A	N/A	N/A	N/A
S4	SAV1W	SQ1	588	1373/2014	New Kingdom	Sandy layer with some mud brick fragments	N/A	N/A	N/A	N/A
S5	SAV1W	SQ1	590	1377/2014	New Kingdom	Loose sandy debris	N/A	N/A	N/A	N/A
S7	SAV1W	SQ1	572	1324/2014	New Kingdom	Sandy debris adjacent to Enclosure Wall	N/A	N/A	N/A	N/A
S8	SAV1W	SQ1	584	1341/2014	(Post-)New Kingdom	Pit in SE corner of square; sandy filling; potentially mixed context	N/A	N/A	N/A	N/A
S10	SAV1W	SQ1	555	1208/2014	New Kingdom	Sandy filling from pit inside enclosure wall Feature 100	N/A	N/A	N/A	N/A
S11	SAV1W	SQ1	563	1244/2014	New Kingdom	Sandy filled pit layer; mixed material	N/A	N/A	N/A	N/A
S12	SAV1W	SQ1	511	662/2014	(Post-)New Kingdom	Debris layer above enclosure wall; mixed material	N/A	N/A	N/A	N/A
S13	SAV1W	SQ2	508	630/2014	Post-New Kingdom/ Ottoman	Debris of destroyed mud brick; mixed material	N/A	N/A	N/A	N/A
S14	SAV1W	SQ1W + NW	511	1202/2014	(Post-)New Kingdom	Debris layer above enclosure wall; mixed material	N/A	N/A	N/A	N/A
S15	SAV1W	SQ1, adjacent Feature 100	501	707/2014	(Post-)New Kingdom	Sandy layer close to Enclosure Wall	N/A	N/A	N/A	N/A
S16	SAV1W	SQ1	501	698/2014	New Kingdom	Sandy layer	N/A	N/A	N/A	N/A
S17	SAV1W	SQ2	516	825/2014	(Post-)New Kingdom	Mud brick debris; still mixed material	N/A	N/A	N/A	N/A
S18	SAV1W	SQ1W	522	847/2014	(Post-)New Kingdom	Sandy layer; possibly windblown sand; potentially Post-New Kingdom	N/A	N/A	N/A	N/A

* Context function/feature = e.g. floor, pit, hearth; Vol. Soil = ml; Vol. botanics = ml; Weight sample = gram; Weight botanics = gram

Tab. 30 Context descriptions and measurements for surface and soil samples

ID	Area	Location	SU	Find no.	Relative dating	Context function / feature*	Vol. soil	Vol. botanics	Weight sample	Weight botanics
S19	SAV1W	SQ1W	524	873/2014	(Post-)New Kingdom	Sandy layer with mud brick debris; Post-New Kingdom	N/A	N/A	N/A	N/A
S20	SAV1W	SQ1	536	774/2014	Post-New Kingdom	Debris layer with mud brick fragments; Post- New Kingdom	N/A	N/A	N/A	N/A
S21	SAV1W	SQ1W	529	882/2014	(Post-)New Kingdom	Charcoal from surface cleaning; date unclear	N/A	N/A	N/A	N/A
S22	SAV1W	SQ2	510	651/2014	New Kingdom	Debris layer with loose mud bricks; date unclear	N/A	N/A	N/A	N/A
S23	SAV1W	SQ1W	540	1019/2014	New Kingdom	Sandy layer W of Enclosure Wall	N/A	N/A	N/A	N/A
S24	SAV1W	SQ1W	534	914/2014	Post-New Kingdom	Compact mud brick pieces and much organic material	N/A	N/A	N/A	N/A
S25	SAV1W	SQ1	548	1130/2014	New Kingdom	Loose sandy debris	N/A	N/A	N/A	N/A
S26	SAV1E	SQ1B	051	2016/2014	(Post-)New Kingdom	SU 051 = sandy layer, with a lot of mud brick debris; potentially mixed material	N/A	N/A	N/A	N/A
S27	SAV1E	SQ4/4A	009	120/2014	Sub-recent	SQ4, 2,5-5,5 m W-E / 9-10 m N-S ; SQ4A 2,50-6,50 m W-E / 0-2 m N-S; dung with plant remains	N/A	N/A	N/A	N/A
S28	SAV1E	SQ1B	051	2034/2014	(Post-)New Kingdom	SU 051 = sandy layer, with a lot of mud brick debris; potentially mixed material	N/A	N/A	N/A	N/A
S29	SAV1E	SQ1B	049	2005/2014	New Kingdom	Loose sandy debris with mud bricks; mixed material	N/A	N/A	N/A	N/A
S30	SAV1E	SQ3	063	2157/2014	New Kingdom	In Feature 29 (pit); sandy filling below SU 060 and SU 20	N/A	N/A	N/A	N/A
S31	SAV1E	SQ4	079	2274/2014	(Post-)New Kingdom	Layer of debris of mud bricks in Feature 15; potentially mixed material	N/A	N/A	N/A	N/A
S32	SAV1E	SQ3	030	0395/2014	New Kingdom	Sandy material, partly loamy with mud brick debris; potentially mixed material	N/A	N/A	N/A	N/A

Context function/feature = e.g. floor, pit, hearth; Vol. Soil = ml; Vol. botanics = ml; Weight sample = gram; Weight botanics = gram

Tab. 30 *continued* Context descriptions and measurements for surface and soil samples

ID	Area	Location	SU	Find no.	Relative dating	Context function / feature*	Vol. soil	Vol. botanics	Weight sample	Weight botanics
S33	SAV1E	SQ4A	004	0132/2014	New Kingdom	Sandy filling of Feature 7 = pit; topmost layer and potentially mixed material	N/A	N/A	N/A	N/A
S34	SAV1E	SQ1B	018	0216/2014	(Post-)New Kingdom	Sandy filling of depression in NW corner of SQ1B; potentially mixed material	N/A	N/A	N/A	N/A
S35	SAV1E	SQ3	015	0175/2014	(Post-)New Kingdom	Sandy mixed surface material; disturbed context	N/A	N/A	N/A	N/A
OR1	SAV1W	SQ1S	733	0844/2015	18th Dynasty	Rest of silty material below the wall (SU 712) in W part on top of SU 724 (ashy layer)	5.0	5.0	3.0	3.0
CH1	SAV1E	SQ2B, 7–8m to E, debris around Feature 27, before Pl. 5	N/A	326/2013	Post-New Kingdom/Ottoman	Finds associated with Feature 27, an organic basket. These finds are Post-New Kingdom and potentially Ottoman in date	40.0	40.0	13.0	13.0
CH2	SAV1W	SQ1, NW Corner	502	0624/2014	(Post-)New Kingdom	Mixed finds from a debris layer	81.0	81.0	17.0	17.0
CH3	SAV1W	SQ1S, Pr. 13	682		18th Dynasty	Ashy layer from horizon below SU 681	68.0	68.0	40.0	40.0
CH4	SAV1W	SQ1, Pr. 18	707		18th Dynasty	Probe of Sampling area: Profile 18 (not yet excavated)	7.0	1.0	9.0	1.0
CH5	SAV1W	SQ1	716	0812/2015	18th Dynasty	Below brick wall (SU 712) in NE part of SQ1S; E-area	120.0	120.0	46.0	46.0
CH6	SAV1E	Feature 15	321	1677/2015	18th Dynasty	Cellar (Feature 15)	100.0	100.0	33.0	33.0
CH7	SAV1E	Feature 15	321	1677a/2015	18th Dynasty	Cellar (Feature 15)	500.0	71.0	466.0	41.0
W1	SAV1N	25N	Wall	N/A	New Kingdom	Debris layer; mixed wood fragments; potentially mixed material	N/A	N/A	N/A	N/A
W2	SAV1N	33N	Wall	N/A	New Kingdom	Debris layer; mixed wood fragments; potentially mixed material	N/A	N/A	N/A	N/A

Context function/feature = e.g. floor, pit, hearth; Vol. Soil = ml; Vol. botanics = ml; Weight sample = gram; Weight botanics = gram

Tab. 30 *continued* Context descriptions and measurements for surface and soil samples

ID	Area	Location	SU	Find no.	Relative dating	Context function / feature*	Vol. soil	Vol. botanics	Weight sample	Weight botanics
W3	SAV1W	SQ1A	587	1366/2014	New Kingdom	Debris layer; mixed wood fragments; potentially mixed material	N/A	N/A	N/A	N/A
W4	SAV1W	SQ1A	556	1275/2014	New Kingdom	Debris layer; mixed wood fragments; potentially mixed material	N/A	N/A	N/A	N/A
W6	SAV1E	SQ1B	040	511/2014	(Post-)New Kingdom	Debris layer; mixed wood fragments; potentially mixed material	N/A	N/A	N/A	N/A
W7	SAV1E	SQ1B	051	2026/2014	Post-New Kingdom	2026/2014 = basketry; SU 051 = sandy layer, with a lot of mud brick debris; potentially mixed material	N/A	N/A	N/A	N/A
OL1	SAV1W	SQ1S	609	N/A	New Kingdom	Organic layer Subsample 1/2 + 2/2 added together	750.0	22.0	812.0	15.0
O1A + O1B	SAV1 Sur. Temple A	Temenos S of Temple A	N/A	N/A	New Kingdom	From a mortar	N/A	N/A	N/A	N/A
O5	SAV1E	SQ2, Feature 14, in Find Number 40	N/A	49/2013	Early 18th Dynasty	Charcoal within pot SAV1E 49/2013	N/A	N/A	N/A	N/A

Context function/feature = e.g. floor, pit, hearth; Vol. Soil = ml; Vol. botanics = ml; Weight sample = gram; Weight botanics = gram

Tab. 30 *continued* Context descriptions and measurements for surface and soil samples

typically from beneath a sampled mud brick. Mud brick plaster, which appears as clearly distinguishable thick 'sheets' on walls (Pl. 131) was loosened using a knife or trowel and carefully removed. The processing protocol for mortars and plasters was largely identical to that for mud bricks, with the exception that neither cut-offs were made nor dimensions taken.

5.1.4 The samples

From the New Kingdom town 30 mud bricks, 11 mortars, 3 plasters, 9 soil samples and 34 loose/surface finds were studied. In Tab. 29 the recorded metrics, relative dating and context information is provided for the mud bricks, while Tabs. 30 and 31 provide the same information for the mud plasters and mud mortars and for the soil samples and loose/surface finds respectively. Some remarks as to dating, context, possible biases and some other observations shall be made here. A few of the mud bricks encountered at Sai had surface markings; some had grooves made with fingers (MB21 and MB22) and others marks made by fingers impressed from above (MB28 with two fingers, MB19 and MB20 with three fingers) (Pl. 132).[968] While not quite formal production stamps,[969] the markings may have had an administrative or logistical meaning[970] and we will assess if this group of marked bricks stands out in any way. It should also be noted that the dimensions of MB24, a fragment of a mud brick that had been collected in a previous season and was in storage, could not be recorded due to its fragmentary nature. The occasional inclusion of pottery as temper aided the relative dating of some mud bricks. With respect to the loose/surface finds, it was ascertained that some finds are possibly of Post-Pharaonic origin or are sub-recent, which cannot always be conclusively established through visual evaluation in desiccated materials (see Tab. 30). Lastly, a bias typically exists with respect to loose/surface finds as they are handpicked by non-botanists; larger remains that can be more easily spotted in the field and can be easily recognised as botanical tend to be overrepresented in such material (e.g. large fruits). Tabs. 31, 32 and 33 provide the results of the botanical analyses of the different categories of samples and give an overview of the taxa and plant parts present in each sample as well as their quantifications.

5.1.5 Archaeobotanical analysis

The archaeobotanical analysis of the samples was conducted at the Laboratory for Palaeobotany and Palynology at the Groningen Institute of Archaeology at Groningen University, the Netherlands, using a standard binocular light microscope. As aids in the archaeobotanical identification, the institute's modern and archaeological reference collection as well as the identification manuals and plant atlases by Mark Nesbitt, René T.J. Cappers et al., René T.J. Cappers and Reinder Neef, Reinder Neef et al. and René T.J. Cappers and Renée M. Bekker were used; their use for specific identifications is cited in the text.[971] For general ecological reference the *Flora of Egypt* by Loutfy Boulos was used.[972] Before proceeding to the results, we will briefly reflect on some terminological issues and biases in archaeobotanical research (5.1.5.1), followed by a note on preservation conditions at Sai (5.1.5.2).

5.1.5.1 On crops and taxa and the absence of certain crops from the assemblage

The classification system for organisms that biologists use is taxonomy: any rank or grouping within taxonomy is referred to as a taxon (plural: taxa), such as family, genus, species or subspecies. In the common parlance of agriculture and trade (and likewise in the history and archaeology of these subjects), the grouping of plants is typically practical and based on similarities in use (e.g. 'food crops', 'fruit trees', 'vegetables').

968 For the marks on mud bricks from Sai, see Doyen 2017, 25–28 with references.
969 Cf. Kemp 2000, 89.
970 See Doyen 2017, 26 with examples given in fn. 77.
971 Nesbitt 2006; Cappers et al. 2009; Cappers and Neef 2012; Neef et al. 2012; Cappers and Bekker 2013.
972 Boulos 1999–2005.

			Mud brick ID	MB1	MB2	MB3	MB4
			Area	SAV1W	SAV1W	SAV1W	SAV1W
			Feature / Quarter	Feature 100, Enclosure Wall	Feature 100, Enclosure Wall	Feature behind 100	Feature behind 100
			Context Type	Wall	Wall	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				
Acacia nilotica	Nile acacia	Seed	Charred				
Acacia nilotica	Nile acacia	Seed	Desiccated				
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated				
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated		5	7	
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred				
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated			32	
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				
Boraginaceae	Borage	Seed	Desiccated				
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred				
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated				
Centaurea sp.	Centaury	Fruit	Charred			1	
Centaurea sp.	Centaury	Fruit	Mineralised				
Citrullus lanatus	Watermelon	Seed	Desiccated				
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated				
Cyperaceae Type 1	Sedge family	Seed	Desiccated			1	
Cyperaceae Type 2	Sedge family	Seed	Desiccated			5	
Echium sp.	*Echium* sp.	Seed	Mineralised	1	10	1	
Fabaceae	Legume family	Leaf	Desiccated	7		13	
Fabaceae	Legume family	Seed	Charred		59	1	
Fabaceae	Legume family	Seed	Modern			27	
Hordeum vulgare hulled	Barley	Floret	Charred				
Hordeum vulgare hulled	Barley	Floret	Desiccated	12	14	1	
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred				
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated				
Hordeum vulgare	Barley	Rachis (node + internode)	Charred				
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	351	586	33	
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated		3		
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated	14	122	7	
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp	Charred				

Tab. 31 Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred				
Palmae	Palm family	Wood	Charred				
Panicum cf. *turgidum*/*miliaceum*	Thaman/broomcorn millet	Fruit	Desiccated				
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated				
Papaveraceae	Poppy family	Seed	Charred			9	
Phalaris sp.	Canary grass	Fruit	Charred				
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated				
Poaceae	Grass family	Fruit	Desiccated			6	
Poaceae	Grass family	Infructescence	Desiccated				
Poaceae	Grass family	Palea/Lemma	Desiccated			3	
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated			2	
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated			19	
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated				
Triticeae	Cereal indet.	Seed	Charred				
Triticeae	Cereal indet.	Seed	Desiccated	4	3	1	
Triticeae	Cereal indet.	Palea/Lemma	Desiccated		2		
Triticeae	Cereal indet.	Straw	Desiccated	++++			
Triticeae	Cereal indet.	Culm nodes	Charred			1	
Triticeae	Cereal indet.	Culm nodes	Desiccated	31	46	23	
Triticeae	Cereal indet.	Culm base	Charred			2	
Triticeae	Cereal indet.	Culm base	Desiccated			6	
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated		7		
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred				
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated				
Indeterminate							
Calyx	N/A	Calyx	Desiccated				
Fruit indet.	N/A	Fruit	Charred	+	++	+	
Fruit indet.	N/A	Fruit	Desiccated	+	++	++++	+
Leaf	N/A	Leaf	Desiccated				
Pedicel	N/A	Pedicel	Desiccated			4	
Root/Rhizome	N/A	Root/Rhizome	Desiccated			3	
Wood TBI	N/A	Wood	Charred	+	+		++
Wood TBI	N/A	Wood	Desiccated		+		+
Other finds							
Animal bone	N/A	N/A	Desiccated	+			+
Animal dung indeterminate	N/A	N/A	Desiccated				+
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated		+		
Faience or glaze fragments	N/A	N/A	N/A				

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB5	MB6	MB7	MB8	MB9
			Area	SAV1N	SAV1N	SAV1N	SAV1N	SAV1N
			Feature / Quarter	N4 Enclosure Wall	N4 Enclosure Wall	N3 Small Tower	N3 Small Tower	N2 Large Tower
			Context Type	Wall	Wall	Tower	Tower	Tower
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Desiccated	1				
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated					
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated					
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred					
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated	4				
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated					
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated					
Boraginaceae	Borage	Seed	Desiccated					
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred					
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated					
Cyperaceae Type 1	Sedge family	Seed	Desiccated					
Cyperaceae Type 2	Sedge family	Seed	Desiccated					
Echium sp.	*Echium* sp.	Seed	Mineralised					
Fabaceae	Legume family	Leaf	Desiccated	11		13	3	1
Fabaceae	Legume family	Seed	Charred					
Fabaceae	Legume family	Seed	Modern					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Floret	Desiccated					
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred					
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated				1	
Hordeum vulgare	Barley	Rachis (node + internode)	Charred			1		
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated					
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated					
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated					
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp	Charred					

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred					
Palmae	Palm family	Wood	Charred		+			
Panicum cf. *turgidum*/*miliaceum*	Thaman/broomcorn millet	Fruit	Desiccated				1	
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated					
Papaveraceae	Poppy family	Seed	Charred					
Phalaris sp.	Canary grass	Fruit	Charred					
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated					
Poaceae	Grass family	Fruit	Desiccated	20				
Poaceae	Grass family	Infructescence	Desiccated					
Poaceae	Grass family	Palea/Lemma	Desiccated					
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated					
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated					
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated					
Triticeae	Cereal indet.	Seed	Charred				1	
Triticeae	Cereal indet.	Seed	Desiccated	2				
Triticeae	Cereal indet.	Palea/Lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Desiccated	++	+	++	++	++
Triticeae	Cereal indet.	Culm nodes	Charred			1		
Triticeae	Cereal indet.	Culm nodes	Desiccated				1	
Triticeae	Cereal indet.	Culm base	Charred					
Triticeae	Cereal indet.	Culm base	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated					
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred					
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated				3	
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred					
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated					
Indeterminate								
Calyx	N/A	Calyx	Desiccated					
Fruit indet.	N/A	Fruit	Charred					
Fruit indet.	N/A	Fruit	Desiccated	++	+		+	
Leaf	N/A	Leaf	Desiccated					++
Pedicel	N/A	Pedicel	Desiccated	2				
Root/Rhizome	N/A	Root/Rhizome	Desiccated					
Wood TBI	N/A	Wood	Charred	++	++	++	++	+++
Wood TBI	N/A	Wood	Desiccated		++	++		++
Other finds								
Animal bone	N/A	N/A	Desiccated	+		+	+	+
Animal dung indeterminate	N/A	N/A	Desiccated	+	++			+
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated					
Faience or glaze fragments	N/A	N/A	N/A					

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB10	MB11	MB12	MB13
			Area	SAV1N	SAV1N	SAV1N	SAV1N
			Feature / Quarter	N2 Large Tower, tumble N	N2 Large Tower, extension	1 Curve	1 Curve
			Context Type	Tower	Tower	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				
Acacia nilotica	Nile acacia	Seed	Charred				
Acacia nilotica	Nile acacia	Seed	Desiccated		1		
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated				
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated				
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred			1	
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated	1			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated			1	
Boraginaceae	Borage	Seed	Desiccated				
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred				
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated				
Centaurea sp.	Centaury	Fruit	Charred				
Centaurea sp.	Centaury	Fruit	Mineralised				2
Citrullus lanatus	Watermelon	Seed	Desiccated		1	3	
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated				
Cyperaceae Type 1	Sedge family	Seed	Desiccated				
Cyperaceae Type 2	Sedge family	Seed	Desiccated				
Echium sp.	*Echium* sp.	Seed	Mineralised			1	
Fabaceae	Legume family	Leaf	Desiccated	2	2	26	10
Fabaceae	Legume family	Seed	Charred				
Fabaceae	Legume family	Seed	Modern				
Hordeum vulgare hulled	Barley	Floret	Charred				3
Hordeum vulgare hulled	Barley	Floret	Desiccated				
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred				2
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated				
Hordeum vulgare	Barley	Rachis (node + internode)	Charred	5	2	3	5
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated			10	1
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated				
Hordeum vulgare ssp. vulgare	6-row barley	Rachis (node + internode)	Desiccated				
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp	Charred				1

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred				
Palmae	Palm family	Wood	Charred				
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcorn millet	Fruit	Desiccated			1	
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated				
Papaveraceae	Poppy family	Seed	Charred				
Phalaris sp.	Canary grass	Fruit	Charred				
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated		1		
Poaceae	Grass family	Fruit	Desiccated	1		2	
Poaceae	Grass family	Infructescence	Desiccated			1	
Poaceae	Grass family	Palea/Lemma	Desiccated				
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated				
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated				
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated				
Triticeae	Cereal indet.	Seed	Charred	1	2	3	2
Triticeae	Cereal indet.	Seed	Desiccated			1	
Triticeae	Cereal indet.	Palea/Lemma	Desiccated	1			
Triticeae	Cereal indet.	Straw	Desiccated	++	++	+++	
Triticeae	Cereal indet.	Culm nodes	Charred			1	
Triticeae	Cereal indet.	Culm nodes	Desiccated	1		4	
Triticeae	Cereal indet.	Culm base	Charred				
Triticeae	Cereal indet.	Culm base	Desiccated				
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred				2
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated	1			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred	1	1	1	2
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated				
Indeterminate							
Calyx	N/A	Calyx	Desiccated				
Fruit indet.	N/A	Fruit	Charred	+		+	+
Fruit indet.	N/A	Fruit	Desiccated	+	+	+++	+
Leaf	N/A	Leaf	Desiccated			++	
Pedicel	N/A	Pedicel	Desiccated			1	
Root/Rhizome	N/A	Root/Rhizome	Desiccated			1	
Wood TBI	N/A	Wood	Charred	+++	+++	++++	+++
Wood TBI	N/A	Wood	Desiccated	+++		++	+
Other finds							
Animal bone	N/A	N/A	Desiccated	++	++	+	+
Animal dung indeterminate	N/A	N/A	Desiccated	+++	+		++
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated			++	
Faience or glaze fragments	N/A	N/A	N/A			+	

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB14	MB15	MB16	MB17	MB18
			Area	SAV1N	SAV1N	SAV1N	SAV1N	SAV1N
			Feature / Quarter	22 (Round Wall)	27	N8, 34N	42S	11
			Context Type	Wall	Wall	Wall	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A	+			+	+
Acacia nilotica	Nile acacia	Seed	Charred	1				
Acacia nilotica	Nile acacia	Seed	Desiccated					
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated					
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated					
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred					
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated		1			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated		2			
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated					
Boraginaceae	Borage	Seed	Desiccated				8	
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred					
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated					
Cyperaceae Type 1	Sedge family	Seed	Desiccated					
Cyperaceae Type 2	Sedge family	Seed	Desiccated					
Echium sp.	*Echium* sp.	Seed	Mineralised				1	
Fabaceae	Legume family	Leaf	Desiccated	125	1		4	9
Fabaceae	Legume family	Seed	Charred					
Fabaceae	Legume family	Seed	Modern					
Hordeum vulgare hulled	Barley	Floret	Charred				1	
Hordeum vulgare hulled	Barley	Floret	Desiccated	1	2			
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred					
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated	2				
Hordeum vulgare	Barley	Rachis (node + internode)	Charred	2				
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	4	33	92		
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated					
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated		20			
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp	Charred			1		

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaenethebaica*	Doum palm	Fragmented endocarp	Charred	1		1	1	
Palmae	Palm family	Wood	Charred	++				
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcorn millet	Fruit	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated	1				
Papaveraceae	Poppy family	Seed	Charred					
Phalaris sp.	Canary grass	Fruit	Charred	1				
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated					
Poaceae	Grass family	Fruit	Desiccated					
Poaceae	Grass family	Infructescence	Desiccated					
Poaceae	Grass family	Palea/Lemma	Desiccated		1			
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated					
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated					
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated					
Triticeae	Cereal indet.	Seed	Charred	2		1	2	
Triticeae	Cereal indet.	Seed	Desiccated	1				
Triticeae	Cereal indet.	Palea/Lemma	Desiccated		1			
Triticeae	Cereal indet.	Straw	Desiccated	+++	++++	++++	+	++
Triticeae	Cereal indet.	Culm nodes	Charred					
Triticeae	Cereal indet.	Culm nodes	Desiccated		3	9		3
Triticeae	Cereal indet.	Culm base	Charred					
Triticeae	Cereal indet.	Culm base	Desiccated		1			
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated		1			
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred				1	
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred				1	
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated					
Indeterminate								
Calyx	N/A	Calyx	Desiccated	6				
Fruit indet.	N/A	Fruit	Charred			+	+	
Fruit indet.	N/A	Fruit	Desiccated	+++	+		+	+
Leaf	N/A	Leaf	Desiccated					
Pedicel	N/A	Pedicel	Desiccated					
Root/Rhizome	N/A	Root/Rhizome	Desiccated		1			
Wood TBI	N/A	Wood	Charred	+++	++	+++	++++	++
Wood TBI	N/A	Wood	Desiccated	+++	++	+++	++	
Other finds								
Animal bone	N/A	N/A	Desiccated	+			+	
Animal dung indeterminate	N/A	N/A	Desiccated	+++			++	+
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated		+			
Faience or glaze fragments	N/A	N/A	N/A					

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB19	MB20	MB21	MB22	MB23
			Area	SAV1N	SAV1N	SAV1N	SAV1N	SAV1N
			Feature / Quarter	N/A	N/A	N/A	N/A	N/A
			Context Type	N/A	N/A	N/A	N/A	N/A
			Date	Uncertain Date	Uncertain Date	Uncertain Date	Uncertain Date	Uncertain Date
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Desiccated					
cf. Acacia nilotica	Nile acacia	Fruit	Desiccated					
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated					
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred					
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated					
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated					
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated					
Boraginaceae	Borage	Seed	Desiccated					
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred			7		
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated			10	1	
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated					
Cyperaceae Type 1	Sedge family	Seed	Desiccated					
Cyperaceae Type 2	Sedge family	Seed	Desiccated					
Echium sp.	*Echium* sp.	Seed	Mineralised					
Fabaceae	Legume family	Leaf	Desiccated	20	17	48	34	8
Fabaceae	Legume family	Seed	Charred					
Fabaceae	Legume family	Seed	Modern					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Floret	Desiccated					
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred					
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated					
Hordeum vulgare	Barley	Rachis (node + internode)	Charred		6			
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated					
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated					
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated					
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp	Charred					

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred					1
Palmae	Palm family	Wood	Charred					
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcorn millet	Fruit	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated					
Papaveraceae	Poppy family	Seed	Charred					
Phalaris sp.	Canary grass	Fruit	Charred					
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated					
Poaceae	Grass family	Fruit	Desiccated			2	4	
Poaceae	Grass family	Infructescence	Desiccated					
Poaceae	Grass family	Palea/Lemma	Desiccated					
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated					
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated					
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated					
Triticeae	Cereal indet.	Seed	Charred		1			
Triticeae	Cereal indet.	Seed	Desiccated					
Triticeae	Cereal indet.	Palea/Lemma	Desiccated	1		1		3
Triticeae	Cereal indet.	Straw	Desiccated	++	++	++	+++	+++
Triticeae	Cereal indet.	Culm nodes	Charred					
Triticeae	Cereal indet.	Culm nodes	Desiccated					
Triticeae	Cereal indet.	Culm base	Charred					
Triticeae	Cereal indet.	Culm base	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated		3		2	
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated					
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred					
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred					
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated					
Indeterminate								
Calyx	N/A	Calyx	Desiccated					
Fruit indet.	N/A	Fruit	Charred	+				
Fruit indet.	N/A	Fruit	Desiccated	+	+	+		++
Leaf	N/A	Leaf	Desiccated			++		
Pedicel	N/A	Pedicel	Desiccated					
Root/Rhizome	N/A	Root/Rhizome	Desiccated					
Wood TBI	N/A	Wood	Charred		+	+		++
Wood TBI	N/A	Wood	Desiccated				+++	
Other finds								
Animal bone	N/A	N/A	Desiccated					
Animal dung indeterminate	N/A	N/A	Desiccated					+
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated		+	+		
Faience or glaze fragments	N/A	N/A	N/A					

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB26	MB27	MB28	MB29
			Area	SAV1	SAF2	SAV1 Sur. Temple A	SAV1 Sur. Temple A
			Feature / Quarter	Southern Pharaonic Enclosure Wall	Western side, in doorway	Structure N of Temple A	Temenos' South of Temple A
			Context Type	Wall	Wall	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				++++
Acacia nilotica	Nile acacia	Seed	Charred				
Acacia nilotica	Nile acacia	Seed	Desiccated				
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated				
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated				
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred				
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated				
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				
Boraginaceae	Borage	Seed	Desiccated		3		
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred				
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated				
Centaurea sp.	Centaury	Fruit	Charred				
Centaurea sp.	Centaury	Fruit	Mineralised			1	
Citrullus lanatus	Watermelon	Seed	Desiccated				
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated		1		
Cyperaceae Type 1	Sedge family	Seed	Desiccated				
Cyperaceae Type 2	Sedge family	Seed	Desiccated				
Echium sp.	*Echium* sp.	Seed	Mineralised		1		
Fabaceae	Legume family	Leaf	Desiccated	9	18	6	8
Fabaceae	Legume family	Seed	Charred				
Fabaceae	Legume family	Seed	Modern				
Hordeum vulgare hulled	Barley	Floret	Charred				
Hordeum vulgare hulled	Barley	Floret	Desiccated		2		
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred				
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated				
Hordeum vulgare	Barley	Rachis (node + internode)	Charred				
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	83	1		
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated				
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated				
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated	2			

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

Hyphaene thebaica	Doum palm	Endocarp	Charred				
cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred				
Palmae	Palm family	Wood	Charred			+	
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcorn millet	Fruit	Desiccated				
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated	1			
Papaveraceae	Poppy family	Seed	Charred				
Phalaris sp.	Canary grass	Fruit	Charred				
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated				
Poaceae	Grass family	Fruit	Desiccated		3		
Poaceae	Grass family	Infructescence	Desiccated		1		
Poaceae	Grass family	Palea/Lemma	Desiccated	10			1
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated				
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated				
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated	2			
Triticeae	Cereal indet.	Seed	Charred				
Triticeae	Cereal indet.	Seed	Desiccated				
Triticeae	Cereal indet.	Palea/Lemma	Desiccated	1			
Triticeae	Cereal indet.	Straw	Desiccated		++	++	++
Triticeae	Cereal indet.	Culm nodes	Charred				
Triticeae	Cereal indet.	Culm nodes	Desiccated	31	1		
Triticeae	Cereal indet.	Culm base	Charred				
Triticeae	Cereal indet.	Culm base	Desiccated				
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred				
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated		1		
Indeterminate							
Calyx	N/A	Calyx	Desiccated				
Fruit indet.	N/A	Fruit	Charred		+		
Fruit indet.	N/A	Fruit	Desiccated	++	++	+	
Leaf	N/A	Leaf	Desiccated		+		
Pedicel	N/A	Pedicel	Desiccated		2		
Root/Rhizome	N/A	Root/Rhizome	Desiccated				
Wood TBI	N/A	Wood	Charred		++	++	
Wood TBI	N/A	Wood	Desiccated		++	+	+
Other finds							
Animal bone	N/A	N/A	Desiccated			+	+
Animal dung indeterminate	N/A	N/A	Desiccated				++
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated		+		
Faience or glaze fragments	N/A	N/A	N/A				

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mud brick ID	MB31	MB33	MB34
			Area	SAV1	SAV1	SAV1N
			Feature / Quarter	1st Southern magazine, eastern wall	Northern magazine	Eboulement A; Square 190/2260
			Context Type	Wall	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**			
Acacia sp.	*Acacia* sp.	Gum	N/A			+
Acacia nilotica	Nile acacia	Seed	Charred			
Acacia nilotica	Nile acacia	Seed	Desiccated			
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated		1	
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated			
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred			
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated			
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated			
Boraginaceae	Borage	Seed	Desiccated			
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred			
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated			
Centaurea sp.	Centaury	Fruit	Charred			
Centaurea sp.	Centaury	Fruit	Mineralised			
Citrullus lanatus	Watermelon	Seed	Desiccated			
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated			
Cyperaceae Type 1	Sedge family	Seed	Desiccated			
Cyperaceae Type 2	Sedge family	Seed	Desiccated			
Echium sp.	*Echium* sp.	Seed	Mineralised			
Fabaceae	Legume family	Leaf	Desiccated		3	
Fabaceae	Legume family	Seed	Charred			
Fabaceae	Legume family	Seed	Modern			
Hordeum vulgare hulled	Barley	Floret	Charred			
Hordeum vulgare hulled	Barley	Floret	Desiccated			
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred			
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated			
Hordeum vulgare	Barley	Rachis (node + internode)	Charred			1
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated			
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated			
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated			
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated			
Hyphaene thebaica	Doum palm	Endocarp	Charred			

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred			
Palmae	Palm family	Wood	Charred			
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcrn millet	Fruit	Desiccated			
cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated			
Papaveraceae	Poppy family	Seed	Charred			
Phalaris sp.	Canary grass	Fruit	Charred			
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated			
Poaceae	Grass family	Fruit	Desiccated			
Poaceae	Grass family	Infructescence	Desiccated			
Poaceae	Grass family	Palea/Lemma	Desiccated			
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated			
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated			
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated			
Triticeae	Cereal indet.	Seed	Charred			
Triticeae	Cereal indet.	Seed	Desiccated			
Triticeae	Cereal indet.	Palea/Lemma	Desiccated		1	
Triticeae	Cereal indet.	Straw	Desiccated		++	++
Triticeae	Cereal indet.	Culm nodes	Charred			
Triticeae	Cereal indet.	Culm nodes	Desiccated			
Triticeae	Cereal indet.	Culm base	Charred			
Triticeae	Cereal indet.	Culm base	Desiccated			
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated		5	
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated			
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred			
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred			
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated			
Indeterminate						
Calyx	N/A	Calyx	Desiccated			
Fruit indet.	N/A	Fruit	Charred			
Fruit indet.	N/A	Fruit	Desiccated	+		
Leaf	N/A	Leaf	Desiccated			
Pedicel	N/A	Pedicel	Desiccated			
Root/Rhizome	N/A	Root/Rhizome	Desiccated			
Wood TBI	N/A	Wood	Charred	+++	++	++
Wood TBI	N/A	Wood	Desiccated	+		
Other finds						
Animal bone	N/A	N/A	Desiccated	+	+	
Animal dung indeterminate	N/A	N/A	Desiccated		+	
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated			
Faience or glaze fragments	N/A	N/A	N/A			

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

Scientific Name	English Common Name	Plant Part	Preservation	Total count per taxa	Ubiquity (% of samples)
Acacia sp.	*Acacia* sp.	Gum	N/A		16.67
Acacia nilotica	Nile acacia	Seed	Charred	1	3.33
Acacia nilotica	Nile acacia	Seed	Desiccated	2	6.67
cf. *Acacia nilotica*	Nile acacia	Fruit	Desiccated	1	3.33
Aizoaceae, cf. *Aizoon* sp.	Carpetweed family, cf. *Aizoon* sp.	Fruit w/seeds	Desiccated	12	6.67
cf. *Ambrosia maritima*	*Ambrosia maritima*	Whole fruit	Charred	1	3.33
Ambrosia maritima	*Ambrosia maritima*	Whole fruit	Desiccated	38	13.33
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated	2	3.33
cf. *Ambrosia maritima*	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated	1	3.33
Boraginaceae	Borage	Seed	Desiccated	11	6.67
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Charred	7	3.33
Boraginaceae (cf. *Echium* sp.)	Borage	Seed	Desiccated	11	6.67
Centaurea sp.	Centaury	Fruit	Charred	1	3.33
Centaurea sp.	Centaury	Fruit	Mineralised	3	6.67
Citrullus lanatus	Watermelon	Seed	Desiccated	4	6.67
cf. Citrullus lanatus	Watermelon	Seed	Desiccated	1	3.33
Cyperaceae Type 1	Sedge family	Seed	Desiccated	1	3.33
Cyperaceae Type 2	Sedge family	Seed	Desiccated	5	3.33
Echium sp.	*Echium* sp.	Seed	Mineralised	15	20
Fabaceae	Legume family	Leaf	Desiccated	398	80
Fabaceae	Legume family	Seed	Charred	60	6.67
Fabaceae	Legume family	Seed	Modern	27	3.33
Hordeum vulgare hulled	Barley	Floret	Charred	4	6.67
Hordeum vulgare hulled	Barley	Floret	Desiccated	32	20
cf. *Hordeum vulgare* hulled	Barley	Floret	Charred	2	3.33
cf. *Hordeum vulgare* hulled	Barley	Floret	Desiccated	3	6.67
Hordeum vulgare	Barley	Rachis (node + internode)	Charred	25	26.67
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	1194	33.33
Hordeum vulgare with smut	Barley	Rachis (node + internode)	Desiccated	3	3.33
Hordeum vulgare ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated	163	13.33
cf. *Hordeum vulgare* ssp. *vulgare*	6-row barley	Rachis (node + internode)	Desiccated	2	3.33
Hyphaene thebaica	Doum palm	Endocarp	Charred	2	6.67
cf. *Hyphaene thebaica*	Doum palm	Fragmented endocarp	Charred	4	13.33
Palmae	Palm family	Wood	Charred		10
Panicum cf. *turgidum*/ *miliaceum*	Thaman/ broomcorn millet	Fruit	Desiccated	2	6.67

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

cf. *Panicum* sp.	Panicgrass	Palea/Lemma	Desiccated	2	6.67
Papaveraceae	Poppy family	Seed	Charred	9	3.33
Phalaris sp.	Canary grass	Fruit	Charred	1	3.33
cf. *Phoenix dactylifera*	Date palm	Pedicel	Desiccated	1	3.33
Poaceae	Grass family	Fruit	Desiccated	38	23.33
Poaceae	Grass family	Infructescence	Desiccated	2	6.67
Poaceae	Grass family	Palea/Lemma	Desiccated	15	13.33
Portulaca cf. *nitida*	*Portulaca nitida*	Seed	Desiccated	2	3.33
Sorghum halepense	Johnson grass	Palea/Lemma	Desiccated	19	3.33
cf. *Sorghum halepense*	Johnson grass	Palea/Lemma	Desiccated	2	3.33
Triticeae	Cereal indet.	Seed	Charred	15	30
Triticeae	Cereal indet.	Seed	Desiccated	12	20
Triticeae	Cereal indet.	Palea/Lemma	Desiccated	11	26.67
Triticeae	Cereal indet.	Straw	Desiccated		80
Triticeae	Cereal indet.	Culm nodes	Charred	3	10
Triticeae	Cereal indet.	Culm nodes	Desiccated	153	36.67
Triticeae	Cereal indet.	Culm base	Charred	2	3.33
Triticeae	Cereal indet.	Culm base	Desiccated	7	6.67
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (node + internode)	Desiccated	10	10
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Desiccated	1	3.33
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred	3	6.67
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Desiccated	11	10
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (= glume bases + internode)	Charred	6	16.67
cf. *Urtica pilulifera*	Roman nettle	Seed	Desiccated		3.33
Indeterminate					
Calyx	N/A	Calyx	Desiccated	6	3.33
Fruit indet.	N/A	Fruit	Charred		33.33
Fruit indet.	N/A	Fruit	Desiccated		76.67
Leaf	N/A	Leaf	Desiccated		13.33
Pedicel	N/A	Pedicel	Desiccated	9	13.33
Root/Rhizome	N/A	Root/Rhizome	Desiccated	5	10
Wood TBI	N/A	Wood	Charred		83.33
Wood TBI	N/A	Wood	Desiccated		56.67
Other finds					
Animal bone	N/A	N/A	Desiccated		53.33
Animal dung indeterminate	N/A	N/A	Desiccated		43.33
Capra sp. / *Ovis* sp. dung	Sheep/Goat	N/A	Desiccated		20
Faience or glaze fragments	N/A	N/A	N/A		3.33

Tab. 31 *continued* Identification and quantification of archaeobotanical remains in mud brick samples

			Mortar ID	MO1	MO2	MO3	MO4
			Area	SAV1W	SAV1N	SAV1N	SAV1N
			Feature / Quarter	Feature 100, Enclosure Wall	N2 Large Tower, tumble N	N2 Large Tower, extension	1 Curve
			Context Type	Wall	Tower	Tower	Wall
			Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Desiccated				
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Charred				
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated				1
Centaurea sp.	Centaury	Fruit	Charred				1
Citrullus lanatus	Watermelon	Seed	Desiccated				
Citrullus lanatus	Watermelon	Fragment of seed	Desiccated				
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated				
Fabaceae	Legume family	Leaf	Desiccated	3		2	4
Ficus cf. *sycamorus*	Sycamore fig	Fruit	Desiccated				3
Hordeum vulgare hulled	Barley	Floret	Charred				
Hordeum vulgare	Barley	Rachis (node + internode)	Charred		2		
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated				9
Palmae	Palm family	Wood	Charred				
cf. *Panicum* sp.	Panicgrass	Spikelet	Desiccated				
Phalaris sp.	Canary grass	Fruit	Charred				
cf. *Phalaris* sp.	Canary grass	Fruit	Charred				
Poaceae	Grass family	Fruit	Modern		1		
Poaceae	Grass family	Fruit	Charred				
Silene sp.	Catchfly	Fruit	Desiccated				1
Triticeae	Cereal indet.	Seed	Charred				
Triticeae	Cereal indet.	Palea/lemma	Charred		1		
Triticeae	Cereal indet.	Straw	Charred		+		
Triticeae	Cereal indet.	Straw	Desiccated	+++	++	++	+++
Triticeae	Cereal indet.	Culm nodes	Charred				
Triticeae	Cereal indet.	Culm nodes	Desiccated				2
Triticum cf. *turgidum* ssp. *dicoccon*	cf. Emmer wheat	Palea/Lemma	Desiccated				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred				
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (=glume bases + internode)	Charred				
Indeterminate							
Calyx	N/A	Calyx	Desiccated		1	1	
Flower + calyx	N/A	Flower + calyx	Modern		1		1
Fruit w/many seeds	N/A	Fruit	Desiccated / Modern	1			

Tab. 32 Identification and quantification of archaeobotanical remains in mortar and plaster samples

Fruit indet.	N/A	Fruit	Charred	+			
Fruit indet.	N/A	Fruit	Desiccated		++		++
Indeterminate	N/A	N/A	Desiccated		+		
Leaf	N/A	Leaf	Desiccated				
Leaf	N/A	Leaf	Modern	+			
Wood TBI	N/A	Wood	Charred	+	++	++	++
Wood TBI	N/A	Wood	Desiccated		+		++
Other finds							
Animal bone	N/A	N/A	Desiccated		+		+
Animal dung	N/A	N/A	Desiccated				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated		+		++
Faience fragments	N/A	N/A	N/A				
Pottery undiagnostic	N/A	N/A	N/A				

Mortar ID	**MO5**	**MO6**	**MO7**	**MO10**
Area	SAV1N	SAV1N	SAV1N	SAF2
Feature / Quarter	27	N8, 34N	11	Western side, in doorway
Context Type	Wall	Wall	Wall	Wall
Date	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A	+			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Desiccated	16			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Charred	1			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated	14			
Centaurea sp.	Centaury	Fruit	Charred				
Citrullus lanatus	Watermelon	Seed	Desiccated	1			
Citrullus lanatus	Watermelon	Fragment of seed	Desiccated				
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated				
Fabaceae	Legume family	Leaf	Desiccated		1		
Ficus cf. *sycamorus*	Sycamore fig	Fruit	Desiccated				
Hordeum vulgare hulled	Barley	Floret	Charred	4			
Hordeum vulgare	Barley	Rachis (node + internode)	Charred	7			
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	1			
Palmae	Palm family	Wood	Charred				
cf. *Panicum* sp.	Panicgrass	Spikelet	Desiccated				
Phalaris sp.	Canary grass	Fruit	Charred	1			
cf. *Phalaris* sp.	Canary grass	Fruit	Charred	1			
Poaceae	Grass family	Fruit	Modern				
Poaceae	Grass family	Fruit	Charred	1		1	
Silene sp.	Catchfly	Fruit	Desiccated				
Triticeae	Cereal indet.	Seed	Charred	4	1		

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

Triticeae	Cereal indet.	Palea/lemma	Charred				
Triticeae	Cereal indet.	Straw	Charred	++			
Triticeae	Cereal indet.	Straw	Desiccated	+++	+++	++	++
Triticeae	Cereal indet.	Culm nodes	Charred	1			
Triticeae	Cereal indet.	Culm nodes	Desiccated	1			
Triticum cf. *turgidum* ssp. *dicoccon*	Emmer wheat	Palea/Lemma	Desiccated		1		
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred	1			
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred	1			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (=glume bases + internode)	Charred		2		
Indeterminate							
Calyx	N/A	Calyx	Desiccated	1			
Flower + calyx	N/A	Flower + calyx	Modern				
Fruit w/many seeds	N/A	Fruit	Desiccated / Modern				
Fruit indet.	N/A	Fruit	Charred	+			
Fruit indet.	N/A	Fruit	Desiccated	++			+
Indeterminate	N/A	N/A	Desiccated				
Leaf	N/A	Leaf	Desiccated				
Leaf	N/A	Leaf	Modern				
Wood TBI	N/A	Wood	Charred	+++	++	++	++
Wood TBI	N/A	Wood	Desiccated	++	++		
Other finds							
Animal bone	N/A	N/A	Desiccated	+++	+	++	
Animal dung	N/A	N/A	Desiccated	++	++		+
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred			1	
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated	++			
Faience fragments	N/A	N/A	N/A	+			
Pottery undiagnostic	N/A	N/A	N/A	+			

			Mortar ID	**MO11**	**MO13**	**MO14**
			Area	SAV1 Sur. Temple A	SAV1	SAV1
			Feature / Quarter	Structure N of Temple A	1st Southern magazine, eastern wall	Northern magazine
			Context Type	Wall	Wall	Wall
			Date	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**			
Acacia sp.	*Acacia* sp.	Gum	N/A			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Desiccated			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Charred			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated			
Centaurea sp.	Centaury	Fruit	Charred		1	
Citrullus lanatus	Watermelon	Seed	Desiccated			

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

Citrullus lanatus	Watermelon	Fragment of seed	Desiccated			
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated			
Fabaceae	Legume family	Leaf	Desiccated		10	
Ficus cf. *sycamorus*	Sycamore fig	Fruit	Desiccated			
Hordeum vulgare hulled	Barley	Floret	Charred			
Hordeum vulgare	Barley	Rachis (node + internode)	Charred			
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated			
Palmae	Palm family	Wood	Charred		+	
cf. *Panicum* sp.	Panicgrass	Spikelet	Desiccated			
Phalaris sp.	Canary grass	Fruit	Charred			
cf. *Phalaris* sp.	Canary grass	Fruit	Charred			
Poaceae	Grass family	Fruit	Modern			
Poaceae	Grass family	Fruit	Charred			
Silene sp.	Catchfly	Fruit	Desiccated			
Triticeae	Cereal indet.	Seed	Charred	1	1	+
Triticeae	Cereal indet.	Palea/lemma	Charred			
Triticeae	Cereal indet.	Straw	Charred			
Triticeae	Cereal indet.	Straw	Desiccated	+++	++	++
Triticeae	Cereal indet.	Culm nodes	Charred			
Triticeae	Cereal indet.	Culm nodes	Desiccated			
Triticum cf. *turgidum* ssp. *dicoccon*	Emmer wheat	Palea/Lemma	Desiccated			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred		1	
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (=glume bases + internode)	Charred		8	
Indeterminate						
Calyx	N/A	Calyx	Desiccated			
Flower + calyx	N/A	Flower + calyx	Modern			
Fruit w/many seeds	N/A	Fruit	Desiccated / Modern			
Fruit indet.	N/A	Fruit	Charred	+		+
Fruit indet.	N/A	Fruit	Desiccated	++	++	+
Indeterminate	N/A	N/A	Desiccated			
Leaf	N/A	Leaf	Desiccated			
Leaf	N/A	Leaf	Modern			
Wood TBI	N/A	Wood	Charred	++	+++	++
Wood TBI	N/A	Wood	Desiccated			
Other finds						
Animal bone	N/A	N/A	Desiccated	+	+++	
Animal dung	N/A	N/A	Desiccated	+	++	
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred			
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated			
Faience fragments	N/A	N/A	N/A			
Pottery undiagnostic	N/A	N/A	N/A			

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

			Mortar ID	P1	P2	P3
			Area	SAV1N	SAV1N	SAV1 Sur. Temple A
			Feature / Quarter	34S	N17	Silo below Temple A
			Context Type	Wall	Pit	Plaster
			Date	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**			
Acacia sp.	*Acacia* sp.	Gum	N/A			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Desiccated			
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Charred			
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated			
Centaurea sp.	Centaury	Fruit	Charred			
Citrullus lanatus	Watermelon	Seed	Desiccated		1	2
Citrullus lanatus	Watermelon	Fragment of seed	Desiccated			+
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated		1	
Fabaceae	Legume family	Leaf	Desiccated			
Ficus cf. *sycamorus*	Sycamore fig	Fruit	Desiccated			
Hordeum vulgare hulled	Barley	Floret	Charred			1
Hordeum vulgare	Barley	Rachis (node + internode)	Charred			
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated			
Palmae	Palm family	Wood	Charred			
cf. *Panicum* sp.	Panicgrass	Spikelet	Desiccated			1
Phalaris sp.	Canary grass	Fruit	Charred			
cf. *Phalaris* sp.	Canary grass	Fruit	Charred			
Poaceae	Grass family	Fruit	Modern			
Poaceae	Grass family	Fruit	Charred			
Silene sp.	Catchfly	Fruit	Desiccated			
Triticeae	Cereal indet.	Seed	Charred			
Triticeae	Cereal indet.	Palea/lemma	Charred			
Triticeae	Cereal indet.	Straw	Charred			
Triticeae	Cereal indet.	Straw	Desiccated			++
Triticeae	Cereal indet.	Culm nodes	Charred			
Triticeae	Cereal indet.	Culm nodes	Desiccated			2
Triticum cf. *turgidum* ssp. *dicoccon*	Emmer wheat	Palea/Lemma	Desiccated			1
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred			
cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred			
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (=glume bases + internode)	Charred			
Indeterminate						
Calyx	N/A	Calyx	Desiccated			
Flower + calyx	N/A	Flower + calyx	Modern			
Fruit w/many seeds	N/A	Fruit	Desiccated / Modern			

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

Fruit indet.	N/A	Fruit	Charred			
Fruit indet.	N/A	Fruit	Desiccated			++
Indeterminate	N/A	N/A	Desiccated			
Leaf	N/A	Leaf	Desiccated			+
Leaf	N/A	Leaf	Modern			
Wood TBI	N/A	Wood	Charred	++	++	++
Wood TBI	N/A	Wood	Desiccated	+	+	++
Other finds						
Animal bone	N/A	N/A	Desiccated	+	+	++
Animal dung	N/A	N/A	Desiccated			+
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred			
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated			
Faience fragments	N/A	N/A	N/A			
Pottery undiagnostic	N/A	N/A	N/A			

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**	**Total count per taxa**	**Ubiquity (% of samples)**
Acacia sp.	*Acacia* sp.	Gum	N/A		7.1
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Desiccated	16	7.1
Ambrosia maritima	*Ambrosia maritima*	Complete fruit	Charred	1	7.1
Ambrosia maritima	*Ambrosia maritima*	Fragment of fruit (3 = 1)	Desiccated	15	14.3
Centaurea sp.	Centaury	Fruit	Charred	2	14.3
Citrullus lanatus	Watermelon	Seed	Desiccated	4	21.4
Citrullus lanatus	Watermelon	Fragment of seed	Desiccated		7.1
cf. *Citrullus lanatus*	Watermelon	Seed	Desiccated	1	7.1
Fabaceae	Legume family	Leaf	Desiccated	20	35.7
Ficus cf. *sycamorus*	Sycamore fig	Fruit	Desiccated	3	7.1
Hordeum vulgare hulled	Barley	Floret	Charred	5	14.3
Hordeum vulgare	Barley	Rachis (node + internode)	Charred	9	14.3
Hordeum vulgare	Barley	Rachis (node + internode)	Desiccated	10	14.3
Palmae	Palm family	Wood	Charred		7.1
cf. *Panicum* sp.	Panicgrass	Spikelet	Desiccated	1	7.1
Phalaris sp.	Canary grass	Fruit	Charred	1	7.1
cf. *Phalaris* sp.	Canary grass	Fruit	Charred	1	7.1
Poaceae	Grass family	Fruit	Modern	1	7.1
Poaceae	Grass family	Fruit	Charred	2	14.3
Silene sp.	Catchfly	Fruit	Desiccated	1	7.1
Triticeae	Cereal indet.	Seed	Charred	7	35.7
Triticeae	Cereal indet.	Palea/lemma	Charred	1	7.1
Triticeae	Cereal indet.	Straw	Charred		14.3
Triticeae	Cereal indet.	Straw	Desiccated		85.7
Triticeae	Cereal indet.	Culm nodes	Charred	1	7.1
Triticeae	Cereal indet.	Culm nodes	Desiccated	5	21.4
Triticum cf. *turgidum* ssp. *dicoccon*	Emmer wheat	Palea/Lemma	Desiccated	2	14.3
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred	2	14.3

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

cf. *Triticum turgidum* ssp. *dicoccon*	Emmer wheat	Seed	Charred	1	7.1
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (=glume bases + internode)	Charred	10	14.3
Indeterminate					
Calyx	N/A	Calyx	Desiccated	3	21.4
Flower + calyx	N/A	Flower + calyx	Modern	2	14.3
Fruit w/many seeds	N/A	Fruit	Desiccated / Modern	1	7.1
Fruit indet.	N/A	Fruit	Charred		28.6
Fruit indet.	N/A	Fruit	Desiccated		57.1
Indeterminate	N/A	N/A	Desiccated		7.1
Leaf	N/A	Leaf	Desiccated		7.1
Leaf	N/A	Leaf	Modern		7.1
Wood TBI	N/A	Wood	Charred		100
Wood TBI	N/A	Wood	Desiccated		50
Other finds					
Animal bone	N/A	N/A	Desiccated		71.4
Animal dung	N/A	N/A	Desiccated		42.9
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred	1	7.1
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated		21.4
Faience fragments	N/A	N/A	N/A		7.1
Pottery undiagnostic	N/A	N/A	N/A		7.1

Tab. 32 *continued* Identification and quantification of archaeobotanical remains in mortar and plaster samples

			ID	S1	S2	S3	S4	S5
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	Around feature 100	SQ1	SQ1	SQ1	SQ1
			SU	N/A	587	590	588	590
			Find no.	N/A	1366 / 2014	1376 / 2014	1373 / 2014	1377 / 2014
			Relative Dating	Post-New Kingdom/ Ottoman	New Kingdom	New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated		2	1	1	
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated			+		
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred		+			
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated		+			
Hyphaene thebaica	Doum palm	Seed	Charred		1	1	2	
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					+
Palmae	Palm family	Fiber	Desiccated					

Tab. 33 Identification and quantification of archaeobotanical remains in surface and soil samples

Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated					
Palmae	Palm family	Wood	Charred					
cf. Palmae/ cf. P*apyrus* sp.	Palm family/ papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructicense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

ID	**S1**	**S2**	**S3**	**S4**	**S5**
Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
Location	Around Feature 100	SQ1	SQ1	SQ1	SQ1
SU	N/A	587	590	588	590
Find no.	N/A	1366 / 2014	1376 / 2014	1373 / 2014	1377 / 2014
Relative Dating	Post-New Kingdom/ Ottoman	New Kingdom	New Kingdom	New Kingdom	New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern				
Phoenix dactylifera	Date palm	Seed	Charred	3			
Phoenix dactylifera	Date palm	Seed	Desiccated				
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated	1			
Poaceae	Grass family	Fruit	Charred				
Poaceae	Grass family	Palea/lemma	Modern				
Triticeae	Cereal indet.	Seed	Charred				
Triticeae	Cereal indet.	Culm node	Charred				
Triticeae	Cereal indet.	Palea/lemma	Charred				
Triticeae	Cereal indet.	Palea/lemma	Desiccated				
Triticeae	Cereal indet.	Straw	Charred				
Triticeae	Cereal indet.	Straw	Desiccated				
Triticum sp.	Wheat indet.	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated				
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated				
Vitis vinifera	Grape	Seed	Desiccated				
Wood TBI	N/A	Wood	Desiccated				
Wood TBI	N/A	Wood	Charred				

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Other materials								
Animal bone			N/A					
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated	1				
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated					
Human hair, lock of wig	Lock of wig		Desiccated					

ID	S6	S7	S8	S9	S10
Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
Location	SQ1	SQ1	SQ1	SQ2	SQ1
SU	563	572	584	575	555
Find no.	1300 / 2014	1324 / 2014	1341 / 2014	327 / 2014	1208 / 2014
Relative Dating	Modern	New Kingdom	(Post-) New Kingdom	Modern	New Kingdom

Scientific Name	English Common Name	Plant Part	Preservation					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred			1		

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated		2			1
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred			2		2
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					2
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated		0.5 ml			
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern	1				

ID	**S6**	**S7**	**S8**	**S9**	**S10**
Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
Location	SQ1	SQ1	SQ1	SQ2	SQ1
SU	563	572	584	575	555
Find no.	1300 / 2014	1324 / 2014	1341 / 2014	327 / 2014	1208 / 2014
Relative Dating	Modern	New Kingdom	(Post-) New Kingdom	Modern	New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred		1			
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated		1			
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated					
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern				1	
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated					
Human hair, lock of wig	Lock of wig		Desiccated					

ID	**S11**	**S12**	**S13**	**S14**	**S15**
Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
Location	SQ1	SQ1	SQ2	SQ1W + NW	SQ1, adj. F100
SU	563	511	508	511	501
Find no.	1244 / 2014	662 / 2014	630 / 2014	1202 / 2014	707 / 2014
Relative Dating	New Kingdom	(Post-) New Kingdom	Post- New Kingdom/ Ottoman	(Post-) New Kingdom	(Post-) New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					3
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					3
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred				1	
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated					+
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated	1				
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					1

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	S11	S12	S13	S14	S15
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	SQ1	SQ1	SQ2	SQ1W + NW	SQ1, adj. F100
			SU	563	511	508	511	501
			Find no.	1244 / 2014	662 / 2014	630 / 2014	1202 / 2014	707 / 2014
			Relative Dating	New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom/ Ottoman	(Post-) New Kingdom	(Post-) New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred					
Phoenix dactylifera	Date palm	Seed	Desiccated			6		
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated			3		
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated					
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern					
Animal / human dung			Desiccated					2
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred		1		1	
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated		1		3	
Carnivore dung			Desiccated				++	
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated				++	
Human hair, lock of wig	Lock of wig		Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	S16	S17	S18	S19	S20
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	SQ1	SQ2	SQ1W	SQ1W	SQ1
			SU	501	516	522	524	536
			Find no.	698 / 2014	825 / 2014	847 / 2014	873 / 2014	774 / 2014
			Relative Dating	New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom	Post-New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. Hordeum sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated		1			1
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred	++				
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated					
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

			ID	**S16**	**S17**	**S18**	**S19**	**S20**
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	SQ1	SQ2	SQ1W	SQ1W	SQ1
			SU	501	516	522	524	536
			Find no.	698 /2014	825 / 2014	847 / 2014	873 / 2014	774 / 2014
			Relative Dating	New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom	Post-New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					1
Phoenix dactylifera	Date palm	Seed	Charred					
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated		1			
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated	+				
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Animal dung			Modern					
Animal / human dung			Desiccated	++				
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated				+	
Human hair, lock of wig	Lock of wig		Desiccated			+		

			ID	**S21**	**S22**	**S23**	**S24**	**S25**
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	SQ1W	SQ2	SQ1W	SQ1W	SQ1
			SU	529	510	540	534	548
			Find no.	882 / 2014	651 / 2014	1019 / 2014	914 / 2014	1130 / 2014
			Relative Dating	(Post-) New Kingdom	New Kingdom	New Kingdom	Post-New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred	+				
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated					
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

			ID	**S21**	**S22**	**S23**	**S24**	**S25**
			Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
			Location	SQ1W	SQ2	SQ1W	SQ1W	SQ1
			SU	529	510	540	534	548
			Find no.	882 / 2014	651 / 2014	1019 / 2014	914 / 2014	1130 / 2014
			Relative Dating	(Post-) New Kingdom	New Kingdom	New Kingdom	Post-New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred	3				
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated					
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					+
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated					
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated		+			
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred	3				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated				+	
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated			++	+	
Human hair, lock of wig	Lock of wig		Desiccated					

ID	**S21**	**S22**	**S23**	**S24**	**S25**
Area	SAV1W	SAV1W	SAV1W	SAV1W	SAV1W
Location	SQ1W	SQ2	SQ1W	SQ1W	SQ1
SU	529	510	540	534	548
Find no.	882 / 2014	651 / 2014	1019 / 2014	914 / 2014	1130 / 2014
Relative Dating	(Post-) New Kingdom	New Kingdom	New Kingdom	Post-New Kingdom	New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred	3				
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated					
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					+
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated					
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated		+			
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred	3				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated				+	
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated			++	+	
Human hair, lock of wig	Lock of wig		Desiccated					

ID	**S26**	**S27**	**S28**	**S29**	**S30**
Area	SAV1E	SAV1E	SAV1E	SAV1E	SAV1E
Location	SQ1B	SQ4 / 4A	SQ1B	SQ1B	SQ3
SU	051	009	051	049	063
Find no.	2016 / 2014	120 / 2014	2034 / 2014	2005 / 2014	2157 / 2014
Relative Dating	(Post-) New Kingdom	Sub-recent	(Post-) New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated			1		
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated			1		
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated	+				
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated			+		
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated				1	
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated				+	
Pennisetum sp.	Fountain grass	Seed	Desiccated				1	
Pennisetum sp.	Fountain grass	Spikelet	Desiccated				+++	
Pennisetum sp.	Fountain grass	Rachis	Desiccated				+	
Phoenix dactylifera	Date palm	Complete fruit	Modern					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	S26	S27	S28	S29	S30
			Area	SAV1E	SAV1E	SAV1E	SAV1E	SAV1E
			Location	SQ1B	SQ4 / 4A	SQ1B	SQ1B	SQ3
			SU	051	009	051	049	063
			Find no.	2016 / 2014	120 / 2014	2034 / 2014	2005 / 2014	2157 / 2014
			Relative Dating	(Post-) New Kingdom	Sub-recent	(Post-) New Kingdom	New Kingdom	New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred			1		
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated	1				
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					+
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					1
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated			+	++	
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A			+		
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated			3		
Carnivore dung			Desiccated		+			
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated					+
Human hair, lock of wig	Lock of wig		Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	S31	S32	S33	S34	S35
			Area	SAV1E	SAV1E	SAV1E	SAV1E	SAV1E
			Location	SQ4	SQ3	SQ4A	SQ1B	SQ3
			SU	079	030	004	018	015
			Find no.	2274 / 2014	395 / 2014	132 / 2014	216 / 2014	175 / 2014
			Relative Dating	(Post-) New Kingdom	New Kingdom	New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					
cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*)	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated	+				
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Palmae	Palm family	Wood	Desiccated					+
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					++
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					++
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

			ID	**S31**	**S32**	**S33**	**S34**	**S35**
			Area	SAV1E	SAV1E	SAV1E	SAV1E	SAV1E
			Location	SQ4	SQ3	SQ4A	SQ1B	SQ3
			SU	079	030	004	018	015
			Find no.	2274 / 2014	395 / 2014	132 / 2014	216 / 2014	175 / 2014
			Relative Dating	(Post-) New Kingdom	New Kingdom	New Kingdom	(Post-) New Kingdom	(Post-) New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred					
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated		1			
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					+
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated					+
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated				+++	
Human hair, lock of wig	Lock of wig		Desiccated					

			ID	**OR1**	**CH1**	**CH2**	**CH3**
			Area	SAV1W	SAV1E	SAV1W	SAV1W
			Location	Sq. 1S	Square 2B, 7–8m to E, debris around Feature 27, before Pl. 5	Sq. 1, NW Corner	Sq. 1S, Pr. 13
			SU	733		502	682
			Find no.	0844 / 2015	326 / 2013	0624 / 2014	
			Relative Dating	18th Dynasty	Post-New Kingdom / Ottoman	(Post-) New Kingdom	18th Dynasty
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated				
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated				
Acacia nilotica	Nile acacia	Seed	Charred				
cf. *Acacia nilotica*	Nile acacia	Seed	Charred				
Acacia nilotica	Nile acacia	Seed	Mineralised				
Centaurea sp.	Centaury	Fruit	Charred				
Centaurea sp.	Centaury	Fruit	Mineralised				
Citrullus lanatus	Watermelon	Seed	Desiccated	1			
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated				2
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated				
Hordeum vulgare hulled	Barley	Floret	Charred				3
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated				
Hordeum vulgare	Barley	Rachis (internode + node)	Charred				23
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated				3
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred				
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated				
Hyphaene thebaica	Doum palm	Complete fruit	Charred				
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred				
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred	+	+		+

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Hyphaene thebaica	Doum palm	Mesocarp	Charred				
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated				
Hyphaene thebaica	Doum palm	Seed	Charred				
Indeterminate		Endocarp (fragment)	Desiccated				++
Indeterminate			Desiccated				
Lathyrus sativus	Grass pea	Seed	Charred				
Lolium temulentum	Darnel	Fruit	Charred				
cf. *Lolium temulentum*	Darnel	Fruit	Charred				
Palmae	Palm family	Fiber/binding	Desiccated				
Palmae	Palm family	Fiber	Desiccated				
Palmae	Palm family	Leaf/fibre basketry	Desiccated				
Palmae	Palm family	Leaf fragment	Desiccated				
Palmae	Palm family	Wood	Desiccated	+			
Palmae	Palm family	Wood	Charred				
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated				
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated				
Pennisetum sp.	Fountain grass	Infructescense	Desiccated				
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated				
Pennisetum sp.	Fountain grass	Seed	Desiccated				
Pennisetum sp.	Fountain grass	Spikelet	Desiccated				
Pennisetum sp.	Fountain grass	Rachis	Desiccated				
Phoenix dactylifera	Date palm	Complete fruit	Modern				

			ID	**OR1**	**CH1**	**CH2**	**CH3**
			Area	SAV1W	SAV1E	SAV1W	SAV1W
			Location	Sq. 1S	Square 2B, 7–8m to E, debris around Feature 27, before Pl. 5	Sq. 1, NW Corner	Sq. 1S, Pr. 13
			SU	733		502	682
			Find no.	0844 / 2015	326 /2013	0624 / 2014	
			Relative Dating	18th Dynasty	Post-New Kingdom / Ottoman	(Post-) New Kingdom	18th Dynasty
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern				
Phoenix dactylifera	Date palm	Seed	Charred				
Phoenix dactylifera	Date palm	Seed	Desiccated				
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated	1			
Poaceae	Grass family	Fruit	Charred				3
Poaceae	Grass family	Palea/lemma	Modern				
Triticeae	Cereal indet.	Seed	Charred				4
Triticeae	Cereal indet.	Culm node	Charred				3
Triticeae	Cereal indet.	Palea/lemma	Charred				+
Triticeae	Cereal indet.	Palea/lemma	Desiccated				
Triticeae	Cereal indet.	Straw	Charred				+
Triticeae	Cereal indet.	Straw	Desiccated				++
Triticum sp.	Wheat indet.	Seed	Charred				2

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred				7
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated				1
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated				
Vitis vinifera	Grape	Seed	Desiccated				
Wood TBI	N/A	Wood	Desiccated	+			
Wood TBI	N/A	Wood	Charred		+		
Other materials							
Animal bone			N/A				+
Animal dung			Modern				
Animal / human dung			Desiccated				
Animal leather / hide			Desiccated				
Bead			N/A				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated				
Carnivore dung			Desiccated				
Herbivore dung with hulled barley and barley rachis			Desiccated				
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated				
Human hair, lock of wig	Lock of wig		Desiccated				

ID	**CH4**	**CH5**	**CH6**	**CH7**	**W1**
Area	SAV1W	SAV1W	SAV1E	SAV1E	SAV1N
Location	Sq. 1, Pr. 18	Sq. 1	Feature 15	Feature 15	25N
SU	707	716	321	321	Wall
Find no.		0812 / 2015	1677 / 2015	1677a / 2015	N/A
Relative Dating	18th Dynasty	18th Dynasty	18th Dynasty	18th Dynasty	New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A				
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated				
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated				
Acacia nilotica	Nile acacia	Seed	Charred			15	
cf. *Acacia nilotica*	Nile acacia	Seed	Charred			4	
Acacia nilotica	Nile acacia	Seed	Mineralised				
Centaurea sp.	Centaury	Fruit	Charred			1	
Centaurea sp.	Centaury	Fruit	Mineralised			1	
Citrullus lanatus	Watermelon	Seed	Desiccated				
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated				
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated				
Hordeum vulgare hulled	Barley	Floret	Charred			77	
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated				
Hordeum vulgare	Barley	Rachis (internode + node)	Charred			36	

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred				24	
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated				1	
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred		+		++	
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated				++	
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred				1	
Lolium temulentum	Darnel	Fruit	Charred				12	
cf. *Lolium temulentum*	Darnel	Fruit	Charred				1	
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated					+
Palmae	Palm family	Wood	Charred			+	++	
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

ID	**CH4**	**CH5**	**CH6**	**CH7**	**W1**
Area	SAV1W	SAV1W	SAV1E	SAV1E	SAV1N
Location	Sq. 1, Pr. 18	Sq. 1	Feature 15	Feature 15	25N
SU	707	716	321	321	Wall
Find no.		0812 / 2015	1677 / 2015	1677a / 2015	N/A
Relative Dating	18th Dynasty	18th Dynasty	18th Dynasty	18th Dynasty	New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred					
Phoenix dactylifera	Date palm	Seed	Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Phoenix dactylifera	Date palm	Gnawed seed	Desiccated					
Poaceae	Grass family	Fruit	Charred				18	
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred				110	
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred				20	
Triticeae	Cereal indet.	Straw	Desiccated				1	
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred				72	
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred				17	
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated		++			
Wood TBI	N/A	Wood	Charred	+	+++	++	+++	
Other materials								
Animal bone			N/A		+		++	
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred				7	
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated					
Human hair, lock of wig	Lock of wig		Desiccated					

ID	**W2**	**W3**	**W4**	**W6**	**W7**
Area	SAV1N	SAV1W	SAV1W	SAV1E	SAV1E
Location	33N	SQ1A	SQ1A	SQ1B	SQ1B
SU	Wall	587	556	040	051
Find no.	N/A	1366 / 2014	1275 / 2014	511 / 2014	2026 / 2014
Relative Dating	New Kingdom	New Kingdom	New Kingdom	(Post-) New Kingdom	Post-New Kingdom

Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Acacia sp.	*Acacia* sp.	Gum	N/A					
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated					
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated					
Acacia nilotica	Nile acacia	Seed	Charred					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

cf. *Acacia nilotica*	Nile acacia	Seed	Charred					
Acacia nilotica	Nile acacia	Seed	Mineralised					
Centaurea sp.	Centaury	Fruit	Charred					
Centaurea sp.	Centaury	Fruit	Mineralised					
Citrullus lanatus	Watermelon	Seed	Desiccated					
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated					
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated					
Hordeum vulgare hulled	Barley	Floret	Charred					
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated					
Hordeum vulgare	Barley	Rachis (internode + node)	Charred					
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred					
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated					
Hyphaene thebaica	Doum palm	Complete fruit	Charred					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated					
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Charred					
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated					
Hyphaene thebaica	Doum palm	Seed	Charred					
Indeterminate		Endocarp (fragment)	Desiccated					
Indeterminate			Desiccated					
Lathyrus sativus	Grass pea	Seed	Charred					
Lolium temulentum	Darnel	Fruit	Charred					
cf. *Lolium temulentum*	Darnel	Fruit	Charred					
Palmae	Palm family	Fiber/binding	Desiccated					
Palmae	Palm family	Fiber	Desiccated					
Palmae	Palm family	Leaf/fibre basketry	Desiccated					+
Palmae	Palm family	Leaf fragment	Desiccated					
Palmae	Palm family	Wood	Desiccated	+				
Palmae	Palm family	Wood	Charred					
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated					
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Infructescense	Desiccated					
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated					
Pennisetum sp.	Fountain grass	Seed	Desiccated					
Pennisetum sp.	Fountain grass	Spikelet	Desiccated					
Pennisetum sp.	Fountain grass	Rachis	Desiccated					
Phoenix dactylifera	Date palm	Complete fruit	Modern					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	W2	W3	W4	W6	W7
			Area	SAV1N	SAV1W	SAV1W	SAV1E	SAV1E
			Location	33N	SQ1A	SQ1A	SQ1B	SQ1B
			SU	Wall	587	556	040	051
			Find no.	N/A	1366 / 2014	1275 / 2014	511 / 2014	2026 / 2014
			Relative Dating	New Kingdom	New Kingdom	New Kingdom	(Post-) New Kingdom	Post-New Kingdom
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**					
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern					
Phoenix dactylifera	Date palm	Seed	Charred					
Phoenix dactylifera	Date palm	Seed	Desiccated					
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated					
Poaceae	Grass family	Fruit	Charred					
Poaceae	Grass family	Palea/lemma	Modern					
Triticeae	Cereal indet.	Seed	Charred					
Triticeae	Cereal indet.	Culm node	Charred					
Triticeae	Cereal indet.	Palea/lemma	Charred					
Triticeae	Cereal indet.	Palea/lemma	Desiccated					
Triticeae	Cereal indet.	Straw	Charred					
Triticeae	Cereal indet.	Straw	Desiccated					
Triticum sp.	Wheat indet.	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred					
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated					
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated					
Vitis vinifera	Grape	Seed	Desiccated					
Wood TBI	N/A	Wood	Desiccated		+	+	+	
Wood TBI	N/A	Wood	Charred					
Other materials								
Animal bone			N/A					
Animal dung			Modern					
Animal / human dung			Desiccated					
Animal leather / hide			Desiccated					
Bead			N/A					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred					
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated					
Carnivore dung			Desiccated					
Herbivore dung with hulled barley and barley rachis			Desiccated					
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated					
Human hair, lock of wig	Lock of wig		Desiccated					

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

			ID	OL1	O1A	O1B	O5
			Area	SAV1W	SAV1 Sur. Temple A	Ibed. O1A	SAV1E
			Location	SQ1 S			Square 2, Feature 14, in Find No. 40
			SU	609	Temenos' South of Temple A		
			Find no. pottery	N/A			49/2013
			Relative Dating	New Kingdom	New Kingdom		Early 18th Dynasty
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Acacia sp.	*Acacia* sp.	Gum	N/A		63 ml	5 ml	
Acacia nilotica	Nile acacia	Segment of fruit	Desiccated	1			57
Acacia nilotica	Nile acacia	Fruit fragments	Desiccated				+++
Acacia nilotica	Nile acacia	Seed	Charred				
cf. *Acacia nilotica*	Nile acacia	Seed	Charred				
Acacia nilotica	Nile acacia	Seed	Mineralised				2
Centaurea sp.	Centaury	Fruit	Charred				
Centaurea sp.	Centaury	Fruit	Mineralised				
Citrullus lanatus	Watermelon	Seed	Desiccated				
Cucumis cf. *sativus*	Cucumber	Seed	Desiccated				
cf. *Hordeum* sp.	Barley	Palea/lemma	Desiccated	1			
Hordeum vulgare hulled	Barley	Floret	Charred				
Hordeum vulgare hulled	Barley	Palea/lemma	Desiccated				
Hordeum vulgare	Barley	Rachis (internode + node)	Charred				
Hordeum vulgare	Barley	Rachis (internode + node)	Desiccated	2			
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Charred				
Hordeum vulgare ssp. *spontaneum*	Wild barley	Fruit	Desiccated				
Hyphaene thebaica	Doum palm	Complete fruit	Charred				
Hyphaene thebaica	Doum palm	Endocarp (complete)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp (complete)	Charred				
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Desiccated				
Hyphaene thebaica	Doum palm	Endocarp (fragments)	Charred				
Hyphaene thebaica	Doum palm	Mesocarp	Charred				
Hyphaene thebaica	Doum palm	Mesocarp	Desiccated				
Hyphaene thebaica	Doum palm	Seed	Charred				
Indeterminate		Endocarp (fragment)	Desiccated				
Indeterminate			Desiccated				
Lathyrus sativus	Grass pea	Seed	Charred				
Lolium temulentum	Darnel	Fruit	Charred				
cf. *Lolium temulentum*	Darnel	Fruit	Charred				
Palmae	Palm family	Fiber/binding	Desiccated				
Palmae	Palm family	Fiber	Desiccated				
Palmae	Palm family	Leaf/fibre basketry	Desiccated				

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Palmae	Palm family	Leaf fragment	Desiccated	+			
Palmae	Palm family	Wood	Desiccated				
Palmae	Palm family	Wood	Charred				+
cf. Palmae / cf. *Papyrus* sp.	Palm family / papyrus	Leaf, tied	Desiccated				
cf. *Panicum* sp.	Panicgrass	Palea/lemma	Desiccated	1			
Pennisetum sp.	Fountain grass	Infructescense	Desiccated				
Pennisetum sp.	Fountain grass	Palea/lemma	Desiccated				
Pennisetum sp.	Fountain grass	Seed	Desiccated				
Pennisetum sp.	Fountain grass	Spikelet	Desiccated	2			
Pennisetum sp.	Fountain grass	Rachis	Desiccated				
Phoenix dactylifera	Date palm	Complete fruit	Modern				

			ID	**OL1**	**O1A**	**O1B**	**O5**
			Area	SAV1W	SAV1 Sur. Temple A	Ibed. O1A	SAV1E
			Location	SQ1S			Square 2, Feature 14, in Find No. 40
			SU	609	Temenos South of Temple A		
			Find no. pottery	N/A			49 / 2013
			Relative Dating	New Kingdom	New Kingdom		Early 18th Dynasty
Scientific Name	**English Common Name**	**Plant Part**	**Preservation**				
Phoenix dactylifera	Date palm	Complete fruit, charred	Modern				
Phoenix dactylifera	Date palm	Seed	Charred				
Phoenix dactylifera	Date palm	Seed	Desiccated				
Phoenix dactylifera	Date palm	Gnawed seed	Desiccated	2			
Poaceae	Grass family	Fruit	Charred				
Poaceae	Grass family	Palea/lemma	Modern	17			
Triticeae	Cereal indet.	Seed	Charred	1			
Triticeae	Cereal indet.	Culm node	Charred				
Triticeae	Cereal indet.	Palea/lemma	Charred				
Triticeae	Cereal indet.	Palea/lemma	Desiccated	+			
Triticeae	Cereal indet.	Straw	Charred	+			
Triticeae	Cereal indet.	Straw	Desiccated	+++			
Triticum sp.	Wheat indet.	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Seed	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Charred				
Triticum turgidum ssp. *dicoccon*	Emmer wheat	Rachis/spikelet fork (glume bases + internode)	Desiccated				
Triticum aestivum ssp. *aestivum*	Bread wheat	Rachis (internode + node)	Desiccated				
Vitis vinifera	Grape	Seed	Desiccated	3			
Wood TBI	N/A	Wood	Desiccated	+			++
Wood TBI	N/A	Wood	Charred	+++			++
Other materials							
Animal bone			N/A	+			++

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Animal dung			Modern				
Animal / human dung			Desiccated				
Animal leather / hide			Desiccated				
Bead			N/A	1			
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Charred				
Capra sp. / *Ovis* sp. dung	Sheep/Goat		Desiccated	1			
Carnivore dung			Desiccated				
Herbivore dung with hulled barley and barley rachis			Desiccated				
Herbivore dung with cf. *Panicum* sp.		Palea/lemma	Desiccated	+			
Human hair, lock of wig	Lock of wig		Desiccated				

Tab. 33 *continued* Identification and quantification of archaeobotanical remains in surface and soil samples

Below we discuss the encountered taxa grouped according to the latter system, as this is most practical and makes most sense from the economic historical perspective. It should be noted that in this system some overlap may exist, especially if a single taxon provides several different products humans use. The date palm, for instance, is both a fruit tree (because of its eponymous fruit) and also a fibre crop if its leaves are used for making basketry.

Another issue is the use of common or trade names for plants and their products by historians and general archaeologists, which can sometimes be oversimplifying or misrepresenting the complexity of agricultural decision making. While terms such as 'wheat' and 'barley' have their uses, they strictly refer to cultivated species and subspecies within genera *Triticum* and *Hordeum* and not to any specific crop a historical actor/farmer would have cultivated. For the farmer and therefore for the study of ancient agriculture, in wheat it is at the subspecies level that economically relevant differences between crops occur. For instance, bread wheat (*Triticum aestivum* ssp. *aestivum*) and spelt wheat (*Triticum aestivum* ssp. *spelta*) are both subspecies of *Triticum aestivum* – a species of wheat for which there is no common name, precisely because the economic relevance lies at the subspecies level.[973] Similarly, the term millet is problematic, as it may refer to a number of (small-seeded) cereal crops rather than to a specific taxon. Examples of 'millets' include common millet (*Panicum miliaceum*) and pearl millet (*Penissetum glaucum*); sorghum (*Sorghum bicolor*), while it shares characteristics with most millets, is typically considered a separate crop. Millets come from various genera and their domestication history, origin and diffusion are diverse and still not fully understood.[974] In the discussion on the spread and rise to importance of millets and sorghum, Sudan has played an important role, which is why we will pay particular attention to any possible millet and sorghum finds. Such finds would also be of importance with respect to cropping regimes: whereas wheats and barleys are winter crops in Egypt and Sudan, millets and sorghum are summer crops. Another reason for their importance is that in stable isotope studies reconstructing human and animal diets in Sudan, sorghum and millets have featured prominently in the debate. Whereas most other crops (both cereals such as wheats and barleys but also pulses, vegetables, fruit trees et cetera) use the so-called C_3 photosynthesis pathway, millets and sorghum use the C_4 pathway, which allows them to conduct photosynthesis more efficiently under arid conditions. The isotopic makeup of the carbon in the plant tissue is affected by the type of photosynthesis pathway, as are the tissues of the animal or human consuming the plant: their tissues are less depleted in $\delta^{13}C$ if a substantial amount of dietary protein is derived from C_4 plants. Isotopic studies of human and animal remains from various locales and peri-

973 See Heinrich 2019 for an in depth discussion.
974 See Fuller 2015; cf. Miller et al. 2016

ods have a tradition of finding stronger C_4 signals in Nubia than Egypt.[975] A complicating factor is that human $\delta^{13}C$ levels are not only affected by the plants they consume, but also by values of the animals whose animal products (e.g. milk, cheese, and meat) they consume. Such animals need not have eaten C_4 crops, but could have grazed or browsed on the many wild C_4 grasses that occur in Egypt and Sudan.[976]

This brings us to another point. While binominal names and the word 'plant' are economically neutral, many other words we use with respect to agriculture and plants are not. Terms such as 'crop', 'weed', 'wild plant' and 'economic plant' are typically context dependent. We will follow the conventions suggested by Frits Heinrich,[977] and will understand a crop as any plant that was cultivated by humans, while wild plants will be defined as plants that were not cultivated. Both crops and wild plants can be economic plants, although for the latter group this is contingent on whether they were actually gathered and used by humans. Weeds are plants that from the human perspective occur in the wrong place and/or at the wrong time, typically within an arable field where they are not wanted. The same species that on the field or in the garden would be considered a weed, might be called a wild plant when it occurs somewhere in the landscape where it does not bother us. Archaeologically, we cannot always discern to which group an individual specimen belongs, although certain taxa can be confidently associated with the ecology of arable fields or with specific agricultural activities, such as irrigation, so we may with great likelihood infer that they were weeds. Lastly, we should note that not all economic plants have an equal chance of being preserved – their survivability is largely contingent on which plant part was used in which way by humans.[978] Leafy vegetables, such as lettuce, spinach or cabbage, for instance, are commonly eaten in many societies but typically do not survive the human digestive tract, or at least not in a recognisable form. As their seeds are neither stored in great quantities, nor are commonly present in domestic or food preparation contexts, these crops are rarely found. There is a relationship between survivability and the preservation conditions prevalent in the archaeological context: softer tissues have a better chance of surviving in wet, anaerobic conditions, while desiccation tends to be conducive to preserving large overall numbers of seeds as the absence of moisture prevents rotting. The observation that a crop or group of crops is absent from an archaeobotanical assemblage does not necessarily mean it did not occur; archaeobotanical evidence follows from presence, not absence.

5.1.5.2 Preservation conditions of the material

Most of the material within the Sai archaeobotanical assemblage was preserved in a desiccated state, which is common in arid regions such as Sudan and Egypt. Some of the material was charred or carbonised, which is also common and indicates the remains were purposely or accidently exposed to fire at some point. A few specimens of wild plants were preserved in a mineralised state, most interesting being two seeds of Nile acacia (*Acacia nilotica*, see Pl. 134.1a–b). They originated from sample O5, an incomplete ceramic vessel part of a trash deposit in a bin at SAV1 East (Feature 14, see Chapter 3.2). The mineralisation of specimens is uncommon in arid environments as it requires wet conditions; mineralised botanical specimens, for instance, are more commonly found in cesspits from medieval Western Europe. Due to the context and the fact that some of the other botanicals in the vessel were desiccated or charred, it stands to reason the seeds were part of a secondary fill and had mineralised elsewhere.

5.1.6 Results: The Sai archaeobotanical assemblage

In the sections 5.1.6.1 through 5.1.6.4 the results of the analyses of the samples will be presented per crop group. We will discuss the archaeobotanical materials encountered in the Sai assemblage and re-

975 See Thompson et al. 2008 and references for an overview and discussion. Cf. Touzeau et al. 2014
976 Copley et al. 2004; Thompson et al. 2008.
977 Cf. Heinrich forthcoming.
978 Cf. Fahmy 2005; Walker et al. 2017.

flect on their possible uses. Pictures of examples of each identified taxon were included in a 'mini plant atlas' in the Plates section for reference and verifiability.

5.1.6.1 Cereals

All cereal crops are cultivated members of the grasses family (Poaceae) and they are the eponymous 'grain crops'. Cereals formed the base of most premodern agricultural systems, economies and diets,[979] and are still of enormous importance. Cereals and cereal processing products would have been ubiquitous in any ancient settlement and this ubiquity is reflected in the widespread presence of cereals in archaeobotanical samples. An important categorisation of cereals can be made with respect to them morphologically being either considered 'hulled' or 'naked' (sometimes the terms glume (wheats) and free-threshing cereals are used). In naked cereals the chaff, in which the kernel is held, comes off easily during the threshing process. The chaff of hulled cereals does not come off during the threshing process and an additional step is required: dehusking. This process often only takes place not too long prior to consumption as dehusking might damage the kernels and cause spoilage. Often hulled cereals are, therefore, transported and stored in their husk; this was likely also the case throughout Dynastic Egypt,[980] and the same tradition of storing hulled cereals and dehusking them piecemeal as needed seems to have applied to Nubia.[981] The choice for either a hulled or naked cereal may have great economic and logistical consequences, for instance, as the inedible parts of hulled cereals take up space and their bulky chaff reduces the density of a volume of grain.[982] Recent work has pointed out that taking into consideration the differences between hulled and naked cereals is also of importance in quantifying and interpreting ancient volumes and prices.[983]

The cereals encountered at Sai were barley (*Hordeum vulgare*) and emmer wheat (*Triticum turgidum* ssp. *dicoccon*), the former occurring more frequently in quantities of kernels and rachis. These are also the cereals commonly attested at contemporary New Kingdom sites in Nubia.[984] Four types of barley can be distinguished: the 2-row variety (*Hordeum vulgare* ssp. *distichum)* and the 6-row variety (*Hordeum vulgare* ssp. *vulgare*), both of which may occur as a hulled or naked form. All barley kernels encountered at Sai were hulled, which means that the palea and lemma were still attached to the kernel; this complete unit is referred to as a floret (Pl. 134.2). The presence of desiccated rachis with three complete glume bases and broad outer glumes, typical of 6-row barley (Pl. 134.3a–b), allowed a more precise identification. Not all barley rachis, however, could be identified to the sub-species level because of rough breakage of the glumes (Pl. 134.4). Hence hulled 6-row barley was the only sub-species positively attested in the assemblage. For ancient Egypt this type of barley is sometimes considered to have most commonly occurred,[985] although hulled 2-row barley has also been found.[986] In the Kerma period tombs on Sai, Jean Erroux encountered both 2-row and 6-row hulled barleys.[987] Therefore, we cannot with certainty exclude the possibility of a continued presence of 2-row barley. A few of the desiccated barley rachis fragments showed clear signs of suffering from smut of barley (Pl. 134.5a–b[988]). This disease, which may occur as either 'loose' or 'covered' smut is caused by the fungi *Ustilago nuda* and *Ustilago hordei* respectively, both of which infest barley in particular.[989] Before chemical seed treatment was developed in the modern

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979 Cf. Heinrich 2019.

980 Nesbitt and Samuel 1996, 50; Murray 2000, 527.

981 Van Zeist 1987, 253.

982 Heinrich 2017.

983 For New Kingdom examples, see Heinrich and van Pelt 2017a, 2017b; Van Pelt and Heinrich 2019.

984 See Ryan 2017 and Ryan et al. 2012 for Amara West and Kahlheber 2013 on the Gala Abu Ahmed fortress.

985 Cappers and Neef 2012, 408; Cappers et al. 2014.

986 E.g. Thanheiser et al. 2002, 302.

987 Erroux also distinguished a now no longer recognised 4-row type of barley, which was probably a specimen of the 6-row type, see Erroux 1980. See also Chaix 1984, 32, who at Kerma speaks of *orge polystique*.

988 Cf. the pictures in Neef et al. 2012, 397.

989 A third, less common yet very similar type of smut that affects barley is false loose barley (*Ustilago nigra*), see Mathre 1997. Furthermore, it should be noted that there are great similarities between loose smut of barley and loose smut of wheat

era, the disease was common anywhere where barley was cultivated and could cause significant yield losses.[990] Previous finds of barley infected with *Ustilago hordei* originate from Greco-Roman Egypt at Berenike,[991] Karanis[992] and Myos Hormos,[993] and at Deir'Alla from Iron Age Jordan,[994] while spores of that species have also been encountered in English and Danish bog bodies from the Iron Age and Roman periods.[995] As loose smut has not been attested archaeologically and is moreover far less common,[996] we tentatively suggest that we are dealing with signs of *Ustilago hordei*, leading to a provisional identification as *Ustilago* cf. *hordei*.[997] The finds in Egypt had led to the conclusion that *Ustilago hordei* was introduced in Egypt during the Greco-Roman period, although both René T.J. Cappers and Marijke Van der Veen have urged that Pharaonic material should be (re-)assessed to see if there is earlier evidence for this pest. With the attestation of *Ustilago* cf. *hordei* infected barley at New Kingdom Sai, this conclusion indeed needs revision, as the *terminus ante quem* for the introduction of smut of barley into the Nile valley is pushed back one millennium. To our knowledge, our samples at Sai also represent the earliest recorded archaeological attestation of smut of barley, covered or loose.[998] Its presence suggests that local farmers likely suffered some yield losses because of smut.

Emmer wheat is a hulled wheat (Pl. 134.6a–c);[999] in the Sai botanical assemblage emmer grain kernels, rachis (including complete spikelet forks (glume bases plus their internode, Pl. 134.7), and palea/lemma were encountered.[1000] In addition, very few desiccated bread wheat rachis (nodes and internodes, *Triticum aestivum* ssp. *aestivum*) were encountered (Pl. 134.8). We believe that these are examples of modern, or at least Post-Pharaonic, contamination. Cappers has suggested that bread wheat played no role in Egypt until the 20th century AD;[1001] at Sai we have clear evidence for its presence alongside hard wheat (*Triticum turgidum* ssp. *durum*) during the Ottoman period,[1002] but a Pharaonic presence seems unlikely.

In the Sai archaeobotanical assemblage several other grasses were encountered in small quantities; it was not always possible to identify these to the species level but sometimes only to the genus level. Among these was wild sorghum (*Sorghum halepense*) of which the chaff was encountered (Pl. 134.9);[1003] this likely represents a wild grass growing in the landscape. The earliest attestation of cultivated sorghum (*Sorghum bicolor*) in Sudan dates from the Jebel Mokram Cultural Group (1500–500 BCE) and originates from Kassala in eastern Sudan;[1004] in the Nile valley cultivated sorghum is possibly attested from the Napatan period and certainly from the Meroitic period onwards.[1005] Elsewhere in Egypt culti-

(*Ustilago tritici*), whose genetic relationship is not perfectly understood and which are sometimes considered different varieties of the same species, exclusively focusing on their respective hosts.

990 Mathre 1997. Cf. Cappers 1999; Cappers 2006, 90–91; Van der Veen 2011, 145; Cappers et al. 2012 references there.

991 Cappers 2006, 90–91.

992 Cappers and Hamdy 2007, 168–169.

993 Van der Veen 2011, 145 who also found evidence of infection in the Islamic period at the same site (Quseir al-Qadim).

994 Cappers et al. 2012; Neef et al 2012, 397. This was encountered on charred barley rachis.

995 The spores of *Ustilago hordei* were found in the stomach contents of Late Iron Age/Roman bog bodies in Denmark and England, see Van der Sanden 1996, 110. Cf. Cappers 2006, 90–91.

996 Mathre 1997.

997 Further analyses will be conducted to assess if a closer identification of the pathogen that affected the encountered barley rachis can be made.

998 It is not unlikely that the pathogens themselves are much older, possibly originating from early fields or preceding agriculture and originating from thick wild stands of grasses, and it is not unlikely that earlier finds will be encountered in the future.

999 Cf. Cappers and Neef 2012, 304–310.

1000 For a further discussion on the terminology of cereal rachis, we refer to Cappers et al. 2009; Cappers and Neef 2012; Neef et al. 2012.

1001 Cappers 2006, 130; Cappers and Neef 2012, 408; Cappers et al. 2014.

1002 Heinrich et al. forthcoming. Clapham and Rowley-Conwy 2007, 160 suggest its presence from the Late Meroitic period onwards at Qasr Ibrim.

1003 For archaeological parallels, see for instance Cappers 2006 and Cappers et al. 2007.

1004 Beldados and Costantini 2011.

1005 Cf. Fuller 2015, 37–38; Fuller 2004, for Qasr Ibrim, see Clapham and Rowley-Conwy 2007.

vated sorghum has been noted at early Roman Berenike and Myos Hormos,[1006] although Van der Veen has argued the early period finds there represent contamination and that only the Late Roman finds are reliable.[1007] Other finds of cultivated sorghum in Egypt from before the Byzantine and Islamic periods originate from the Roman period Kharga oasis and Late Antique Kom el-Nana.[1008] Another grass we encountered at Sai belongs to *Pennisetum* sp., of which we found a single seed and a fragment of an infructescence with intact palea/lemma within the same sample (Pl. 134.10a–d), but it could not be identified to species level. While the genus includes the crop pearl millet (*Pennisetum glaucum*), it also encompasses many wild species, some of which are attested in Sudan from the Neolithic onwards, as several species are native.[1009] Based on its morphology, *Pennisetum glaucum* could be excluded as a possible identification for the infructescence and seed.[1010] Several other identification options of wild Pennisetums remain, although it was not possible to conclusively identify them with the reference material available to us. We therefore, and due to the occurrence in only a single sample, suggest the encountered material represents a wild species within the genus. In Sudan the crop pearl millet is only attested from the Post-Meroitic period onwards,[1011] while in the Egyptian Dakleh oasis and at Qasr Ibrim it is attested for the Roman period.[1012] Early finds of domesticated pearl millet come from early 2nd millennium BCE Mauritania, where it was probably domesticated, and India, while 1st millennium BCE finds are known from the Libyan Fezzan.[1013] Van der Veen observed that parallel to cultivated sorghum the archaeobotanical archive remains largely silent with respect to *Pennisetum glaucum* in East Africa, which she attributes to a lack of botanical studies in the region.[1014] An alternative explanation for their absence might be that the species moved through the area but were, perhaps after some experimentation, not adopted. In the Nile valley agriculture is dependent on the Nile floods, which creates an agricultural 'timetable' well suited to the cultivation of winter crops and much less to the cultivation of the C_4 summer crops, such as millets and sorghum. Simply put, although these crops are more drought-resistant than wheats and barleys, they require water at a time when it is scarcer and irrigation is more difficult because of the lower water level of the Nile. This would have made a shift to such crops unattractive before the introduction of more efficient and effective water-lifting technology such as the *saqqyia* from Roman Egypt.[1015] The early adoption of pearl millet and sorghum in the oases of Egypt's Western Desert and the Libyan Fezzan might then be explained from the fact that their water sources are stable year round and independent from the Nile floods.[1016]

Two desiccated fruits encountered at Sai could be either *Panicum turgidum* or *Panicum miliaceum* (Pl. 134.11a–b, Pl. 134.12a–b, Pl. 134.13a–b, Pl. 134.14 a–b). *Panicum* sp. is a genus of grasses, which besides various wild grasses includes the (originally East Asian) crop common (or broomcorn) millet (*Panicum miliaceum*), with regards to which there is some controversy as to the time of its introduction in Sudan.[1017] The only find in Sudan and Egypt contemporary to Sai of *Panicum miliaceum* originates from the Kerma period necropolis at Ukma West, although this may have been a misidentification.[1018]

[1006] Cappers 2006, 156; Van der Veen 2011, 103.
[1007] Van der Veen 2011, 103.
[1008] Newton et al. 2005 and Smith 2003 (cf. the pictures on pages 38–41, 43) respectively.
[1009] Boulos 1999–2005; Fuller 2015, 37.
[1010] Cf. the photographs in Cappers et al. 2009, 1169–1170.
[1011] See Fuller 2015, 38. Cf. Clapham and Rowley-Conwy 2007, 159–160 who also note it at Roman Qasr Ibrim.
[1012] Thanheiser et al. 2002, 302; Clapham and Rowley-Conwy 2007, 159–160. Although the crop originated from West Africa and was diffused to India early on, Van der Veen 2011.
[1013] For a discussion, see Fuller 2003; Fuller et al. 2007; Fuller and Boivin 2009 and Van der Veen 2011. For Libya, see Pelling 2005 and 2008.
[1014] Van der Veen 2011, 104.
[1015] See, for instance, Clapham and Rowley-Conwy 2007, 163 who indeed link the crop shift in the Meroitic/Post-Meroitic periods to this introduction.
[1016] See Heinrich forthcoming for a discussion.
[1017] Fuller and Boivin 2009 for an overview.
[1018] Van Zeist 1987, 250, 252. The original specimens are no longer available for study. In the photographs in Van Zeist's paper it is visible that the specimens are more oval/elongated, like *Panicum turgidum,* rather than rounder like *Panicum mili-*

From the Napatan and Meroitic periods there are only two archaeobotanical attestations of it.[1019] Archaeologically, *Panicum turgidum* has for instance been attested at various sites in the Egyptian Western Desert from the New Kingdom onwards.[1020] As to the literary sources, in his *Geographica*, the Greek geographer Strabo (64 BCE – 24 CE), who himself visited Nubia in the Meroitic period, mentioned that besides barley, millet was locally eaten (Strab. 17.2.2).[1021] At and near present day Sai *Panicum turgidum*, a desert bunchgrass in Egyptian Arabic referred to as *thaman*, naturally occurs.[1022] *Panicum* sp. chaff was also observed in (possibly Post-New Kingdom) animal dung (S14 and S19, Pl. 134.15a–b), likely as a result of animal browsing.[1023] We therefore suggest the specimens in the assemblage likely represent the wild grass *Panicum turgidum*. Of foxtail millet (*Setaria italica*), for which finds from the Napatan through the Early Christian periods have been reported solely at Qasr Ibrim,[1024] we have no evidence at Sai, nor of any of the wild species in the genus *Setaria* sp. which occur in Sudan.[1025] Other grasses encountered in the Sai assemblage include wild barley (*Hordeum vulgare* ssp. *spontaneum*) (Pl. 134.16a–b),[1026] canary grass (*Phalaris* sp.) (Pl. 134.17)[1027] and darnel (*Lolium temulentum*) (Pl. 134.18),[1028] which are common arable weeds.[1029] They likely grew among the cereals and were unintentionally collected alongside the crop during the harvest. Farmers often do not bother to remove all weeds from their harvest during crop processing as this can be a labour-intensive process – especially if the weed seeds are comparable in size to the grains and hard to sieve out.[1030]

Of the two cereals encountered at Sai, barley appears to have been more abundant than emmer wheat. This is similar to the situation at nearby and contemporary Amara West.[1031] It is often suggested by historians that barley primarily served as an ingredient of beer and as animal fodder. The dominance of barley in Egyptian archaeobotanical assemblages until the New Kingdom – when emmer wheat becomes dominant[1032] – has led this view to be challenged by botanists who emphasise barley's role as primarily a human food.[1033] Experimental studies have moreover shown that barley is as suitable as emmer wheat for the production of the unleavened breads made in bread moulds common in the era.[1034] The apparent dominance of barley over emmer wheat at New Kingdom Sai seems to contrast with what has been observed in New Kingdom Egypt. Crop shifts, however, do not happen overnight; the transition from

aceum. Van Zeist, besides properly depicting the specimens, meticulously described their morphology and his argumentation for reaching his identification. We can, therefore, reconstruct that Van Zeist did not consider *Panicum turgidum* as an option as he only compared *Panicum miliaceum* with *Echinochloa* sp. (cockspur grass). At the start of the article, with a type of academic courage rarely seen today, Van Zeist cautioned his inexperience with/lack of reference material from the area in his collection at that time, which may explain this. It is, therefore, well possible that these specimens were in fact *Panicum turgidum*, yet without the specimens themselves this remains inconclusive.

1019 Fuller 2015, 38. Cf. Clapham and Rowley-Conwy 2007, 159.

1020 Cappers et al. 2007, 134.

1021 Strabo uses κέγχρον. This crop name is typically translated as common millet (*Panicum miliaceum*). When discussing his home region of Pontus in Anatolia (Strab. 12.3.15) he mentions it is grown there as well (although some translators then interpret it as sorghum), alongside ἔλυμος, a word that, like μελίνη, tends to be translated as foxtail millet (*Setaria italica*). For a discussion, see Heinrich, forthcoming. Cf. Heinrich and Wilkins 2013/2014 on the general difficulties of linking historical crop names to botanical taxa.

1022 Heinrich, personal observation.

1023 Cf. Cappers 2006, 210 for a photograph of heavily grazed *Panicum turgidum* in the Eastern Desert in Egypt.

1024 Clapham and Rowley-Conwy 2007, 160 – the authors mention this re-identification of specimens previously identified as *Panicum miliaceum* by Rowley-Conwy 1989, even though argumentation for the re-identification or pictures are not provided.

1025 See Boulos 1999–2005; cf. Beldados and Costantini 2011.

1026 Cf. description and drawings in Nesbitt 2006, 85–86.

1027 Cf. description and drawings in Nesbitt 2006, 74.

1028 Cf. description and drawings in Nesbitt 2006, 54–56.

1029 Walker et al. 2017.

1030 Jasny 1942; Jasny 1950; cf. Heinrich 2019.

1031 Ryan 2017.

1032 Cf. Murray 2000; Cappers and Neef 2012, 408.

1033 For an overview of the discussion, see Cappers et al. 2014.

1034 Cappers et al. 2014.

barley to emmer wheat as the dominant cereal in Egypt would have occurred gradually and the Sai assemblage might just be situated at the beginning of this development. Of the introduction of new cereal crops or the disappearance of others, no clear signs can be observed as compared to the Pre-Kerma and Kerma periods. While Jean Erroux only encountered barley at Sai, Francis Geus, Elisabeth Hildebrand and Elena Garcea and Elisabeth Hildebrand also encountered emmer wheat.[1035] This pattern of the cultivation of both emmer wheat and barley also seems to apply to wider Nubia for these periods.[1036] The Sai assemblage furthermore supports Peter Rowley-Conwy's thesis that the expansion of the Egyptian crop curriculum towards including C_4 crops, such as the millets and sorghum, occurred after the Pharaonic period.[1037]

5.1.6.2 Pulses and other Fabaceae

All grain crops in the family of the Fabaceae are counted among the pulses.[1038] It has been argued that the role of pulses in ancient diets and nutrition has often been underestimated in archaeology and economic history.[1039] In archaeobotanical assemblages pulses are often physically underrepresented. Unlike cereals they are not commonly represented by their threshing remains or other processing products, but generally solely by their seeds. Smaller seeded pulses, of which specimens are more easily lost during crop processing or food preparation, such as lentil (*Lens culinaris*), are typically more predominant in botanical assemblages than larger pulses.[1040] At Pharaonic Sai the only pulse encountered was a single charred specimen of grass pea (*Lathyrus sativus*) (Pl. 134.19). Due to its resistance to both floods and droughts, this crop in some places served as a famine or emergency crop. Overconsumption during famines led to recurring outbreaks of the neurodegenerative disease neurolathyrism due to the presence of neurotoxins. In southern Europe and East Africa outbreaks continued well into the 20th century CE. At normal consumption levels the crop is harmless and it is still used in certain traditional dishes in Italy and Spain.[1041] The only other (potential) attestation of grass pea in Sudan is from Kushite Kawa,[1042] while in Egypt its presence was noted at Greco-Roman Berenike and Myos Hormos.[1043] At New Kingdom Amara West the encountered pulses were lentil and pea (*Pisum sativum*).[1044] The scarcity of pulses in the assemblage at Sai does not necessarily imply that they were absent or unimportant.

In addition to pulses and legumes, the family of the Fabaceae also includes leguminous trees. The most common of those on present day Sai Island is the Nile acacia (*Acacia nilotica*). In addition to the mineralised seeds of this tree we mentioned above, both charred and desiccated seeds were encountered as well as desiccated fragments of the fruit (colloquially: 'the pod'; Pl. 134.20a–b and Pl. 134.21). The pods of Nile acacia have an application as a tanning agent,[1045] while both its leaves and pods may serve as animal fodder or be browsed, especially by goats. Both charred and desiccated wood remains of acacia were common throughout the assemblage, but they, and their potential roles as fuel source, timber as well as the use of the tree's thorny branches for animal enclosures, will be discussed elsewhere.[1046]

The mud architecture samples MB14, MB17, MB18, MB29, MB34, and MO5 contained amounts of a substance we tentatively interpret as gum arabic. The main concentration of this material was found in a strip between two layers of mud bricks in the temenos wall south of Temple A (Pl. 133). Two samples

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1035 Erroux 1980; Geus 2003; Geus 2004b; Hildebrand 2007; Garcea and Hildebrand 2009.
1036 Fuller 2015, 37; Out et al. 2016.
1037 Rowley-Conwy 1989; Clapham and Rowley-Conwy 2007.
1038 'Grain crops' should be understood here as crops of which the seeds are used.
1039 Hansen and Heinrich 2019.
1040 Cappers and Neef 2012, 397.
1041 For an overview, see Hansen and Heinrich 2019.
1042 Fuller 2004, 71, cf. *Lathyrus* sp.
1043 Cappers 2006, 157–158; Van der Veen 2011, 145.
1044 Ryan 2017; Ryan et al. 2012, 104.
1045 Van Zeist 1987, 254.
1046 Hansen et al. forthcoming a.

(O1A and O1B) of the concentrated material were taken; the material has a translucent orange to reddish colour and an amorphous structure (Pl. 134.22). When cut, Acacia trees produce a sap to close off the wound that, once it is hardened, is called gum and which is different from resins.[1047] While *Acacia senegal* in present day Sudan is most prized for the quantity and quality of its gum, numerous species providing varying qualities of gum have been used up to the recent past.[1048] Applications for the gum range from use in paints, glazes, adhesives and glues and cosmetics to burning it for fragrance (similar to incense), which might still be observed in many shops in Khartoum. Judging from its context, it could be envisioned that the encountered material was leftover or spillage of paint-making or general settlement waste that ended up in the mud mortar produced on site as the bricks were laid. Further analyses using SEM microscopy may with greater certainty identify the material.[1049]

5.1.6.3 Fruits and fruit trees

Both in the loose/surface finds and mud brick samples the remains of fruit crops were encountered. Among the loose/surface finds of the doum palm (*Hyphaene thebaica*) were most prevalent; both charred seeds and desiccated endocarps were found as well as a rarer find of a complete charred fruit in which the endocarp and seed are still present (Pl. 134.23a–c).[1050] The dried rinds of the fruit can be used for producing molasses-like substances, the unripe kernel can be pounded and ground into a flour,[1051] while the sweet-tart mesocarp (i.e. the fruit flesh) is eaten as a sweet snack by children. Philippa Ryan noted that at present day nearby Ernetta Island doum palms are rare due to clearing in the 1950s;[1052] also on Sai Island only a handful of trees was counted during the ethnobotanical survey.[1053] It is possible that some of the encountered specimens of doum palm represent a Post-Pharaonic or sub-recent signal. Another fruit tree present in the assemblage is the date palm (*Phoenix dactylifera*) of which modest numbers of both charred and desiccated seeds and a desiccated pedicel were encountered (Pl. 134.24a–c); some of the specimens show signs of gnawing by animals (likely small rodents, such as mice) who typically avoid the tannin rich centre of the seed (Pl. 134.24a). The leaves (and sometimes petioles or leaf stalks) of the date palm have been widely used in the production of basketry and other containers, while (cosmetic) fencing and roofing made of palm leaves also has a long tradition; furthermore, the wood is used in construction and as fuel. While today date palm is ubiquitous on Sai Island and the production of its fruit commercially important, the comparatively small number of specimens found might suggest that this was not yet the case in the New Kingdom. For what it is worth, Strabo, writing during the Meroitic period, mentions that (unlike in Egypt) the date palm (and fruit trees in general) was very rare in Kush and only present in 'royal gardens'.[1054] The last fruit tree encountered in the Sai assemblage was the sycamore fig (*Ficus* cf. *sycamorus*), of which a few desiccated fruits were found (Pl. 134.25). It was not as common in our samples as at Amara West.[1055] A fruit that was common in the Sai samples was watermelon (*Citrullus lanatus*), of which both whole and fragmented desiccated seeds were found (Pl. 134.26a–b). Watermelon was also found at contemporary Amara West and Gala Abu Ahmed[1056] and had also been present at Kerma.[1057] The earliest finds of watermelon seeds in North Africa date to the Neo-

[1047] Mantell 1949.
[1048] Mantell 1949.
[1049] Hansen et al. forthcoming b.
[1050] Cf. Ryan 2017, 22; cf. the photos in Neef et al. 2012, 41–42.
[1051] Mubarak et al. 1982; Ryan et al. 2012.
[1052] Ryan 2017.
[1053] Heinrich et al. forthcoming.
[1054] Strab. 17.2.2.
[1055] Ryan et al. 2012.
[1056] See Ryan 2017; cf. Ryan et al. 2012; Kahlheber 2013.
[1057] Chaix 1984.

lithic, those found in northwestern Libya being of particular note.[1058] In a recent study Harry Paris traces the origins of domestication of the watermelon to Northeastern Africa, particularly Sudan, all prior to the New Kingdom, and from there he argues it was diffused to India and the wider Mediterranean.[1059] Furthermore, three specimens of desiccated *Cucumis* sp. were encountered in a domestic context dated to the 18th Dynasty (Pl. 134.27). Both *Cucumis melo* and *Cucumis sativus* have been attested in Egypt for this period, *Cucumis melo* being attested since the Predynastic period.[1060] In comparison to material in the reference collection, these seeds more closely resembled that of the cucumber (*Cucumis sativus*[1061]). Lastly, three desiccated seeds of grape (*Vitis vinifera*) were encountered in an organic layer (OL 1, Pl. 134.28). While the species was also attested at New Kingdom Semna West[1062] and in small numbers at sites from later periods,[1063] it is possible that the presence of grape is the result of later period mixing.

5.1.6.4 Arable weeds and wild plants

In addition to the wild/weed grasses mentioned above, several seeds and fruits of wild plants or potential weeds were encountered in the assemblage. Some of these were not identifiable or only to the family level, while others could be identified to the lower taxonomic level of the species. One of the species found was *Ambrosia maritima,* a member of the genus *Ambrosia* sp. (the ragweeds). Though the diaspore of *Ambrosia maritima* includes its perianth, only the fruits and fragments of the fruit (as it may break into three parts) were found, both as desiccated and charred specimens (Pl. 134.29a–b). Today in Egypt and Sudan it is commonly found on the banks of the Nile and of irrigation channels; although usually only a weed, its use in folk medicine as a treatment for kidney stones has been recorded.[1064] Its presence in the mud bricks may be explained from the fact that the clay used in mud bricks was sometimes obtained by scraping off part of the topsoil of inundated fields (that over time would be replenished with newly deposited silt) and the specimens encountered were possibly part of the soil seed bank. In MB3 several desiccated seed/fruits reflecting an irrigation or riparian signal belonging to the family of the Cyperaceae (sedges) were found. Damage to their seed coats prevented further identification, although two distinct types were noted (Pl. 134.30a–b).[1065] Two seeds of *Portulaca* cf. *nitida* were also found in MB3. *Portulaca* sp. is the only genus in the family of the Portulacaceae that grows in Egypt and northern Sudan and of the genus, only three species, *Portulaca oleracea*, *Portulaca nitida*, and *Portulaca stellata* occur there.[1066] The leaves and stems of *Portulaca oleracea*, known as common purslane, may be eaten as a salad vegetable, though all three species may occur as arable weeds. Based on the patterning on the seed coat and the seed coat structure (Pl. 134.31), *Portulaca oleracea* could be firmly excluded and of the remaining two species the seeds most closely resemble *Portulaca nitida*.[1067] As *Portulaca* sp. typically grows procumbent, it is likely that its seeds were part of the soil seed bank and included in the clay used to compose the mud bricks. The wild/weed grasses discussed above, by contrast, were likely included in the threshing remains that were actively added to the bricks as they are taller and were (inadvertently) collected with the harvest. Other wild species present in low quantities in the assemblage likely reflect wild flora in and around the settlement and are typical for semi-arid/arid environs. These include a seed of Roman nettle (*Urtica pilulifera*) and seeds/fruits of species belonging

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[1058] Wasylikowa and Van der Veen 2004.
[1059] Paris 2015.
[1060] Fuller 2004; De Vartavan et al. 2010, 90; see Bruyère 1937 for *Cucumis sativus* at 18th Dynasty Deir el-Medine.
[1061] Cf. the pictures in Cappers et al. 2009, 435.
[1062] Van Zeist 1983. Cappers et al. 2007 note grape from the Middle Kingdom at Gebel Qarn el-Gir and from the New Kingdom onwards at Gebel Roma, both in the Western Desert, while Cappers et al. 2014 note it in the Kharga oasis from the Second Intermediate Period onwards.
[1063] Fuller 2015, 38.
[1064] Boulos 1983; Boulos 2002, 230.
[1065] For a general discussion on water and riparian plant remains mud bricks, see Cappers and Neef 2012, 216–218.
[1066] Boulos 1999, 49–50.
[1067] Cf. Amini Rad et al. 2017, Figures 1e and 1f there.

	Length in cm				Width in cm			
	μ	Median	Mode	σ	μ	Median	Mode	σ
New Kingdom	36.8	39.0	40.0	4.9	17.6	17.5	16.0	4.9
Ottoman	38.1	37.5	36.0	2.7	20.0	20.3	N/A	3.0
Uncertain date	32.8	33.0	33.0	0.4	16.0	16.0	16.0	0.7

Tab. 34 Descriptive statistics of mud brick dimensions and weight

to the genera *Centaurea* sp. (centaury), *Silene* sp. (catchfly), *Echium* sp. (bugloss), cf. *Aizoon* sp. as well some belonging to the families of the Boraginaceae (Borage family) and Papaveraceae (Poppy family) (Pl. 134.32 through Pl. 134.38).

5.1.7 Results: Mud brick size and composition

5.1.7.1 Mud brick size

Tab. 29 provides the dimensions and weight of the sampled mud bricks and Tab. 34 gives the descriptive statistics of these data. Following the example of Barry J. Kemp, the length and width of the New Kingdom, Ottoman and undated mud bricks have been plotted in Fig. 134.[1068] As to the dimensions of the mud bricks, no clear grouping can be discerned, even though the New Kingdom bricks on average appear marginally longer, while the Ottoman bricks appear on average marginally wider and heavier. The bricks of uncertain context/date (MB19, MB20, MB21, MB22 and MB23) were slightly smaller. These bricks largely overlap with the group of finger-marked mud bricks (MB19, MB20, MB21, MB22 and MB28), although the unmarked brick MB23 more closely resembles MB19–22, while the marked brick MB28 is more similar to the average of the New Kingdom bricks. The height (or thickness) of the mud bricks is consistent in all samples. Fig. 135 is a triplot in which length, width and height are shown together; the clustering of the mud bricks indicates their great similarity. Overall, the mud bricks fall within accepted ranges for brick size established for Egypt and the local convention of using elongated

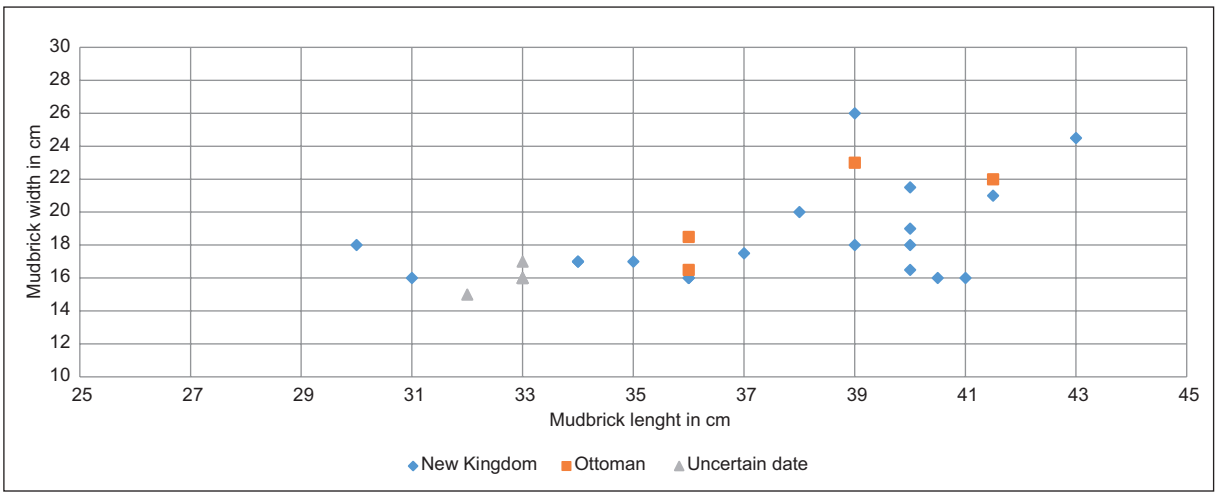

Fig. 134 Scatter plot of the length and width (in cm) of the sampled mud bricks

[1068] Kemp 2000. See also Doyen 2017, 26–28 for the mud brick dimensions encountered at SAV1 North of the New Kingdom town of Sai.

Height in cm				Weight in grams			
μ	Median	Mode	σ	μ	Median	Mode	σ
9.0	9.0	9.0	1.6	7394.8	6680.0	6400.0	2444.6
9.0	9.0	9.0	0.8	8545.0	8520.0	N/A	675.1
10.0	10.0	10.5	0.6	5682.0	5280.0	N/A	742.7

(μ = average/mean; σ = standard deviation)

rectangular bricks of a length that is roughly twice the width[1069] – in contrast, Levantine and Mesopotamian mud bricks were often square.[1070] The absence of clear size differences suggests that (within the sampled population) there was no apparent differentiation in functionality related to dimensions; the same appears to go for the mud bricks with finger markings. Such small variation as exists between individual bricks may be related to shrinkage during drying.[1071] Interestingly, there also does not appear to be a size difference between the New Kingdom and the Ottoman bricks. Furthermore, the New Kingdom mud bricks also do not seem to be categorically different from those used in Nubia before; mud bricks at the Western Deffufa at Kerma, for instance, were also rectangular and had an average size of 37.5 × 18 × 12cm (*n*= 24).[1072]

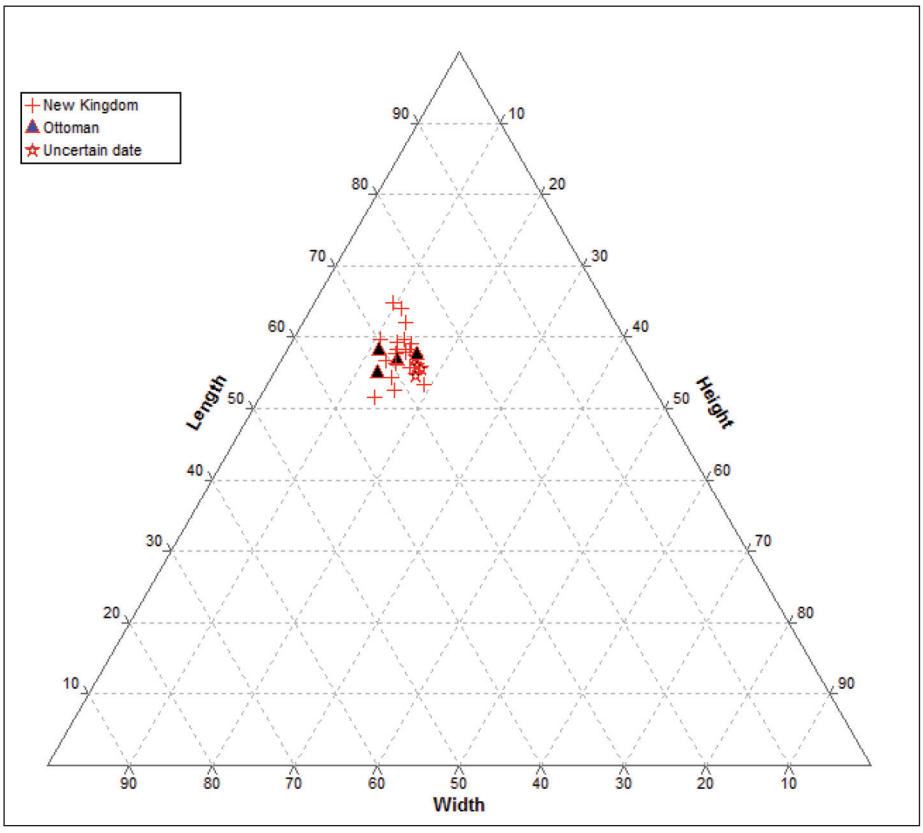

Fig. 135 Triplot indicating the degree of similarity of the mud bricks with respect to their length, width, and height

[1069] Kemp 2000, 85–88.
[1070] Homsher 2012, 5.
[1071] Kemp 2000, 85–88.
[1072] Heinrich, personal observation/measurements taken while working on the site in January 2014.

5.1.7.2 The botanical component of mud architecture

In terms of the botanical component of mud brick architecture, clearer differences are observable. In addition to the sample and context data, Tab. 29 and Tab. 30 provide the weight in grams of the botanics in each mud brick and each mortar or plaster sample as well as the density of botanics per sample expressed as the percentage of the total weight of the sample the botanics represent. These data are shown in Fig. 136 for the New Kingdom, Ottoman and undated bricks and in Fig. 137 for the New Kingdom and Ottoman mortars and plasters. Several observations can be made. In Fig. 136 the difference in the density of botanics between the Ottoman and the New Kingdom and undated bricks is immediately apparent. Whereas botanics in none of the New Kingdom bricks make up more than 1% of the total weight and average at only 0.36%, the weight of the botanics in the Ottoman bricks averages at 3%, or even 3.6% if the outlier MB24 is excluded. At an average of 0.08% (or 0.03% if the outlier MB23 is excluded) in the undated bricks, which largely overlap with the finger marked bricks, the botanics make up the smallest share. In the mortars and plasters similar differences between the New Kingdom and Ottoman samples can be observed; no mortars or plasters were associated with the undated bricks. There is no clear indication that there is a difference in terms of the density of botanics between mortars and plasters. Some of the mortars and plasters were richer in botanics than their associated mud bricks, yet the number of samples is too small for conclusive statements in that regard (see also Chapter 4.6). Ottoman mortar MO9, at 11%, had the greatest density in botanics of all the samples. New Kingdom mortar MO5, at 5.8% botanics, and Ottoman mortar MO8, at 2.3%, however, are more interesting: they are associated with MB15, the New Kingdom mud brick richest in botanics (1%) and MB24 the Ottoman mud brick poorest in botanics (1.4%), suggesting a relationship between the density in botanics between mud brick and mortar. Within the Ottoman samples, the outliers MB24 and MO4 might be explained from the fact that they were derived from an interior wall within the Ottoman fortress, whereas the other samples came from the outer (curtain) wall and the fortress' massive corner towers on which the main gunpowder batteries were mounted. Both historical sources as well as 20th century ethnographies indicate that the producers and consumers of mud bricks had a strong preference for mud bricks with a large botanical component in the form of tempering with straw and chaff; although some modern scholars have claimed choosing straw and chaff is not strictly necessary and other tempering agents work equally well.[1073] Whether in fact stronger or not, the notion that mud bricks heavily tempered with chaff and straw were of better quality may have motivated the choice for such bricks in structures in which strength and durability were especially valued. It is possible yet inconclusive that the reverse of this logic can be applied to the undated/finger marked bricks with minimal additions of plant remains.

The question why the New Kingdom (and undated) bricks contain much less botanical remains than the Ottoman ones is more complex. As straw and chaff are resources with important uses besides mud brick temper in arid environments,[1074] their commitment to any use represents an opportunity cost in terms of forgoing other uses. Lamentations as to shortages and prohibitively high prices depressing the use of straw and chaff in brick making have been historically recorded,[1075] and the Old Testament famously stated: "There shall no straw be given to you, yet ye shall make bricks without straw" (Exodus 5:18) as pharaoh's punishment unto the Israelites for Moses and Aaron demanding their freedom. The Biblical reference later gave rise to the modern English phrases 'to make bricks without straw' or 'you can't make bricks without straw' to express being asked to do the impossible or to denote an impossible feat. Kemp reflected on the absence of straw and chaff in some Egyptian mud bricks despite the historical preference and volunteered that a possible explanation may have been predation by insects, most notably termites, although he stated he did not know of a study investigating this for Egypt.[1076] Since then, some studies have reported possible infestation of mud bricks in present day Egypt by the

[1073] For an overview and discussion, see Kemp 2000, 82.
[1074] Van der Veen 1999.
[1075] Kemp 2000, 82.
[1076] Kemp 2000.

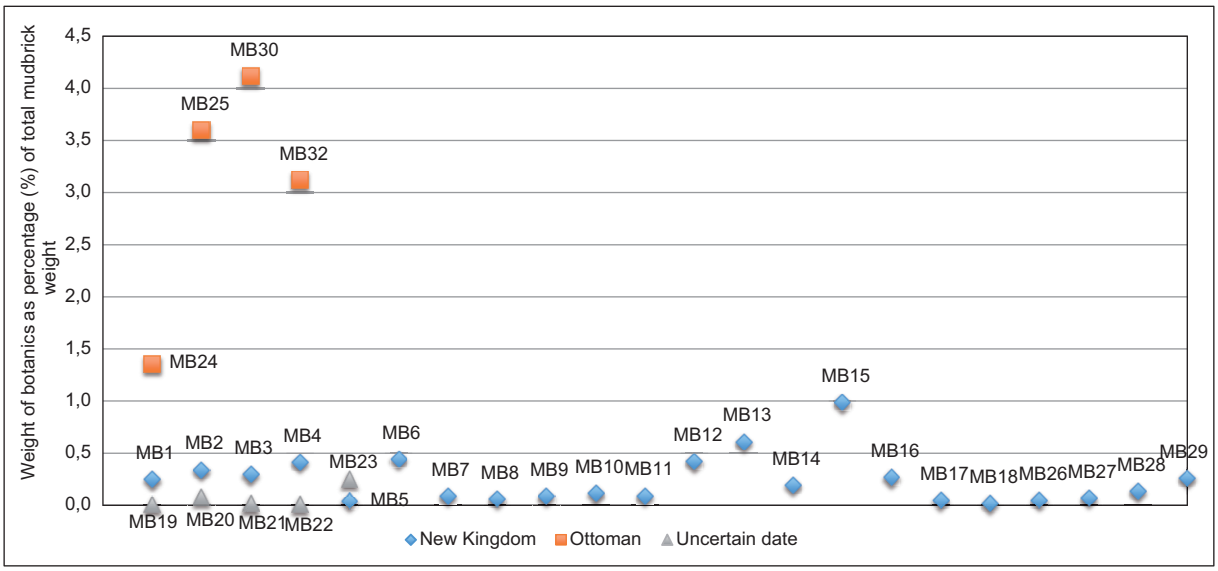

Fig. 136 Scatter plot expressing the density of the botanical element in the sampled bricks as the weight of the botanical element as a percentage of the total weight of the brick

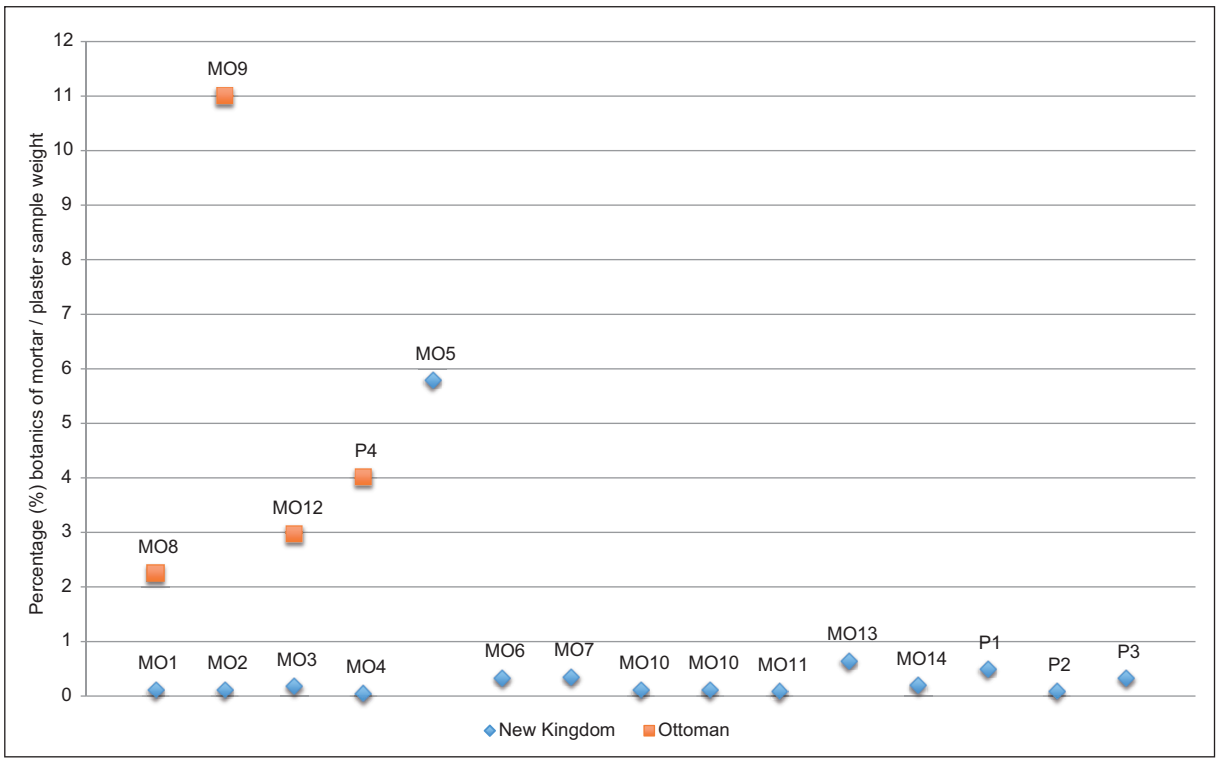

Fig. 137 Scatter plot expressing the density of the botanical element in the sampled mortars and plasters as the weight of the botanical element as a percentage of the total weight of the sample

termite species *Psammotermes hybostoma*.[1077] Such predation could be conceivable in the outer layers of a brick, although reaching all or even most of the material on the inside would require extensive burrowing or tunnelling. No evidence for this was found in mud bricks with low botanic densities at Sai.

[1077] Mohanny and Ahmed 2010; Aly et al. 2012.

Moreover, in other situations in which the physical plant temper does not survive, such as in contexts with a higher humidity or in (semi-)fired mud materials,[1078] impressions of the material may remain and this was also not the case in Sai mud bricks low in botanics. Lastly, on multi-period sites such as Sai, it would be difficult to explain why only the New Kingdom bricks would be greatly affected by insect infestation, while Ottoman bricks were left unharmed. Therefore, we deem it far more likely that the difference in the amount of plant temper represents the making of different choices rather than differences in predation or taphonomy. The construction of the New Kingdom town at Sai and the erection of its enclosure wall must have placed an enormous demand on the local availability of chaff and straw (see also Chapter 2.6). Though we do not possess the variables necessary to reliably reconstruct supply and demand at Sai, calculations at other sites suggest that especially defensive mud brick walls strained the production infrastructure and often required creative or oppressive solutions.[1079] As Sai started out as an outpost in only recently pacified territory, the strain on resources was arguably even greater and more concentrated temporally. It is not inconceivable that the construction of monumental structures with a (symbolic) defensive character under these circumstances was seen as more time sensitive, reducing the number of harvests from which the straw and chaff could have come. Relative scarcity may have forced the 18th Dynasty builders to use alternative sources of temper, such as sand, gravel or even large pebbles – the latter were found in roughly half of the New Kingdom bricks. The construction of the Ottoman period fortress may have been less time sensitive or the logistics may have been less strained. A further explanation of the difference may lie in the cereal crops themselves. As we noted in section 5.1.6.1, the cereals at New Kingdom Sai were (hulled) barley and the hulled wheat, emmer wheat; at Ottoman Sai the naked wheats, hard wheat and bread wheat, were dominant.[1080] In addition to the differences in the economics of transportation listed above, there are also differences in the availability of straw and especially chaff between hulled and naked cereals. Whereas emmer wheat and hulled barley would have been dehusked piecemeal (if the latter was dehusked at all, see above) providing only small amounts of chaff at a time, the chaff of the naked wheats would have become available all at once immediately after threshing.[1081] Hence, the practical availability of straw and chaff is greater if naked wheats are cultivated; and thus changes in crop selection likely affected mud brick technology. If the composition of the botanical material is taken into account, the Ottoman bricks appear to have been primarily tempered with threshing remains, whereas the New Kingdom bricks, besides small amounts of threshing remains, feature more charred plant remains and other inclusions (e.g. pottery sherds, small bone fragments and dung). This suggests that settlement waste was an important part of the temper in the New Kingdom mud bricks – which is remarkably similar to Reisner's ethnographic observation that the poor, who it is implied could not afford straw and chaff, would use street sweepings containing windblown cereal remains (which were omnipresent in most settlements) as temper.[1082]

5.1.8 Conclusion

In this chapter we assessed the archaeobotanical evidence from the New Kingdom town on Sai Island and have demonstrated that mud bricks serve as a good proxy in modelling the agricultural economy of a site, providing insights in both food production and the industrial use of rest products of agricultural production. Since mud bricks tend to have a very long tradition in the places where they occur, often spanning millennia, while most of the non-botanical parameters of their production and use remain the same, it makes them particularly useful for studying diachronic change. The fact that mud bricks are

[1078] Cf. Hansen et al. 2017
[1079] Homsher 2012.
[1080] Heinrich et al. forthcoming.
[1081] The total amount and exact composition of straw and chaff remains also depend on other factors, such as harvesting method – for a model, see Hansen et al. 2017.
[1082] Reisner 1931, 72; Kemp 2000, 82.

sealed contexts and are typically part of dateable archaeological structures that moreover remain, even after excavation or disturbances by looters, further adds to this suitability.

The AcrossBorders project investigated cultural, political, economic and technological cross-cultural exchanges on the Egyptian-Nubian frontier. While Sai was indeed situated on the border between Egypt and Nubia, ecologically and agriculturally the two regions have always had much in common: farmers were facing largely similar environmental constraints and were using mostly the same crops. Most cultivated taxa encountered at New Kingdom Sai have parallels at sites in Egypt and Nubia, both at contemporary sites (e.g. nearby Amara West) and sites from preceding periods, which had been spread along the Nile long before the New Kingdom conquest of Nubia. At New Kingdom Sai 6-row hulled barley and emmer wheat were the cultivated cereals. Emmer wheat does seem somewhat less important at New Kingdom Sai than barley, while in Egypt proper emmer wheat became dominant during that period. It should be noted, however, that crop shifts do not occur overnight, and the Sai assemblage mainly reflects the earlier part of the New Kingdom, the mid- to late 18th Dynasty. The cereals at Sai were part of a group of founder crops of the Neolithic Revolution that had been diffused from the Fertile Crescent. The so-called C_4 cereals (the millets and sorghum), which would become important in Nubia later in the Meroitic and Medieval periods, do not yet make an appearance as cultivated crops at Sai during the New Kingdom. However, some of their wild progenitors and wild relatives were present. Pulses were rare at Sai Island, although their underrepresentation in the archaeobotanical record is not uncommon. Leguminous trees, such as Nile acacia, were commonly encountered; they likely played important roles as sources of fuel and fodder, and also as source of timber, tannins, and quite possibly, gum arabic. Many fruit trees and fruits were present in the assemblage, the most common being doum palm, date palm and watermelon, which were exploited for food, while the wood was likewise a source of timber. Some of the earliest finds of watermelon, an African taxon, have been found in Sudan, though long before the New Kingdom it had spread to Egypt and beyond.

Mud brick dimensions at Sai were comparable between the New Kingdom and Ottoman periods; the main differences lie in the amounts and composition of their botanical component. Ottoman mud bricks contained up to ten times as much botanics as New Kingdom bricks, and the botanical component consisted mostly of straw and chaff. The botanical component in New Kingdom bricks was not only smaller, but besides desiccated plant remains also consisted of charred plant remains and a variety of other organic and inorganic materials that had been used as temper. A direct relationship to the different cereals cultivated in the respective periods is apparent: the hulled wheat emmer wheat and barley that were the dominant cereal crops in the New Kingdom did not concentrate the great and convenient availability of straw and especially chaff as the naked wheats, hard wheat and bread wheat, did in the Ottoman period. Another explanation for the relatively low volume of botanics for New Kingdom mud bricks may lie in the construction rate of the mud brick construction at Sai. The founding of a town and the erection of its buildings and walls would result in a relative scarcity of this material which would have made relatively little chaff and straw available per mud brick, necessitating the greater use of other tempering agents, most likely waste. The identification of the botanics in mud bricks sheds further light on pathways through which the material became incorporated in the brick and as the resultant of which human choices. Chaff and straw, as discussed form very deliberate additions to the mud bricks, but any cereal seeds that could not be (cost-effectively) separated from the threshing material are unintentional inclusions. Some taxa, such as the wild grasses, may have ended up in the mud bricks as they were unintentionally harvested along with the cereals, while the seeds/fruits of various water plants or riparian plants may have been scattered (or deposited by irrigation water) onto fields from which the mud for bricks was collected. In conclusion, the mud bricks at Sai were not only, quite literally, the building blocks of the New Kingdom town, but they play a similar role today in reconstructing its agricultural practices, the agricultural economy, and the daily lives of its inhabitants.

5.2 The faunal remains of vertebrates

by Julia Budka

The faunal remains from the New Kingdom town of Sai are important for our understanding of food production in New Kingdom Nubia and, in combination with the analysis of floral remains, for the reconstruction of essential aspects of the economic system. Much potential lies here in the comparison with other New Kingdom sites in Nubia, such as Amara West, and also sites located in Egypt proper, such as Elephantine.[1083] Furthermore, it was sought to compare the results from the analysis of the faunal remains from New Kingdom Sai with Kerma to address questions about Nubian or Egyptian lifestyle regarding the decision making in food production.[1084]

The study on faunal remains, in particular of vertebrates (for molluscs, see Chapter 5.3), from AcrossBorders excavations on Sai is still in progress (see Chapter 5.2.1). However, the analysis of animal bones from sector SAV1 North of the New Kingdom town of Sai was undertaken by Konstantina Saliari in 2014.[1085] A total of 492 faunal remains excavated in SAV1 North has been identified and analysed (490 bone and two mollusc fragments). More bone material was unearthed, but as those remains derive from badly mixed layers, they were not included in the examination.[1086] Human intervention related to butchery techniques was detected on the remains from 18th Dynasty contexts in the northern sector of the New Kingdom town.

The faunal evidence of vertebrates from Levels 5 to 3 at SAV1 North, the early to mid-18th Dynasty,[1087] is dominated by remains of domesticated mammals. Changes in the faunal profile are evident from Level 5 to 3, which are in particular relevant as Level 3 presents the heyday of the site, the Thutmoside period.[1088] Weight analysis shows a slight prevalence of sheep/goats in Level 5, while Levels 4 and 3 exhibit a higher proportion of cattle, followed by sheep/goats. It is noteworthy, however, that the counting of confirmed individuals (NISP analysis = Number of Identified SPecimens[1089]) changes the ratios between different species, making small ruminants the dominant type both in Level 5 and 3. Pigs are the third most important domesticated species in all three levels. Other taxa contributed only minimally to the archaeozoological assemblages from SAV1 North.[1090]

This assessment of the faunal remains from SAV1 North raises the following points: with sheep/goat as the dominant species, this case study finds many parallels at sites of Nubian cultures[1091] as well as in Egypt.[1092] The evidence from Egyptian settlements suggests that small ruminants were in general "the more common food for family groups in daily life."[1093] The presence of pigs is in particular noteworthy and seems to be specific for an Egyptian foundation in Sudan, contrasting with sites of Nubian cultures.[1094]

1083 No faunal remains have yet been published from Amara West; for Elephantine, see Boessneck and von den Driesch 1982, 1–119 (necropolis and temple of Satet); von den Driesch and Peters 2008 (bird bones). The faunal remains from House 55, serving as close comparison of the AcrossBorders project, will be studied in the near future by Joris Peters and Nadja Pöllath.

1084 Much material has already been published from Kerma, see in particular Chaix 1994. See also Chaix 2006 for a comparison between the rural Kerma site Gism el-Arba and Kerma town. On Nubian vs. Egyptian foodways in Askut as case study, see also Smith 2003, 113–124.

1085 Saliari and Budka forthcoming.

1086 See Budka 2017a, 17–18 for the stratigraphy and formation processes at SAV1 North; see also below, Chapter 5.4.

1087 For the levels at SAV1 North, see Budka 2017a, 18–22.

1088 Budka 2017a, 21–22.

1089 For the use of NISP for faunal remains in Egypt and methodological *caveats*, see Redding 2016, 140–141.

1090 Saliari and Budka forthcoming.

1091 See Chaix 1994.

1092 For the long history of domestication of sheep along the Nile valley, see Lobban 2014.

1093 Ikram 2012, 211. See also Gręzak 2016.

1094 Saliari and Budka forthcoming.

Pigs found at SAV1 North were slaughtered at the optimum age for meat consumption. In combination with the attested young age of slaughtered ruminants, it seems safe to assume a certain preference for tasteful and tender meat in 18th Dynasty Sai, attesting to an elaborated lifestyle. Pigs have been reported from other Egyptian sites in Nubia, but for now Sai represents one of the early attestations, if not the earliest. In Ramesside times, for example, a neonate piglet was found in the western chamber of the pyramid tomb G301 at Cemetery D of Amara West (19th Dynasty).[1095] At present, there is only little evidence for pigs at indigenous Nubian sites prior to medieval times. They are markedly rare at the site of Kerma, both in the town and in the cemeteries.[1096] In New Kingdom Egypt pig is among the most numerous species killed for meat[1097] and a preference for young animals is traceable in the respective settlements.[1098] It can be very tentatively suggested that the presence of pigs in the earliest Level 5 at SAV1 North is in keeping with the analysis of the ceramics from the same contexts: the material is New Kingdom in date and Egyptian in character, supporting the assessment that an Egyptian town was founded on the island very early in the 18th Dynasty.[1099]

The third of the important species of domesticated mammals is cattle. According to current evidence, cattle in SAV1 North became more numerous during Thutmoside times (Level 3). In terms of body size and weight, cattle are important domestic animals at Egyptian sites, even if this is not always apparent numerically.[1100] The distribution of anatomical parts from SAV1 North indicates the presence of complete living animals, at least for Level 3. This must be stressed because this represents the period when the Egyptian town of Sai enjoyed the status of an Egyptian temple town and administrative centre.[1101] The cattle remains may indicate an increased wealth of the town and could be associated with the presence of Egyptian elite and with the slaughter of sacrificial animals for Egyptian cults and festivals.[1102] As at sites within Egypt, a high percentage of the meat supply at Sai seems to have derived from cattle.[1103]

In general, Egyptian texts, temple reliefs and wall paintings give plenty of evidence that various domestic and also wild animals were imported to Egypt from Nubia. Several types of cattle are mentioned in the texts; for example, the paintings in the tomb of viceroy Amenhotep Huy at Thebes show *jw3*-cattle being brought from Kush.[1104] At Sai, a small number of wild animals was documented from the large cellars at SAV1 East, among others gazelles, in particular dorcas gazelles (see Chapter 5.2.1). Although it is also possible that these animals were hunted by and for the occupants of Sai, it is more tempting to associate these findings with so-called "tributes" depicted in numerous Egyptian tombs and temple reliefs and frequently including gazelles, in particular because the cellars on Sai are probably connected with the stone temple.[1105] Interestingly, gazelle bones found at Elephantine were in particular recorded from the temple area and the magazine tracts.[1106] In this case, an association with the goddess Satet seems likely, but the general occurrence and possible provenience of wild animal bones in contexts of New Kingdom towns in Egypt and Nubia need to be investigated further.

[1095] Binder et al. 2011, 53.
[1096] See the studies by Chaix, e.g., 1988; cf. Ikram 2012, 212.
[1097] Ikram 1995, 29–33; Bertini 2014, 306–308. For zooarchaeological sources for pigs in Egypt, see also Volokhine 2014, 179–182; Redding 2016, 173. For the consumption of pork see also Volokhine 2015.
[1098] See, e.g., at Amarna, Kemp 2012, 219–20. Cf. also Elephantine Boessneck and von den Driesch 1982, 21 (necropolis).
[1099] See Budka 2017a, 19.
[1100] See, e.g., Ikram 1995, 8–15; Kemp 2012, 219.
[1101] See Budka 2017a, 21–22; Budka 2017c.
[1102] Cf. Ikram 2012, 211–12. At Sai, it is intriguing that the amount of cattle seems to increase with the heyday of the town, when also the stone temple for Amun-Re and the king were expanded, thus in Thutmoside times (see Chapter 1.1).
[1103] See Amarna as a case study: Kemp 2012, 220, fig. 6.27.
[1104] Davies and Gardiner 1926, pl. 23.
[1105] See Budka 2017c, 80; also Budka et al. forthcoming.
[1106] Boessneck and von den Driesch 1982, 112–113.

5.2.1 Preliminary report on the faunal remains (vertebrate)

by Ptolemaios Paxinos and Nadja Pöllath

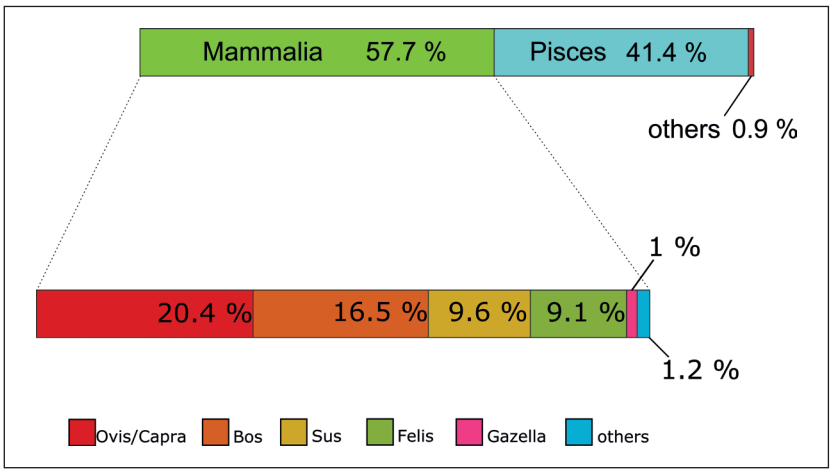

Fig. 138 Sai Island. Distribution of the classes Mammalia, Pisces and "others" (Aves, Reptilia, Mollusca) on the basis of the identified animal bones, along with the identified mammalian species. Rodent bones are not included

The animal bones reported here come from the New Kingdom town on Sai Island and were excavated between 2015–2017, predominantly at sector SAV1 East and also in SAV1 West.[1107] Overall, more than 7400 bones were studied. In spite of the high degree of fragmentation, it was possible to identify *c.* 30% of the bones at least to the level of order or higher. The faunal remains are composed for the most part of mammal and fish bones (Fig. 138). Birds, reptiles and molluscs[1108] are present, but only in small numbers. The bones of small rodents still need to be studied and are not part of the current report.

The majority of mammal bones pertain to livestock animals such as sheep, goat and cattle, thus corresponding well with the findings in sector SAV1 North. Although in lesser quantities, pig bones are also present, primarily in SAV1 East. Interestingly, cat bones are surpassing those of pig in terms of numbers. They were found in Feature 15 at SAV1 East and it seems that they belong to at least two juvenile cats, which were most likely not consumed but disposed as complete carcasses judging from the lack of cutmarks and traces of burning.[1109]

Bones of wild mammals were also present, although in small numbers with gazelle being the most abundant taxon (Fig. 138). Other wild mammals are hare (*Lepus capensis*), hippo (*Hippopotamus amphibius*) and baboon (*Pavio* sp.). Many gazelle bones could be identified only to genus level (*Gazella* sp.), but in some cases the identification of dorcas gazelle (*Gazella dorcas*) and dama gazelle (*Nanger dama*) was possible. Since most of the unidentified gazelle bones seemingly belong to small-sized gazelles, it can be assumed that they also represent dorcas gazelles.

The ichthyofauna evidenced in the present assemblage shows a rather high species richness. Bones of cyprinids (*Cyprinidae*) clearly dominate the fish bone assemblage, amounting to over 20%. Among the cyprinid bones some could be identified to the genera *Labeo* and *Labeobarbus*, while in one case the identification to the species level, *Labeobarbus bynni*, was possible. Besides cyprinids, a larger number

[1107] The strategy of exporting animal bones to Munich was the following: the complete assemblages from the large cellars at SAV1 East (Features 15, 83 and 85), from small units, such as Feature 75 as well as some selected samples from well-stratified contexts at SAV1 West, e.g. Feature 122.

[1108] The bulk of the mollusc remains was studied by Helmut Sattmann (see Chapter 5.3). Only few fragments were overlooked when the material was sorted on site.

[1109] Feature 15 (see Chapter 3.2.2) and its inventory will be published elsewhere in detail: Budka forthcoming b.

of bones pertain to catfishes (Siluriformes), such as *Synodontis*, *Bagrus*, *Schilbe*, clariids and *Auchenoglanis*. Alestid, mormyrid and tilapiine fish apparently were of minor importance for the diet.

Many bones are burnt to various degrees. Some of them are calcined, whereas others are partially burnt or completely charred (black). Interestingly, Feature 15 in SAV1 East yielded not only the bulk of the faunal material (*c.* 80% based on NISP) but also the vast majority of the burnt bones of either birds, mammals or fishes. The high number of burnt bones and the high degree of fragmentation strengthen the interpretation of the feature as a kitchen and room for food preparation.[1110]

5.3 Mollusc remains from Sai Island

by Helmut Sattmann, Sara-Maria Schnedl and Julia Budka

5.3.1 Introduction

During the archaeological investigations of the European Research Council project AcrossBorders on Sai Island in Upper Nubia (Kush) from 2013 to 2018, among other material, also remains of mollusc shells were recovered (Pl. 135). Because of their robust calcified structure, mollusc shells are often very well preserved and are, therefore, in many cases determinable and hence interpretable. Molluscs in archaeological findings can well represent local faunal evidence of the time span covered by a certain find/layer. Shells might have arrived there either naturally or in context with utilisation of shells by humans. It is also imaginable that shells used for a particular purpose were introduced from outwards. Thus, mollusc remains can provide several kinds of evidence. They may tell us about the local fauna, climate and ecology. If molluscs were used by humans as tools, diet, ornamentation or religious accompaniment, the findings also tell us about technology, economy, behaviour and religious traditions.[1111] Moreover, mollusc findings may also contain information about transport and trade routes and usage of resources. Thus, shells have been gathered, sorted, determined and analysed within the framework of this project.

5.3.2 Material and methods

Location

Sai Island is a Nile island between the Second and Third Nile Cataracts in northern Sudan. Geologically, it is dominated by several types of metamorphic Precambrian rocks and Nubian sandstone, largely covered by thin layers of comparably much younger Nile sediments.[1112] The New Kingdom town is situated at the eastern shore of the island. The particular sites studied are two areas with New Kingdom building remains (SAV1 East and SAV1 West) and one cemetery site (SAC 5).

Determination

Shells were studied macroscopically and for surface structures under weak magnification (5–10 fold) using a stereomicroscvope (Nikon SMZ25). Taxonomic assignment as well as information on ecology and geographic distribution were thoroughly analysed according to relevant literature on Holocene/Pleistocene mollusc fauna.[1113]

[1110] Budka 2015a, 44.
[1111] See Allen and Payne 2017; Hamdeen and Salih 2018.
[1112] Cf. Geus 1996, 1170–1171, fig. 5; Draganits 2014, 20; see also this volume, Chapter 2.2.
[1113] Van Damme 1984; Brown 1994; Van Damme and Van Bocxlaer 2009.

Photography

Smaller specimens were photographed using a Nikon SMZ25 microscope, large shells were shot using a Nikon D7200 digital camera with a AF-S Micro NIKKOR 60mm f/2.8 G ED lens and a repro stand.

5.3.3 Results

In total, nine species of molluscs (five gastropods, four bivalves) were identified (Tab. 35). Most of the species belong to the local Nile fauna, except for two; one of which is of marine origin, the other is unknown from Sudan and Egypt, but recorded from adjacent regions in the Mediterranean.

Species	SAV1W	SAV1E	Tomb 26	
Theodoxus niloticus	1			
Melanoides tuberculata	2	1	3 (F 1, 2, 4)	
Cleopatra bulimoides	1	7	2 (F1)	
Melanopsis c.f.costata	1			
Cypraeidae g. sp.		3		
Nitia teretiuscula	4	3		
Chambardia rubens	4	5		
Etheria elliptica	17	12	1 (F2)	
Corbicula consobrina	1			
sum	31	31	6	68
Undetermined fragments	1	7		

Tab. 35 Mollusc species list and abundance per species and sampling site (two sites within the New Kingdom town, SAV1 East and SAV1 West and the cemetery site, SAC 5, Tomb 26) as well as the total number and shell fragments. Species in bold are considered as being transported or used by humans, the others are small local species

Gastropods (Gastropoda)

Theodoxus niloticus (REEVE 1856) (Pl. 136)

Prefers slow flowing water and is tolerant to salinity, frequently occurring in the lower Nile in Egypt and in Sudan below the Second Cataract.[1114] The southern range extension of this palearctic species, however, might have fluctuated considerably during the Late Pleistocene – Holocene.[1115]

Melanoides tuberculata (O.F. MÜLLER 1774) (Pl. 137)

Occurs in different permanent water bodies and is tolerant to brackish water; widely distributed in Africa, as well as in Western and Southern Asia.[1116]

Cleopatra bulimoides (OLIVIER 1804) (Pl. 138)

Prefers muddy and sandy substrates with submerse vegetation, and is widely distributed in Africa.[1117] It occurs frequently in the Lower Nile.[1118]

[1114] Brown 1994.
[1115] Van Damme and Van Bocxlaer 2009.
[1116] Brown 1994.
[1117] Brown 1994.
[1118] Sattmann and Kinzelbach 1988.

Melanopsis c.f. costata (OLIVIER 1804) (Pl. 139)

The specimen is strongly costulated. Based on shell morphology, many taxa have been described within this species group in the past. However, dependent on ecological factors, shell sculpture seems to be very plastic.[1119] Different species of Melanopsis are recorded circum-mediterrean. From Egypt, Libya and Sudan, however, no records are known, not even in Pleistocene records. Geographically closest modern records are from Arabia and Sinai.[1120] In a recent revision of the family Melanopsidae, the species of the genus *Melanopsis* are clearly divided into an Eastern and a Western Mediterranean cluster. However, delimitations of described species based on morphological descriptions are not confirmed by molecular results.[1121] Thus, according to shell morphology and geography, we assign the specimen to *Melanopsis costata* (OLIVIER 1804).

Cypraeidae *g.sp.* (Pl. 140)

Crypraeids or Cowries are mainly subtropical and tropical marine gastropods. Many species occur in the Red Sea and in the Indian Ocean. The three remains found in SAV1 East resemble *Monetaria annulus* in size and form. There is clear evidence for the use of cowries as early as in the Neolithic period in the Levant[1122] and for these shells circulating long distances.[1123]

Bivalves (Lamellibranchia)

Nitia teretiuscula (PHILIPPI 1847) (Pl. 141)

This species occurs in the Lower Nile and White Nile, including some African lakes. Late Pleistocene – Holocene records include archaeological findings in Upper Egypt[1124] and Sudan.[1125]

Chambardia rubens (LAMARCK 1819) (Pl. 142)

The nominate subspecies is recorded from West and Central Africa. Specimens from the Nile populations are assigned to the subspecies *Chambardia rubens arcuata* (CAILLIAUD 1823),[1126] which is mainly characterised by larger shells and more gradually down-scurving anterior margin.[1127] However, the taxonomic situation still seems unresolved. Recent distribution in the Nile involves Lower Egypt and Sudan south of Karthoum. However, the Pleistocene to Holocene distribution in the Nile ranges to Upper Egypt and the Second Nile Cataract in Sudan as well.[1128] The uses of these large bivalves apparently were manifold in the past and have been recorded from ancient Egyptian graves.[1129]

Etheria elliptica (LAMARCK 1807) (Pl. 143)

Distributed in rivers and lakes in tropical Africa, reaching the Lower Nile at its northernmost margin. They represent large thick-shelled oyster-like bivalves, in rivers they can form impressive reefs.[1130] The

[1119] Tchernov 1975.
[1120] Van Damme 1984; Brown 1994.
[1121] Neiber and Glaubrecht 2018.
[1122] Bar-Yosef Mayer 2005.
[1123] Ridout-Sharp 2015.
[1124] Germain 1909.
[1125] Arkell 1953.
[1126] Cailliaud 1823.
[1127] Van Damme 1984.
[1128] Van Damme 1984.
[1129] de Morgan 1897 cited in Van Damme 1984.
[1130] Van Damme 1984.

Egyptian population in the Lower Nile supposedly got extinct recently; in Sudan the species reaches until the Second Cataract, where shells have been found recently,[1131] but on the other hand it seems to be rare or even lacking northwards of Khartoum.[1132] Nevertheless, Pleistocene to Holocene distribution was less fragmentary in Egypt and Sudan.[1133] Within the findings of the New Kingdom town of Sai, *Etheria elliptica* is the most common mollusc (see Tab. 35).

Corbicula consobrina (CAILLIAUD 1827) (Pl. 144)

A tiny freshwater bivalve, widely distributed in the Nile system, many (sub-)specific taxa are described, but taxonomy of the whole genus is far from being settled.[1134]

5.3.4 Comments on the molluscs from Sai

The most common species of molluscs found in the New Kingdom town are *Etheria elliptica*, followed by *Chambardia rubens* and *Cleopatra bulimoides*. While the latter is mostly attested from SAV1 East (seven examples compared to one example from SAV1 West) and most likely represents post-depositional additions to the archaeological layers,[1135] the other two species are evenly distributed between SAV1 West and SAV1 East and presumably entered the archaeological context as finds.

The contexts of the *Chambardia rubens* specimens (four pieces SAV1 West, five pieces SAV1 East) are partly mixed debris layers, but also some well-stratified contexts of the 18th Dynasty. At SAV1 West this applies to SAV1W 830/2015 which was found in the early-mid 18th Dynasty filling of a cellar (Feature 115, see Chapter 3.3). At SAV1 East two examples were found in the large cellar Feature 15 (see Chapter 3.2), SAV1E 1626/2015 and 1677/2015. SAV1E 1076/2015 was found in a debris layer which is associated with a 18th Dynasty floor level (SU 205).

Two further fragments of *Chambardia rubens* specimens were recorded from sector SAV1 North from 18th Dynasty levels.[1136] In general, it is one of the most common species of shells found at Pharaonic sites, remains of which have been recorded at numerous excavations in Egypt.[1137]

The most common species at Sai, *Etheria elliptica,* with 17 pieces from SAV1 West and 12 pieces from SAV1 East were partly found in sandy debris layers with mixed material. Noteworthy is that within the debris layer SU 337 one *Etheria* and one *Cypraea* were found (SAV1E 173/2016). Feature 15, the large cellar, yielded a total of three *Etheria* and the comparable cellar Feature 83 contained one individual. These shells retrieved from the cellars can be clearly dated to the 18th Dynasty. The question of the function and use of the *Etheria* within the New Kingdom town is difficult to answer. While Feature 15 and the associated burnt animal bones may indicate the consumption of the flesh,[1138] the findings at SAV1 West could attest to another use. Associated with the debris layers in SAV1 West are also a large number of painter's plaquettes and maybe the *Etheria* shells were used as raw material/ingredient for producing plaster or mortar as this is known from recent African peoples.[1139] *Etheria elliptica* has been used in Africa frequently. From archaeological findings to modern records, various

[1131] Martin 1968.
[1132] Van Damme and Van Bocxlaer 2009.
[1133] Van Damme 1984.
[1134] Van Damme 1984.
[1135] For small molluscs, such as *Cleopatra bulimoides*, also archaeological contexts as complements of mud bricks, mortars and plaster are attested in Egypt (Odler, Dulíková and Juřičková 2013, 11, fig. 4 and 14) and possible for Sai as well.
[1136] Recorded and identified in 2014 by Konstantina Saliari, see above, Chapter 5.2.
[1137] Falkner 1982, 160–162; Boessneck and von den Driesch 1992, 43–44.
[1138] For Nile oyster collecting at other sites in Nubia, see Kobusiewicz 1989.
[1139] Cf. Pilsbry and Bequaert 1927.

human uses of these animals are documented.[1140] It was also cited as burial gifts in graves at Karnak and Ballas.[1141]

Interestingly, the three cowrie shell fragments attested from the New Kingdom town of Sai were all found at SAV1 East. The contexts are, unfortunately, again mixed debris layer, but associated with Building A and thus with an administrative unit connected to the distribution of goods (see Chapter 3.2.2). It is, therefore, possible that the Cypraeids from SAV1 East should be seen within the context of the trading/collecting of various exotic items, which was already proven for the Old Kingdom.[1142] Cowries were mainly used as ornamentation and they are frequently recorded from Egyptian cemeteries as burial objects, in particular as amulets.[1143]

The other most probably imported species, *Melanopsis*, was only found as a single piece at SAV1 West (SAV1W 082/2017). Its archaeological context is again interesting, since it derives from the stratified and sealed filling of Feature 151, a small silo in Square 1SE_E which was dated to the mid-18th Dynasty (see Chapters 3.3.4 and 4.5).

The gastropods *Cleopatra bulimoides*, *Melanoides tuberculata* and *Theodoxus niloticus* as well as the bivalves *Corbicula consobrina* and *Nitia teretiuscula* are widely distributed in the Nile in Egypt and northern Sudan and also recorded there in the Pleistocene-Holocene records.[1144] They might have come into the archaeological layers accidentally. However, it is also possible that some were collected by people intentionally as food, tools, toys and and/or ornamentation. It is noticeable that many common freshwater molluscs of the local Nile fauna are missing, such as the genera *Bellamya, Pila, Cleopatra, Lymnaea, Bulinus, Mutela, Eupera*.[1145]

Overall, a number of the mollusc fragments found in the New Kingdom town of Sai were unearthed in 18th Dynasty layers and contexts, in particular in the cellars and storage installations at SAV1 East and SAV1 West, thus making these finds a valuable addition for reconstructing the New Kingdom fauna at Sai.

5.4 The human remains from the town site[1146]

by Julia Budka

New Kingdom settlement sites in Egypt and Nubia yield, as a rule, only in rare cases human remains.[1147] One group of burials which is often associated with Egyptian domestic architecture is infant burials,[1148] frequently placed within pottery vessels.[1149] During AcrossBorders fieldwork on Sai, no infant burials were found within the New Kingdom town.[1150] But since bones are one of the main categories of finds within the town area (see Chapter 4, Appendix), the human remains from sectors investigated by AcrossBorders seemed of interest, even if a New Kingdom date is unlikely for the majority of the material. As mentioned elsewhere, the upper strata of the town area consist of mixed material from Post-Meroitic,

[1140] Pilsbry and Bequaert 1927; Arkell 1953, compiled in Van Damme 1984.
[1141] Germain 1909.
[1142] Mumford 2012.
[1143] See Golani 2014; Stoof 2015.
[1144] Van Damme and Van Bocxlaer 2009.
[1145] Compare Van Damme 1984.
[1146] This chapter is based on the work and written report by Anna Sonnberger, Andrea Stadlmayr and Marlies Wohlschlager, March 2015; Sonnberger, Stadlmayr and Wohlschlager 2015a and Sonnberger, Stadlmayr and Wohlschlager 2015b.
[1147] For Egypt, see, e.g., Cagle 2016; for Nubia, no published skeletal remains from town areas/domestic contexts are known to me; all the published data derive from the associated cemeteries.
[1148] See von Pilgrim 1996, 36, fn. 84 with references for findings in Egypt.
[1149] Elephantine may serve as a case study; see von Pilgrim 1996, 136, pl. 22b. For a new interpretation of pot burials, see Kilroe 2015; Power and Tristant 2016. For general aspects of child burials in Egypt, see Zillhardt 2009; Marshall 2018. See also von Pilgrim 1996, 36–37, figs. 5–6, pls. 2c–d and 137–138, figs. 52–53 for infant burials in houses on Elephantine without pots (wrapped in linen or places in wooden chests).
[1150] For infant burials fromTomb 26 in cemetery SAC5, see Wohlschlager and Stadlmayr 2018.

Christian and Ottoman times.[1151] Extensive cemeteries of the Meroitic,[1152] Post-Meroitic[1153] and Christian periods[1154] as well as modern Islamic tombs[1155] are located in the near neighbourhood. Furthermore, at all sectors excavated within the New Kingdom town, disturbances and pits within the Pharaonic remains were documented, resulting partly in a very complex stratigraphy with mixed materials directly above strata of the 18th Dynasty.[1156] The human bones analysed for this chapter do not represent strong stratigraphic markers and their dating remains partly unclear.

All in all, this presentation of the human remains does not aim to provide conclusive remarks about the population of New Kingdom Sai,[1157] but rather presents aspects of the site formation process of the town and its history after the Second Millennium BCE. This chapter is, therefore, a useful contribution to the interpretation of the environmental remains from the Egyptian town on Sai because it presents an integral part of a systematic approach to consider all archaeological and material remains in order to reconstruct life and living conditions at the site.

The human remains from SAV1 North, SAV1 West and SAV1 East were anthropologically investigated in 2015. As a first step, human bones were separated from animal bones and then identified. Biological age and sex were determined when possible. Furthermore, pathologies and degenerative diseases were documented by Anna Sonnberger, Andrea Stadlmayr and Marlies Wohlschlager. The minimum number of individuals within the sectors SAV1 East, SAV1 West and SAV1 North as well as the total minimum number of all of these areas was established.

5.4.1 Material: commingled human remains

Within the studied human remains, the material from SAV1 East was excavated between 2013 and 2015, the material from SAV1 West between 2014 and 2015. The finds bag numbers (e.g. 285/2013, see Chapter 4, Appendix) were used to label/mark the human remains (e.g. 285/2013/1) and in the case of several bones within the same finds bag, consecutive numbers at the end of the finds bag number (e.g. 291/2014/1–291/2014/5) were added.

Bones from SAV1 North that had been excavated by the SIAM mission, directed by Florence Doyen between 2008 and 2012, had largely remained unprocessed up until 2015.[1158] This material was labelled according to the square number of the finds bags (e.g. all finds in square 180/2250: 180/2250/1–180/2250/35), since these finds bags from SAV1 North did not contain specific numbers. However, some of the SAV1 North bones had already been marked by the zooarchaeologist Konstantina Saliari in 2014, and those numbers, identified by a "B" as "bone" (e.g. B156/2, 1845/2), were kept. In such cases, the number following the slash indicated the level of the find.[1159]

In order to preserve the original bone for future analysis (e.g. stable isotope analysis), the AcrossBorders physical anthropologists intentionally refrained from washing the bones and used no adhesive substances to glue fragments together. Easily removable soil was brushed off to keep the original bone surface intact.

[1151] Budka 2017a, 17.
[1152] Geus 1994b; Francigny 2014.
[1153] Vercoutter 1958, 164–169; Vercoutter 1986, 15; Geus 1994 a, 27. See also Siguoirt 2012.
[1154] Vercoutter 1986, 15; Tsakos 2012.
[1155] Cf. Davies 2017a, 133 (modern graveyard).
[1156] See Budka 2017a, 17.
[1157] For more significant remains from New Kingdom tombs on Sai, see Murail 2012; Wohlschlager and Stadlmayr 2018; Budka forthcoming c.
[1158] For these excavations, which were analysed within the framework of AcrossBorders, see Doyen 2017.
[1159] For the levels at SAV1 North, see Budka 2017a, 17–22.

5.4.2 Methods

Age at death and sex was estimated following the standard methods summarised in Denise Ferembach et al.,[1160] Rainer Knussmann,[1161] Jaroslav Bruzek,[1162] Louise Scheuer,[1163] Maureen Schaefer et al.[1164] and Jane Buikstra and Douglas Ubelaker.[1165]

Age was determined as precisely as possible, otherwise categorised in age groups, which are listed in the data base as follows:

Infant I:	0–7 yrs.
Infant II:	7–14 yrs.
Juvenile:	14–22 yrs.
Adult:	20–40 yrs.
Mature:	40–60 yrs.
Senile:	60–x yrs.

Sex was recorded as follows:

0	Unobservable
1	Female
2	Female?
3	Ambiguous
4	Male?
5	Male

Bones were recorded as follows:

Name of the bone

- **Side** (L=left, R=right, B=both, M=mid line, ?=unsidable)
- **Articular regions, long bone diaphysis and vertebrae by segments** (PE=proximal epiphysis, P=proximal third of diaphysis, M=middle third of diaphysis, D=distal third of diaphysis, DE=distal epiphysis), B=vertebral body, NA=neural arch)
- **Completeness of element** (1: >75% present, 2: 25–75% present, 3: <25% present)

Cranial bones were reported separately. The position of vertebrae and ribs was recorded when possible. In cases where this was not possible, the fragments were grouped together (e.g. cervical vertebrae 3–6, thoracic vertebrae 1–9, ribs 3–10). Bone surface preservation and soft tissue residues were macroscopically investigated and recorded.

Pathologies and degenerative diseases were recorded according to Jane Buikstra and Douglas Ubelaker[1166] and Richard Steckel et al.[1167] The following stages were used to describe articular margins and surfaces (after Michael Schultz):[1168]

[1160] Ferembach et al. 1980.
[1161] Knussmann 1988.
[1162] Bruzek 2002.
[1163] Scheuer and Black 2000; 2004.
[1164] Schaefer et al. 2009.
[1165] Buikstra and Ubelaker 1994.
[1166] Buikstra and Ubelaker 1994.
[1167] Steckel et al. 2011.
[1168] Schultz 2011.

1:	Joint shows no evidence of pathological changes
2:	Slight marginal lipping (osteophytes less than about 3mm) and slight degenerative/productive changes present (no eburnation)
3:	Severe marginal lipping (osteophytes greater than 3mm) and severe degenerative/productive changes present, eburnation possible
4:	Complete or near complete (>80%) destruction of articular surface, ankylosis
5:	Joint fusion (synostosis)

The minimum number of individuals (MNI) per area was determined according to Tim White and Pieter Folkens.[1169] Bones were sorted by element, age and side, and matching fragments were refitted in order to establish the most represented skeletal element. As long as bone fragments did not overlap they could represent the same individual (unless they were distinctively assigned to different age groups) and were, therefore, counted as one individual. Right-side bones that did not correspond to any of the left-side bones in age or morphology were added to the minimum number.

The total minimum number of individuals for SAV1 North, SAV1 East and SAV1 West (MNI NEW) was determined.

5.4.3 Conclusion about the human remains

In the sectors of the New Kingdom town of Sai which were anthropologically investigated (SAV1 East, SAV1 West and SAV1 North) no in situ burials were found until 2015.[1170] The excavated commingled remains most probably derive from different phases and have possibly been disturbed several times. The human remains show various stages of preservation. Some bones contained soft tissue residues, some were sun-bleached and a few were burnt. At present, it seems very unlikely that any of the human remains presented here originate from the New Kingdom; a Post-New Kingdom and mostly medieval/Ottoman date is more probable.

MNI SAV1 East

The most represented bone element in adults at SAV1 East was the left hip bone. Since the comparison is based on the acetabulum which generally fuses between the age of 15 and 18 years, it was only possible to distinguish between individuals younger or older than 15 years. At least four of those individuals were diagnosed older than 15 years. The total of five left fused hip bone fragments (030/2013/1, 041/2013/2, 351/2013/1, 365/2013/16, 365/2013/19) represent at least three different individuals. One of the two right hip bone fragments in this assemblage could be assigned to one of the left ones (365/2013/18 and 365/2013/16+19). The remaining right hip bone (365/2013/17) definitely represents another individual; therefore, we have a total of four individuals older than 15 years.

The minimum number of sub-adult individuals is based on infant and juvenile fragments. The existing skull fragments (332/2014/1, 368/2013/1 and 368/2013/2) could all belong to one individual younger than 15 years. The three existing femur fragments (285/2013/1, 131/2013/3 and 368/2013/1) may all derive from another individual aged Infant II – Juvenile. As the femur head could fuse later than the acetabulum in the hip bone, this individual could belong to one of the hip bones mentioned above and, therefore, cannot be taken into account.

Considering all age groups the total minimum number of individuals in sector SAV1 East is five (5).

[1169] White and Folkens 2005.

[1170] A burial in Feature 123 in SAV1 West was discovered in 2016, but not studied by the physical anthropologists (see Chapter 3.3.2).

Maxilla	776/2014/1	**Costae 3–10**	0411/2015/1
Mandibula	738/2014/1	**Costae 3–10**	0411/2015/2
Os frontale	598/2014/2	**Vertebra cervicalis 2**	0329/2015/1
Os frontale	745/2014/2	**Calcaneus**	0082/2015/1
Os ilium	0310/2015/1	**Tibia**	0197/2015/1
Radius	0310/2015/3	**Fibula**	0205/2015/3
Costae 3–10	0310/2015/2		

Tab. 36 Human remains from one sub-adult individual from SAV1 West

MNI SAV1 West

For sector SAV1 West the most represented elements were cranial fragments and hip bones. The minimum number of individuals based on cranial fragments is based on the posterior section of the sagittal suture (S3+S4) which was present four times (0461/2015/2, 598/2014/3, 0185/2015/1 and 571/2014/1). In terms of the hip bone, the comparison was again based on the acetabulum. Three left hip bones (1298/2014/1, 0454/2015/1 and 1228/2014/1) and two right hip bones (1338/2014/1 and 1149/2014/1) only represent four individuals as 1338/2014/1 could be the same individual as 1228/2014/1.

The minimum number of sub-adult individuals is two. However, one of these individuals represented via one scapula (0511/2015/1) and one tibia (0746/2015/1) aged Infant II – Juvenile possibly matches one of the pelvises/crania of the above mentioned adult individuals, therefore only one of the sub-adult individuals (Infant) can be taken into account for the total minimum number of individuals. It contains the elements given in Tab. 36.

Considering all age groups the total minimum number of individuals in SAV1 West is five (5).

MNI SAV1 North

In sector SAV1 North the most represented element was the sacroiliac articulation (where sacrum and hip bone join). In this case, it was possible to separate adult individuals from sub-adults by focusing on the iliac crest of the hip bone, which generally fuses between the age of 21–24 years, and the fusion of S1 and S2 at the age of 25 years in the sacrum respectively. Within the adult group there were three right hip bones (190/2260/24, 190/2260/33 and 190/2260/67) and three sacra (1410/2, 190/2250/3 and 200/2260/1) containing parts of the articular surface which were assigned to different individuals. Hence, the minimum number of adult individuals is six (6).

The sub-adult group is represented by one right pubic bone (B682/3) belonging to an Infant aged 4–5 years, two left humeri (B304/1 and 190/2250/12) belonging to two different individuals aged 12–15 years and >14 years, and one left tibia (1835/2) belonging to a fourth individual aged 15–19 years. Those four bones clearly derived from different individuals, based on age, size and morphology. It was possible to assign all other bone fragments in this age group of SAV1 North to one of those four individuals.

Considering all age groups the total minimum number of individuals in SAV1 North is ten (10).

MNI NEW

Since the areas SAV1 East, SAV1 West and SAV1 North are relatively close to each other (see Fig. 3), it was also tried to refit the fragments from all three areas. Although no matches could be made, the bone fragments could, however, still have been spread over more than one area. Therefore, the total minimum individual number for all three areas (MNI NEW) was determined.

For the adult group, the analysis focused on the hip bones (incl. sacrum), as these were the most represented elements in all three areas: two right hip bones from SAV1 East (365/2013/17 and 365/2013/18), three right hip bones from SAV1 West (920/2014/1, 1149/2014/1 and 1338/2014/1) and five right hip

Age	Bone numbers	Sectors within the town
Infant I	332/2014/1, 368/2013/1, 368/2013/2, B682/3	SAV1 East (3×), SAV1 North (1×)
Infant I – II	0082/2015/1, 0197/2015/1, 0205/2015/3, 0310/2015/1–3, 329/2015/1, 0411/2015/1+2, 598/2014/2, 738/2014/1, 745/2014/2, 776/2014/1	SAV1 West (10×)
Infant II – Juvenile	285/2013/1, 304/2014/1, 131/2013/1, 365/2013/1, 0511/2015/1, 0746/2015/1	SAV1 East (4×), SAV1 West (2×)
Infant II – Juvenile	B304/1, 381/2013/1	SAV1 North (1×); SAV1 East (1×)
Infant II – Juvenile	180/2250/20, 190/2250/12, 190/2260/93	SAV1 North (3×)
Juvenile	1835/2	SAV1 North (1×)

Tab. 37 Sub-adult group of individuals with corresponding bone numbers from the New Kingdom town

bones from SAV1 North (180/2250/2, 190/2260/24, 190/2260/33, 190/2260/61 and 190/2260/67) as well as three sacra (1410/2, 190/2250/3 and 200/2260/1) also from SAV1 North. Only one of the three sacra could not be assigned to any of the other right hip bones, which left a total of eleven individuals over the age of 15 years. In addition, the MNI based on skull fragments containing the sagittal suture S3–S4 from all three areas was checked, resulting in a total minimum number of eleven individuals. In order to prevent an overlap of adult and sub-adult individuals, the number of definite adults (over 21 years) was determined based on the fusion of the iliac crest and the first and second sacral vertebrae respectively. This resulted in a number of eight (8) adult individuals (1410/2, 180/2250/13, 190/2250/3, 190/2260/24, 190/2260/33, 190/2260/67, 200/2260/1 and 365/2013/17).

In the sub-adult group it was possible to assign the present bone fragments to a minimum of six individuals based on age, size and morphology (Tab. 37). Considering all age groups, the total minimum number of individuals in all three sectors within the New Kingdom town of Sai excavated between 2008 and 2015 is fourteen (14).

Age & sex

Due to the poor state of preservation and fragmentation, information on age and sex was very limited. However, individuals from all age groups, except for the fetus/neonatus and distinct senile group were represented in the overall sample. Sex could only be determined for one female and four male bones without doubt. 16 fragments were identified as "Male?" and one fragment was classified as ambiguous. The rest remained unclassified, since no distinguishing features were present on the respective fragments.

Pathologies and degenerative diseases

Because of the poor state of preservation on the one hand and soft tissue remains on the other hand, the evaluation of pathologies and degenerative diseases was largely impossible. However, the anthropologists were able to record a small number of cases, in which unspecific stress markers such as periostitis, porotic hyperostosis, cribra orbitalia, sinusitis, stomatitis and/or linear enamel hypoplasias were recorded.[1171] These signs of malnutrition and/or infectious diseases are often found in ancient populations around the world and did not necessarily lead to the respective individuals' death. One individual's cranium contained two small button osteomas (benign tumour), which have also been well documented in the past. The investigated jaws showed cases of intravital tooth loss, intravital chipping on teeth, paradontosis, calculus and caries lesions on one of the teeth.

[1171] For the relevance of stress markers to reconstruct aspects of the life of the deceased, see Mays 2010.

A small number of vertebrae contained Schmorl's nodes (result of increased intervertebral disk pressure on the superior or inferior surfaces of the vertebral bodies).[1172] Schmorl's nodes are most commonly associated with degenerative arthritis and the related changes, i.e. the formation of bony spurs called osteophytes.[1173] The latter, an age and activity-related form of degeneration, had also formed on some of the vertebral margins from Sai. The vertebral articular margins/surfaces rarely showed any severe forms of degeneration.

Trauma

Two cases of trauma were found on the skulls, one of which was a healed depression on a child's frontal bone. The inner surface of the skull appears to have remained intact at the time of impact. The second case was a depression fracture on the cranial vault of an adult which probably led to the death of this individual, since no signs of healing were apparent.

[1172] Cf. Waldron 2009, 45.
[1173] Ortner and Putschar 1981, 430.