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# THE 2016/17 FIELD SEASON AT MUSAWWARAT ES-SUFRA (SUDAN): FROM CONSERVATION PLANNING, APPLIED CONSERVATION AND PROTECTION MEASURES TO ARCHAEOLOGICAL AND SOCIAL ANTHROPOLOGICAL RESEARCH

## I. OVERVIEW

Supported by funding from the Qatar-Sudan Archaeological Project (QSAP), the 2016/17 field season of the Humboldt University Archaeological Mission to Musawwarat es-Sufra focused on site management planning and measures.<sup>1</sup> A conservation survey was undertaken and a first Conservation Master Plan developed for the entire site. The master plan docu-

<sup>1</sup> The Musawwarat Project has been directed by Alexandra Verbovsek and Cornelia Kleinitz (Northeast African Archaeology and Cultural Studies, Institute of Archaeology, Humboldt-Universität zu Berlin) since 2016. The 2016/17 field season at Musawwarat commenced on 7th February 2017 and ended on 1st April 2017. It was coordinated and directed by Cornelia Kleinitz, with Zaroog Bakri Mohamed Ahmed serving as inspector for the National Corporation for Antiquities and Museums (NCAM). The director of NCAM, Abdelrahman Ali Mohamed, and the head of NCAM's fieldwork section, Elhassan Ahmed, are thanked for their support of the field project. Thanks are also due to the staff at the QSAP offices in Khartoum, especially Salaheldin Mohamed Ahmed, for their support during the 2016/17 field season. Field staff included Thomas Scheibner (Archäologische Forschungen und Dienstleistungen) as field director with a primary responsibility for archaeological sondages and excavations. Conservation planning was headed by Thomas Lucker, who was assisted by Stefanie Dannenfeldt (both Restaurierung am Oberbaum, RaO). Applied conservation work was headed by Jan Hamann, with Friederike Hamann and Luise Fusco being part of the applied conservation team (all Restaurierung am Oberbaum, RaO). Thomas Bauer (TrigonArt) undertook 3D-scanning of the columns and column bases undergoing conservation treatments. Social anthropologist Alfatih Mohammed Ali Saeed (Department of Sociology and Social Anthropology, University of Khartoum) continued his research on the local community of Musawwarat during the entire length of the field season. Supervised by Hassan Ebeid-Allah Abdalla, all in all 40 local workmen supported the various activities of the Musawwarat Project. Last but not least, Ayman Hassan Saleh Osman oversaw logistics and acted as driver and cook.



Fig. 1: Early Meroitic column base from room 108 of the Great Enclosure after consolidation (photo: Cornelia Kleinitz).

ments the current state of preservation of the monuments at Musawwarat and outlines short, medium and long term conservation-restoration approaches, strategies and priorities. Applied conservation work and 3D-scanning was dedicated to the Early Meroitic decorated columns on the Central Terrace of the Great Enclosure, with the aim of eventually making these unique pieces accessible again for research and public presentation (Fig. 1, Cover picture).

In terms of protection measures, an archaeological impact assessment was conducted in preparation for the setting of a mesh-wire perimeter fence around the Great Enclosure, and the fence was subsequently erected by a contractor. The fence channels visitors through a main entrance gate to the southeast of the building complex and it prevents animals from entering the monument. In addition, standard site maintenance work was undertaken, such as the removal of sand accumulations from the Great Enclosure or the filling of erosion gullies in the vicinity of the Apedemak Temple.

Research excavations took place at a minimal scale. They focused on courtyard 601 and have shown



archaeologically for the first time that this largest courtyard of the Great Enclosure contained zones of activities connected to construction work and related technologies. Finally, a social-anthropological study of the local pastoral community of Musawwarat and their relationship to the archaeological site was continued, and a new research project documenting elderly local workmen's memory of the Musawwarat Project under Fritz and Ursula Hintze during the 1960s was launched.

## 2. TOWARDS A FIRST CONSERVATION MASTER PLAN FOR MUSAWWARAT: CONSERVATION SURVEY AND CONSERVATION PLANNING

### 2.1. *A brief history of conservation at Musawwarat*

Musawwarat has a long history of conservation approaches and measures, which have contributed to the preservation of the site and shaped its current appearance.<sup>2</sup> During the initial phase of the Musawwarat Project in the 1960s this included the clearing of the site, which accompanied extensive excavations. In addition, individual features were restored, such as the unique elephant wall end on the Central Terrace of the Great Enclosure. Conservation-restoration work at the time culminated in the re-building of the Apedemak Temple in 1969 and 1970.<sup>3</sup>

During the 1990s and early 2000s, several condition assessments were compiled, and conservation strategies were developed and tested.<sup>4</sup> The Sudan Archaeological Society of Berlin (SAG e.V.) as well as the German Foreign Office sponsored various applied conservation, maintenance<sup>5</sup> and protection measures, such as the re-building of parts of the enclosure wall of the Great Enclosure;<sup>6</sup> the capping of sandstone walls with earth and lime mortar and other repairs;<sup>7</sup> the construction of protective brick enclosures for some of the Early Meroitic decorated columns in front of the Central Temple of the Great Enclosure;<sup>8</sup> the construction and development of

the Musawwarat Site Museum;<sup>9</sup> the building of a protective roof for Temple IIA;<sup>10</sup> and maintenance work and repairs concerning the Apedemak Temple and its roof.<sup>11</sup>

Conservation-restoration work from the mid-2000s onwards first focused on preventive documentation and damage assessment in relation to illicit large-scale excavations in the Great Hafir.<sup>12</sup> This was followed by the development and application of a concise strategy for the architectural conservation of Complex 300 of the Great Enclosure: Temple 300 as well as courtyard walls were consolidated and partially restored with funding from the German Foreign Office, supported by the Sudan Archaeological Society of Berlin.<sup>13</sup> In addition, numerous other preservation and maintenance activities took place.<sup>14</sup> Three-dimensional documentation of the condition of architectural structures involved the laser-scanning of the Great Enclosure and the Apedemak Temple in 2009.<sup>15</sup> Additionally, some of the decorated columns from the Central Terrace of the Great Enclosure were captured in great detail using structured light scanning.<sup>16</sup>

When funding from QSAP became available in 2013/14, extensive site management planning began to be undertaken again.<sup>17</sup> This included condition assessments, including a comprehensive damage assessment for the Great Enclosure. A study of visitor behavior at the Great Enclosure was conducted,<sup>18</sup> and a visitor guidance system for this building complex was outlined. In preparation, a first set of measures was immediately implemented, focusing on the protection of the eastern flank of the Great Enclosure, where the ancient main entrance to the monument is thought to have been located.<sup>19</sup> First conservation treatments concerning the decorated columns of the Central Terrace were also tested in 2014,<sup>20</sup> followed by further measures and detailed conservation planning in the year after.<sup>21</sup> Numerous

2 The history of conservation approaches to the site of Musawwarat will be outlined in a future paper, which will refer also to archival material, including unpublished conservation reports, kept at the Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin.  
3 Hintze 1993.  
4 E.g. Wolf & Pittertschatscher 1996. Several unpublished reports are held at the Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin.  
5 Wolf 1996; Gerullat 1998; Wenig 2001, 2004.  
6 Wenig 1999, 2000, 2001, 2002, 2003; Onasch 2001.  
7 Wolf 1998b; Wenig 1999, 2002, 2003, 2004.  
8 Wolf 1996, 1998a.

9 Wenig 2002, 2003, 2004; Aldenhoven & Hinterhuber 2004.  
10 Fitzenreiter 1995; Wanning 1996; Wolf 1996.  
11 Zeebe 1996; Wolf 1998a & b; Wenig 1999, 2001, 2002.  
12 Scheibner 2005; Scheibner & Mucha 2006.  
13 Scheibner & Mucha 2006, 2007, 2008, 2009.  
14 See above.  
15 Kleinitz, Rüter & Näser 2010.  
16 Kleinitz, Bauer & Näser 2009.  
17 Kleinitz & Näser 2014.  
18 Kleinitz 2014.  
19 Kleinitz & Näser 2014; Näser 2015.  
20 Kleinitz & Näser 2014.  
21 Näser 2015; Restaurierung am Oberbaum (RaO) 2015, unpublished report 'Musawwara es-Sufra. Zentraler Tempel der Großen Anlage. Zustandskartierung und Konzept zur Konservierung von 10 Säulen' (Sudan Archaeological



Fig. 2: Conservation survey team during their inspection of Temple ID to the southeast of the Great Enclosure (photo: Cornelia Kleinitz).

other measures were initiated or continued, such as the capping of open wall tops with earth and lime mortar.<sup>22</sup> In late 2014 the state of repair of the roof of the Apedemak Temple was assessed and in early 2015 extensive repairs followed, which included the complete replacement of the zinc and acrylic glass sheets covering the roof.<sup>23</sup>

### 2.2. *Benefits of conservation planning*

Despite the long and successful conservation history under the umbrella of the Musawwarat Project as briefly outlined above, a consistent approach in form of a site-specific master plan had never been developed – even though this is a prerequisite for systematic planning, fundraising, managing and monitoring the challenging and extensive conservation work at Musawwarat. Consequently, during the 2016/17 field season, after a hiatus of one year due to an interruption in QSAP's ability to fund projects in Sudan, a first Conservation Master Plan was drafted for the entire archaeological site of Musawwarat.<sup>24</sup> This

plan takes note of previous conservation approaches to the site and documents the current state of preservation of the individual archaeological features. On this basis, it suggests short, medium and long term conservation and restoration approaches, strategies and priorities, including specific measures. The Conservation Master Plan, apart from being a requirement for World Heritage Sites, is meant to guide the archaeological mission, i.e. the Musawwarat Project, as well as the National Corporation for Antiquities and Museums (NCAM) and other governmental institutions, in their efforts to preserve and present the site of Musawwarat for this and future generations.

The Conservation Master Plan is based, firstly, on an evaluation of the conservation history of the monuments of Musawwarat, as documented in published and unpublished reports.<sup>25</sup> Secondly, it incorporates findings from a study of tourism expectations and behavior at Musawwarat undertaken by the author

Collection & Archive at Humboldt-Universität zu Berlin).

22 Kleinitz & Näser 2014; Näser 2015.

23 Becker 2015; Näser 2015.

24 Restaurierung am Oberbaum (RaO) 2017, unpublished

report 'Musawwarat es-Sufra. Conservation Master Plan' (Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin).

25 Published reports have appeared in several volumes of 'Der Antike Sudan. Mitteilungen der Sudanarchäologischen Gesellschaft zu Berlin e.V.' (MittSAG), while unpublished reports are kept at the Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin.



in early 2014 in preparation for site management planning.<sup>26</sup> Thirdly, new data was collected during a detailed conservation survey that was undertaken by a team of archaeologists, conservators and conservation planners during the early 2017 field season. The latter involved the documentation of the current state of preservation of all archaeological monuments in the valley of Musawwarat es-Sufra at a general level (Fig. 2).<sup>27</sup>

A number of the results of the conservation survey and the subsequent planning process are presented further below. They document some of the challenges facing conservation, maintenance and protection work at Musawwarat, and they highlight requirements for more or less urgent action in the coming field seasons.

### 2.3. *Limits of conservation planning*

Shortly after the Conservation Master Plan was drafted, one of the main parameters of site management and conservation planning changed. News arrived that a paved road was to be constructed imminently, which would connect Musawwarat to the main Khartoum-Atbara road and open fast access for all kinds of vehicles. Information on the road and its purpose was hard to come by, and the exact end point of the road remained unknown to us. Some involved parties claimed that the road would end at the guesthouse of the Sudan Civilization Institute (SCI), just opposite of the Great Enclosure and well inside the core zone of the UNESCO-World Heritage Site, while others stressed that it would end at the edge of the valley of Musawwarat and not impact the core zone.<sup>28</sup>

Wherever the new road is ending, it will facilitate access to Musawwarat and potentially lead to a sharp increase in visitor numbers. While a substantial increase in tourist numbers and diversification in the types of visitors is much welcomed, the opening of access to the site of Musawwarat comes before the site has been prepared for larger visitor numbers, especially large groups, in terms of appropriate site management and protection meas-

ures. In response, such measures were started to be planned with urgency later during the 2016/17 field season and adequate site management will have to take precedent over other interests, such as research excavations, in the coming seasons.

Both, the Conservation Master Plan for Musawwarat as well as a newly drafted Sustainable Tourism Plan for the entire 'Island of Meroe' World Heritage Site,<sup>29</sup> could not anticipate the impending fundamental change in the accessibility of the site of Musawwarat and, in this respect, were outdated in some aspects shortly after having been drafted. The decision by governmental institutions or affiliates for rapid infrastructural development – apparently without a transparent planning and consultation phase – is likely to endanger or even counteract long-running efforts by the Musawwarat Project as well as by NCAM for the preservation of the site of Musawwarat.

### 2.4. *Aspects of the conservation survey*

While all built archaeological monuments in the valley of Musawwarat were evaluated during the conservation survey, only some of its findings can be outlined here. For the Great Enclosure (IA), a plan of urgent conservation measures was drafted with a focus on the Central Terrace, which is accessed by virtually all visitors to the site, as well as for other parts of the building complex that will be open for visitation. A previous outline for a visitor guidance system planned the entrance for visitors to be shifted to the eastern side of the Great Enclosure, where the ancient main entrance to the monument may have been located.<sup>30</sup> These plans needed to be abandoned in view of the encroachment of the Wadi es-Sufra onto the eastern flank of the Great Enclosure during the rainy season in 2016, after various efforts had been undertaken in previous years to protect this part of the site by raising its ground level and constructing a protective wall.<sup>31</sup> The entrance for tourists will have to remain in the south of the Great Enclosure at the start of the long established visitation route (see below).<sup>32</sup>

26 See Kleinitz 2014.

27 Participants of the conservation survey were Stefanie Dannenfeldt, Jan Hamann, Cornelia Kleinitz, Thomas Lucker, Zaroog Bakri Mohamed Ahmed and Thomas Scheibner. See Restaurierung am Oberbaum (RaO) 2017, unpublished report 'Musawwarat es-Sufra. Übergeordnetes Restaurierungskonzept. Anlage 1 - Fotodokumentation' (Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin).

28 For updates see Kleinitz forthcoming a and b.

29 Comer, D. & J. Comer 2016, unpublished report 'Sustainable tourism plan for Meroe, including a regional approach to the Island of Meroe', Cultural Site Research and Management.

30 Kleinitz & Näser 2014; Näser 2015.

31 See above.

32 See Kleinitz 2014.

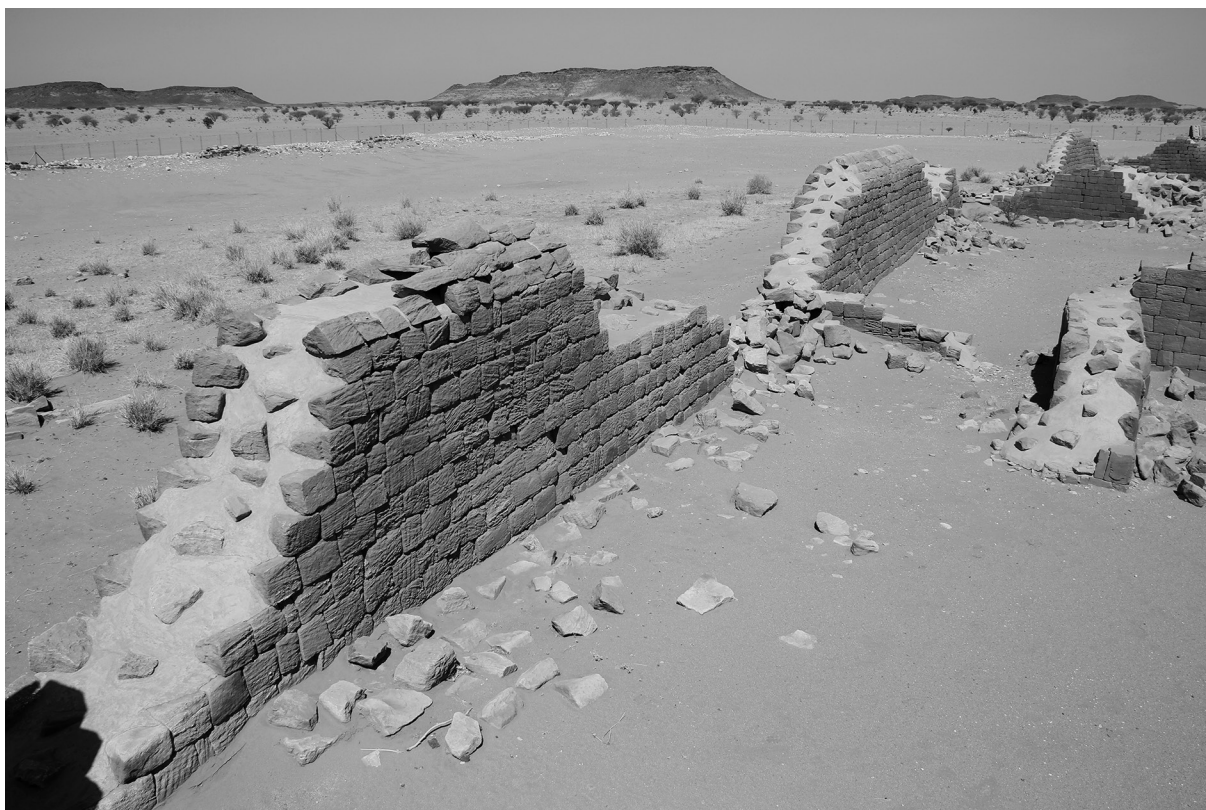


Fig. 3: Wall tops in Complex 500 with their smooth earth and lime mortar covers (photo: Cornelia Kleinitz).

In addition to evaluating which conservation measures would need to accompany the development of a visitor guidance system, recent and ongoing conservation approaches in the Great Enclosure were monitored and re-evaluated. One example are measures of protecting the walls of the Great Enclosure, most of which have lost their original capping and are exposed to water seepage during the rainy season. The established conservation approach, applied since the 1990s, consists of protecting the wall tops with a cover of earth and lime mortar. This redirects rain water along the sides of the walls and prevents water seepage into their interior. During the conservation survey it was recognized, however, that some of the most recently treated wall tops in complexes 200, 300 and 500 already showed signs of damage, such as cracks and holes. The recently applied mortar seems to be much less durable than that applied during the 1990s and early 2000s, which is still in good condition. Consequently, the mixture of the mortar will need to be re-evaluated and adjusted, and the effectiveness of the measures closely monitored before more walls of the Great Enclosure undergo treatment.

A second issue arose, which concerned the appearance of the wall tops. Over the years, the treated wall tops had been prepared with increasingly large and smooth lime mortar surfaces, which were becoming

visually more and more intrusive (Fig. 3). If smaller stones and rubble were pressed into the wet mortar's surface, then the wall tops would more closely resemble the ruinous state of the untreated wall tops and not appear overly 'clean'. This approach would at the same time reduce the smoothness of the covered walls and, thus, prevent them from being easily scaled by visitors.

In the central part of the site of Musawwarat, Temple IIA, the Apedemak Temple (IIC) and the Great Hafir (IIH) received special attention. In respect to Temple IIA, it was noted that its protective roof, installed in 1996,<sup>33</sup> only partially served its intended function of protecting this small structure from the impact of rain water. The metal fence surrounding the temple and the support beams for the protective metal roof were set too close to the walls of the building and in consequence, the roof is not ample enough (Fig.4). The temple had filled with airborne sand over time and small sand dunes had accumulated along the outer walls of the building. Rain water reached these sand accumulations, which stored the water and created a moist environment for the sandstone blocks of the temple's walls. Rapid deterioration of the sandstone resulted. Reed mats, which had been attached to the temple's metal fence for many years

33 Fitzenreiter 1995; Wanning 1996.



Fig. 4: Temple IIA with its protective roof and fence (photo: Cornelia Kleinitz).

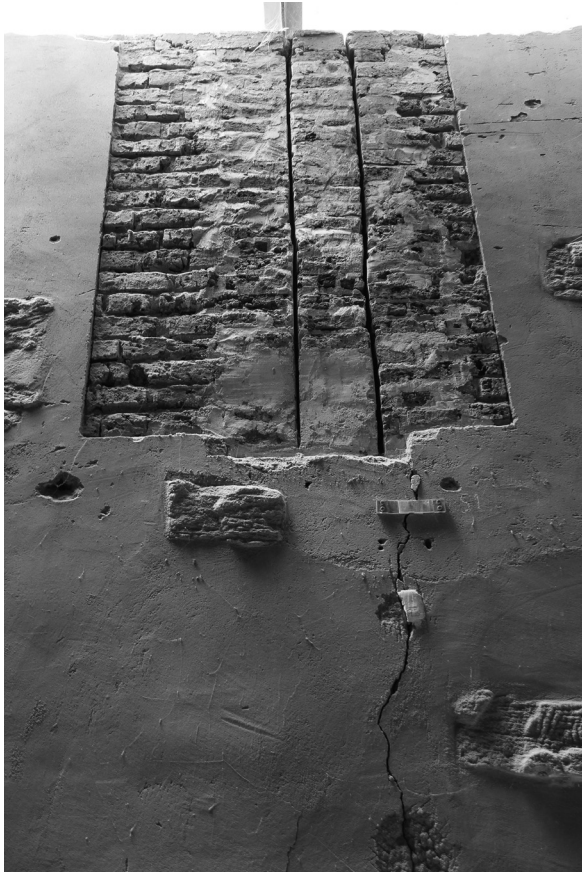


Fig. 5: Section of missing plaster on the inner south wall of the Apedemak Temple (photo: Cornelia Kleinitz).

and sheltered its interior to some extent, may have added to the creation of a moist environment within the roofed area. In order to preserve Temple IIA in the longer term it will need to be cleaned from sand as much as necessary – a measure that in the future should be part of regular site upkeep – and the roof will need to be extended, or the temple should be buried in a protective shell.<sup>34</sup>

In regard to the Apedemak Temple, several short-term conservation measures were listed. In the interior of the temple, large sections of the plaster had been removed from the side walls during the repairs of the temple's roof during the 2014/15 season, exposing the bricks that form the upper parts of the restored walls (Fig. 5).<sup>35</sup> The plaster will need to be re-applied and the exposed areas closed. Repairs of plaster are also necessary in smaller sections of the northern and in larger sections of the western outer walls of the temple due to the deterioration of the plaster over time (Fig. 6, Colour fig. 5).

The conservation survey also showed that the roof lining of the Apedemak Temple, which had only been replaced in early 2015,<sup>36</sup> already showed significant deterioration that could result in substantial damage

<sup>34</sup> See also Kleinitz & Näser 2014.

<sup>35</sup> Becker 2015.

<sup>36</sup> Becker 2015, Näser 2015.



Fig. 6: Section of missing plaster on the outer west wall of the Apedemak Temple (photo: Cornelia Kleinitz).



Fig. 7: Deformed PVC sheets from the light slits along the sides of the Apedemak Temple's roof (photo: Cornelia Kleinitz).

to the monument in the near future. Damage concerned especially the transparent polyvinylchloride (PVC) sheets, which had been employed as roofing sheets along both side walls of the temple, allowing light to enter its interior. As they were not able to withstand the high temperatures that develop on the roof of the temple, the PVC-sheets had deformed and gaps had formed between the sheets, permitting the wind to catch and allowing water to enter the interior of the temple (Figs. 7 and 8). The PVC-sheets had also lost much of their translucency and taken on a dark brown colour, which negatively impacted their function as light sources for the temple's inte-



Fig. 8: Deformed PVC sheets on the Apedemak Temple's roof (photo: Cornelia Kleinitz).



Fig. 9: Loss of translucency in the PVC sheets from the light slits of the Apedemak Temple's roof (photo: Cornelia Kleinitz).

rior (Fig. 9). A second problem concerned the cold welded seams that connect the new zinc sheets on the parapet of the roof, some of which had begun to open (Fig. 10). In view of strong mechanical tear due to severe changes in temperature and strong winds, it would have been preferable to first fold and interlink the sheets to give the connections more stability. A third problem concerned the attachment of the zinc sheets of the roof lining to the pylon, which lacked



Fig. 10: Provisional repairs to the seams between the zinc sheets of the parapet of the Apedemak Temple's roof (photo: Cornelia Kleinitz).



Fig. 11: Loose connection between zinc sheets of the roof and pylon of the Apedemak Temple (photo: Cornelia Kleinitz).

a stable connection and had detached on both pylon towers (Fig. 11). Altogether, the damage to the roof as just described necessitates the replacement of the PVC-sheets with a more durable translucent material as well as repairs to other parts of the roof in a manner that can withstand the local conditions.

While the previously mentioned issues of conservation can be addressed with sufficient time and funding, the rapidly deteriorating condition of the Great Hafir was noted with great worry and its preservation deemed a possibly insoluble challenge. The erosion gullies that had formed along the edges of the area excavated illicitly by the Sudan Civilization Institute (SCI) between 2003 and 2006<sup>37</sup> have grown in length, width and depth to an extent that the original *hafir* lining – and no longer ‘only’ the sediment that had collected in the reservoir over the past two millennia – was going to be impacted during the next strong rains (Figs. 12 and 13). Having already lost the climate archive preserved in the sediments of the Great Hafir, the loss of the *hafir*'s built structure would spell the end to this largest of the ancient Sudanese water reservoirs.

37 See Scheibner 2005; Scheibner & Mucha 2006.



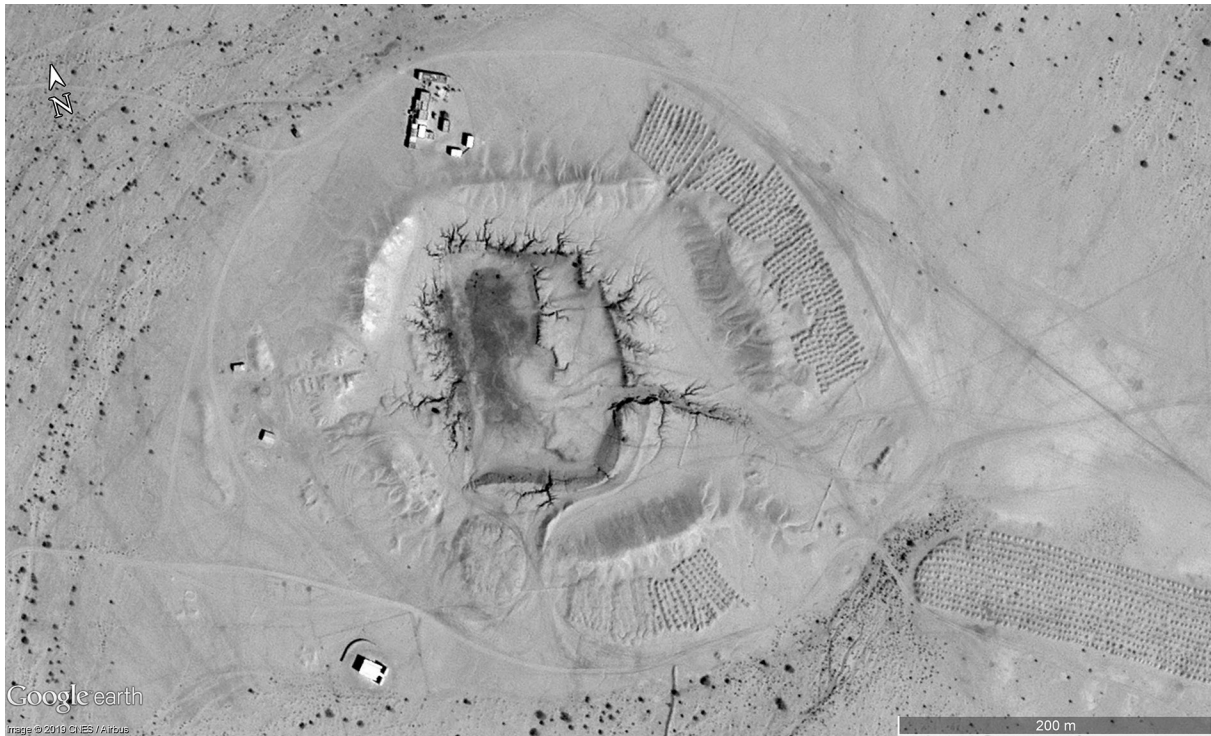


Fig. 12: Deep erosion gullies along the excavated interior of the Great Hafir in 2016 (image: Google Earth).

Ideas for the prevention of the collapse of the Great Hafir's structure included the construction of channels and barriers along the slopes of the reservoir's walls, but it is clear that this would address only parts of the problem. The preservation of the Great Hafir is a challenge that would need to involve structural engineers and environmental specialists in addition to conservators, and the scale of this preservation project exceeds the capacities of the Musawwarat Project. Whatever approach is eventually taken, it must involve local consultation.

After strong rains the Great Hafir has been functioning again as a water reservoir since the large-scale excavations of the SCI, and it is then used by the local community and incoming pastoralists to water animals and to draw water for human use (Fig. 14). This takes pressure off the only public well available to the local population, which is located outside the valley of Musawwarat and is controlled by the SCI. Any attempt at the preservation of the Great Hafir will need to find a compromise between the conservation of the archaeological monument and its active current use by the local people of Musawwarat.



Fig. 13: Deep erosion gullies in its northwestern section of the Great Hafir (photo: Cornelia Kleinitz).

#### 2.5. Conservation planning and the development of a tourism infrastructure

One of the main tenets of the Conservation Master Plan is the acceptance of the ruinous character of the site of Musawwarat. In accordance with the guidelines for UNESCO-World Heritage Sites, there should be no substantial reconstruction. Where the (partial) reconstruction of collapsed or collapsing walls is necessary for their preservation, conservation approaches already established at Musawwarat – such as at Temple 300 and its surrounding court-



Fig. 14: Local pastoralists watering their animals in the Great Hafir (photo: Cornelia Kleinitz).



Fig. 15: Restored sections of Complex 300 with Temple 300 (photo: Thomas Scheibner).



Fig. 16: Planned accessibility of the Great Enclosure (white: accessible, grey: inaccessible) and directions of visitor movement (graphics: Jorge de Torres Rodriguez).

yards<sup>38</sup> – are followed (Fig. 15). A central aspect of the Conservation Master Plan was dedicated to outlining short-term conservation work that would need to accompany the development of a basic tourist infrastructure and a visitor guidance system for Musawwarat. On the basis of previous work as described above, a visitor path was outlined, with the plans to be adjusted and implemented during the 2017/18 and 2018/19 field seasons.<sup>39</sup>

Visitation of the ruins of Musawwarat es-Sufra should be restricted to the main archaeological monuments for reasons of preservation: the Great Enclosure, the Apedemak Temple and the Great Hafir. These structures must be well presented in order to enhance the visitor experience while also protecting the archaeological remains. In the case of the Great

Enclosure, and in accordance with previous plans,<sup>40</sup> only the eastern half of the building complex, parts of its centre as well as the Western Chapel should be visited. Complexes 200 and 400 in the north and south of the Great Enclosure, respectively, and most courtyards of Complex 500 in the central and western part of the monument will be closed to visitors (Fig. 16). Taking account of limitations in funding, short term conservation measures have to focus on the most visited parts of the Great Enclosure in Complexes 100, 300 and 500.

Despite these restrictions, large parts of the building complex will still be accessible. This includes its visitation ‘highlights’, such as Temple 300 with the statues of Arensnuphis and Sebiuameker; the Central Terrace with the Central Temple, the decorated columns and the famous elephant wall end; and

38 Scheibner & Mucha 2006, 2007, 2008, 2009.

39 See Kleinitz forthcoming a and b.

40 Kleinitz & Näser 2014.



Fig. 17: Modern water drainage channels in the northeastern part of the Central Terrace behind the elephant wall end in room 108 as well as brick enclosures for decorated column bases (photo: Cornelia Kleinitz).

the Western Chapel with its views over courtyard 601 and the valley of Musawwarat. Also, many of the ancient graffiti can be visited *in situ*, such as the ‘visitor inscriptions’ on the western wall of the Central Temple or the erotic ‘Holy Wedding’ graffito of courtyard 506. Focusing visitation on well-accessible, well-presented and adequately protected sections of the Great Enclosure will contribute to the preservation of the remainder of the archaeological monument.

Conservation-restoration measures accompany the development of the visitor guidance system. They focus on the northern side of the Central Terrace, where a new water drainage system must be developed and where access paths need to be clarified for the visitors (Fig. 17). The area in front of the Central Temple with its Early Meroitic decorated columns is to be rehabilitated with the columns receiving conservation treatments and their protective brick enclosures eventually removed (Fig. 18). Furthermore, the path around the Central Temple, on to the Western Chapel and down into the courtyards of Complex 500 will need to be clarified. To ease pressure from the two-way use of the narrow corridor 515, which ends in the Western Chapel (516-517), a solution needs to be found for direct access from the end of this corridor down into courtyard 513, either via the rehabilitation of a ramp (514) or the

installation of a staircase. The courtyard (506) surrounding the rooms of the so-called ‘Holy Wedding’ (507-509) will form the end point of the visit to the ruins of the Great Enclosure. Due to their poor state of preservation rooms 507 to 509 need to be secured and visitors led to the Musawwarat Site Museum (or the exit) via courtyard 513 (see Fig. 16).

In short, to outline and secure the visitor path through the Great Enclosure, adequate conservation-restoration measures will be applied together with simple measures of obscuring and clarifying paths. In addition, a small number of metal barriers as well as a set of information panels, warning and direction signs will be developed and installed.

### 3. APPLIED CONSERVATION: THE DECORATED EARLY MEROITIC COLUMNS OF THE CENTRAL TERRACE

Conservation-restoration was a major concern during the 2016/17 QSAP season, even though actual treatments had to be limited in scope due to restrictions in available funding. Conservation measures focused on the decorated columns in room 102 in front of the Central Temple (or Temple 100) and room 108 at the northern end of the Central Terrace of the Great Enclosure. These examples of



Fig. 18: Brick enclosures protecting the decorated Early Meroitic columns in room 102 in front of the Central Temple of the Great Enclosure (photo: Cornelia Kleinitz).

architectural elements with unique relief decoration from the Early Meroitic period had been covered with protective brick enclosures since the mid-1990s as a temporary measure because of the fragility of the local sandstone that was used as building material (see Fig. 18).<sup>41</sup> In an attempt to preserve these extraordinary pieces while also including them into the visitor experience, the columns had in recent years begun to receive attention in form of 3D-scanning tests,<sup>42</sup> as well as the testing of conservation approaches and treatments.<sup>43</sup> A full conservation assessment and plan was drafted in early 2015.<sup>44</sup>



Fig. 19: Demolition of brick enclosure protecting parts of column 5 (photo: Cornelia Kleinitz).

Supported kindly by Karl-Heinz Priebe, the systematic treatment of the column drums and bases was begun in the 2016/17 season, with the aim of eventually rehabilitating the heavily visited area in front of the Central Temple and the northeastern part of the Central Terrace.<sup>45</sup> The brick enclosures of several column drums and bases were demolished and the columns cleaned (Figs. 19 to 21). As part of

41 Wolf 1996.

42 Kleinitz, Bauer and Näser 2009.

43 Kleinitz & Näser 2014; Näser 2015.

44 Restaurierung am Oberbaum (RaO) 2015, unpublished report 'Musawwara es-Sufra. Zentraler Tempel der Großen Anlage. Zustandskartierung und Konzept zur Konservierung von 10 Säulen' (Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin).

45 See Kleinitz 2014.



Fig. 20: Drums and base of column 5 with demolished brick enclosure (photo: Cornelia Kleinitz).



Fig. 21: Cleaning of column 5 by the conservation team (photo: Cornelia Kleinitz).

the 3D-documentation of the columns structured light scanning was applied. 3D-modelling was subsequently completed for several drums and bases from columns 3, 4, 5, 7, 8, 9 and 10 in room 102 (Fig. 22) as well for two column bases from room 108 (Fig. 23). Since they were in a very poor state of preservation due to the sandstone having lost much of its integrity, two column drums from column 5 and the two bases in room 108 were consolidated using a colloidal silica solution (Remmers KSE 300) (Fig. 24 and see Figs. 1, 22 and 23).<sup>46</sup> The consolidation with

<sup>46</sup> Restaurierung am Oberbaum (RaO) 2017, unpublished report 'Musawwarat es-Sufra. Zentraler Tempel der Großen Anlage. Bericht zu den Arbeiten im Frühjahr 2017' (Sudan Archaeological Collection & Archive at Humboldt-Universität zu Berlin).

colloidal silica solution through infusion from within the sandstone objects had shown excellent results at neighbouring sites with a similar type of sandstone, such as Naqa, and it was hoped that similarly positive results could be achieved at Musawwarat.

#### 4. PROTECTING THE GREAT ENCLOSURE: THE INSTALLATION OF A PERIMETER FENCE

In consultation with NCAM a mesh-wire perimeter fence with metal poles had been planned for the protection of the Great Enclosure during the first QSAP project year (2013/14).<sup>47</sup> Its main function was to prevent damage from animal movement within and through the Great Enclosure and from unchecked movement of visitors in and out of the building complex, especially of large groups coming from the guesthouse of the SCI directly to the southwest of the Great Enclosure. While it had been postponed due to funding shortages, its construction became urgent upon the reports in early 2017 that a paved road was planned to be built from the main (Khartoum-Atbara) road to Musawwarat, which

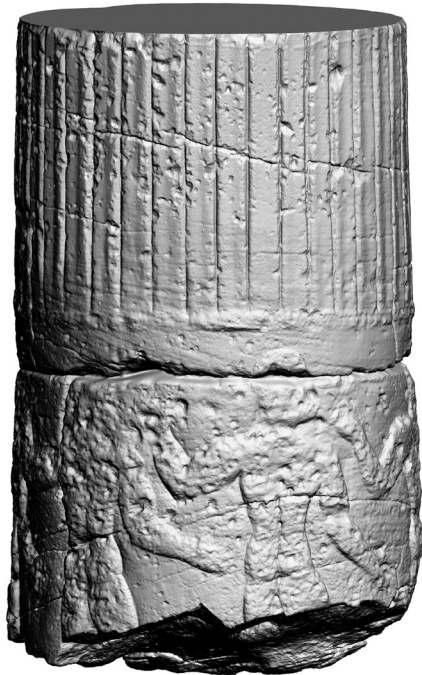
would open access to the site for all sorts of vehicles and potentially bring much larger numbers of visitors to the valley. The Great Enclosure fence would help to channel tourists to the starting point of the planned visitor guidance system and limit unauthorized access.

In preparation for the construction of the perimeter fence a salvage survey was conducted. After the fence's outline had been planned on paper, the survey established on the ground what would be its least intrusive path in terms of interference with archaeological features, future archaeological excavations as well as maintenance and site management measures.

<sup>47</sup> Kleinitz & Näser 2014.



102 Säule5 Trommel1-2



X 671 mm  
Y 662 mm  
Z 1072 mm

Volumen: 0.32 m<sup>3</sup>  
Oberfläche: 2.53 m<sup>2</sup>

108 Löwe Süd



X 706 mm  
Y 622 mm  
Z 478 mm

Volumen: 0.14 m<sup>3</sup>  
Oberfläche: 1.42 m<sup>2</sup>

Fig. 23: 3D-model of southern column base from room 108 with its sculpted elephant and lion (image: Thomas Bauer, TrigonArt).

Fig. 22: 3D-model of two drums of column 5 with its frieze of 'dancing young men' (image: Thomas Bauer, TrigonArt).



Fig. 24: Conservation of column 5 in progress: Infusion and flooding of column drums with colloidal silica solution (photo: Alfatih Mohamed Ali Saeed).



Fig. 25: Google Earth image of the Great Enclosure with the outline of the fence marked (image: modified from Google Earth).

The path of the fence was finalised to extend 12.50 m to the north and south of the northern and southern outer walls of the Great Enclosure, respectively, and 25.00 m to the west of the western outer wall of the Great Enclosure. On the eastern side of the Great Enclosure the fence follows the outline of an artificial platform that was created in past years to protect the monument from the waters of the Wadi es-Sufra (Fig. 25).



Fig. 26: Fire pit in survey trench IA-N.01 to the north of the Great Enclosure (photo: Thomas Scheibner).

In preparation for the setting of the fence, several block deposits to the west of the Great Enclosure were shifted minimally to clear its path. To the northwest of the Great Enclosure a survey trench (IA-N.01) with a length of 40.00 m and a width of 1.00 m was dug down to the natural soil. Finds and findings involved a) one small fire pit, filled with greyish, ashy sandy-silty material, containing larger amounts of charcoal (Fig. 26), and b) two fragments

of possible iron slag, embedded in the sediments of a rain water run-off channel. After preparing the northern side of the Great Enclosure for the setting of the fence, it transpired that the fence poles were pre-fabricated and too short to allow for a full excavation of the path of the fence down to the natural soil and the digging of foundation pits at this level. Rather, small pits would need to be dug into the present soil surface.

Subsequently, 346 foundation pits with a dimension of 35 x 35 cm and depth of 40 cm were dug for the poles of the fence as well as the support poles for the gates, corners and other





Fig. 27: Digging the foundation pits for the poles of the fence to the south of the Great Enclosure (photo: Cornelia Kleinitz).

reinforcements (Fig. 27). They were archaeologically investigated as far as possible. Due to the careful planning of the fence's outline – no fence poles were set in immediate proximity to the walls of the Great Enclosure, except where excavations had already taken place in the past – very few archaeological features were encountered. Finds and findings include a pit with ashy fill and numerous wheel-thrown Meroitic potsherds in the foundation hole of the southwest corner pole of the perimeter fence, starting 15 cm below the present surface and extending down to a depth of 40 cm (Fig. 28). The dimensions of this pit were not entirely revealed since it stretched beyond the limits of the foundation pit and the excavation area could not be extended due to a lack of time. The area in which the pit was found is located between the Great and Small Enclosures and known from previous excavations for its settlement remains.<sup>48</sup>

The mesh wire fence measures 770.40 m in length and encloses the entire Great Enclosure, except where the enclosure walls are of sufficient height to prevent unchecked entry, such as in its northern part. One section of the restored northern wall of the Great Enclosure, which did not have the height required, was closed with a plastered brick wall and sandstone building blocks (Fig. 29).



Fig. 28: Pit with ash and potsherds in the foundation hole of the corner pole of the fence to the southwest of the Great Enclosure (photo: Thomas Scheibner).

<sup>48</sup> See Mucha 2005.



Fig. 29: Increasing the height of a section of the northern enclosure wall of the Great Enclosure (photo: Cornelia Kleinitz).



Fig. 30: Main (visitor) gate of the fence for the Great Enclosure immediately after installation (photo: Cornelia Kleinitz).

Three gates were installed on the northern, southern and western sides of the fence, each measuring 2.50 m in width and allowing vehicle access for archaeological and maintenance work from three sides of the Great Enclosure (Fig. 30). On the eastern side of the fence a small door was installed as car access from the *wadi* was not required.

The fence measures c. 1.60 m in height, with the metal poles installed at intervals of c. 2.50 m in concrete-filled pits (Figs. 31 and 32). The metal poles have an overall length of 2.00 m and were equipped with two hooks to hold the mesh in position. The life-span of the fence may have been extended by adjusting its design before construction and by modifying the building process, e.g. through the addition of 2-3 further hooks per pole; the addition of a third stabilizing horizontal wire to support the

mesh; or the construction of more adequately sized foundations with a more durable concrete mixture. However, as the fence could only be installed by a contractor at the very end of the field season, adjustments were not possible.

At the next opportunity, i.e. early in the 2017/18 field season,<sup>49</sup> the upper openings of the metal poles were closed with concrete caps to prevent rainwater from collecting inside the poles and corroding the metal, and the mesh was fastened to the upper and lower horizontal wires in multiple instances to increase the stability of the fence (Fig. 33). At that point it had become already apparent that the fence was functioning as hoped for and that its installation indeed helps to protect the Great Enclosure.

<sup>49</sup> See Kleinitz forthcoming a.



Fig. 31: Metal poles on the western side of the Great Enclosure during the construction of the perimeter fence (photo: Cornelia Kleinitz).



Fig. 32: Western side of the fence of the Great Enclosure after the completion of work (photo: Cornelia Kleinitz).



Fig. 33: Closing of the tops of the metal fence poles during the 2017/18 season (photo: Cornelia Kleinitz).



Fig. 34: Erosion gullies in the vicinity of the Apedemak Temple (photo: Cornelia Kleinitz).

#### 5. MAINTAINING THE ARCHAEOLOGICAL MONUMENTS OF MUSAWWARAT

After the 2015/16 field season had to be cancelled due to an interruption of funding, which resulted also in the interruption of regular basic maintenance activities at Musawwarat, the 2016/17 field season put significant effort into the upkeep of the site. At the Apedemak Temple, the severe rain of the 2016 rainy season had washed out some of the foundations of its perimeter fence and erosion gullies had formed in the immediate vicinity of the temple (Fig. 34). The fence's foundations were subsequently covered again and the gullies blocked with gravel (Fig. 35).

Several substantial sand accumulations had formed in the Great Enclosure, which were threatening to destabilise and/or otherwise damage some of its walls. Several of these large sand accumulations were removed from rooms 407, 501, 513, 528, 529 and along the northern wall of the Great Enclosure (Fig. 36). Basic maintenance work at the Great Enclosure also involved the cleaning of the Musawwarat Site Museum and of the objects on display. In preparation for the re-development of the museum in the 2017/18 and 2018/19 field seasons,<sup>50</sup> the building and its exhibits were photographically documented, providing the foundation for the development of a new exhibition approach.

50 See Kleinitz forthcoming a and b.

#### 6. RESEARCHING THE LARGEST COURTYARD OF THE GREAT ENCLOSURE

Research-led test-trenching and excavation took place in courtyard 601 of the Great Enclosure as this proved a feasible undertaking in conjunction with work on the archaeological impact assessment for the nearby perimeter fence.<sup>51</sup> Promising geophysical evaluations of courtyard 601 – the largest of the courtyards of the Great Enclosure – were undertaken in 2001/2002.<sup>52</sup> Up to the 2016/17 season, however, the courtyard remained unexcavated and its function(s) unclear. The excavations during the 2016/17 season consequently aimed at archaeologically validating and investigating some of the results of the 2001/2002 geophysical prospection. For this purpose a trench system of 4x4m with 1m baulks was created, which can serve as the basis for a future large-scale excavation of the courtyard. All in all six trenches were dug (trenches 601.26 - 31) and an area of 68 m<sup>2</sup> was exposed.<sup>53</sup>

The results of the excavations were encouraging, even though earlier suggestions could not be confirmed that saw walls extending from complex 500 into what is today courtyard 601.

51 This sub-project was undertaken by Thomas Scheibner. For more information of its results in German see Scheibner 2017.

52 See Wenig 2002.

53 See Scheibner 2017, plan 1.



Fig. 35: Fence of the Apedemak Temple after the filling of erosion gullies (photo: Cornelia Kleinitz).



Fig. 36: Removing windblown sand in room 529 of the Great Enclosure (photo: Cornelia Kleinitz).



Fig. 37: Basin with whitish-grey fill in trenches 601.27 and 601.28 (photo: Thomas Scheibner, see also Scheibner 2017, Fig. 2).

The features excavated in this field season, which include a stone and plaster-lined basin, rather appear to be related to the building process of the Great Enclosure. Hence, these features add to our knowledge of technological processes and building (or maintenance) practices in the Meroitic Period. However, it was initially not clear as yet whether these activities took place before or after the area of (the later) courtyard 601 was added to the Great Enclosure.

The neighbouring trenches 601.27+28 had shown a strong magnetic anomaly (dipole) in the geophysical survey. The excavations of the 2016/17 field season revealed that this anomaly was caused by a basin, which was used either for mixing of lime mortar or for clay material preparation, possibly pottery production. The basin was cut into the ancient natural soil and its walls consist of ferricrete sandstone slabs, partially also of (re-used) sandstone blocks in the upper parts of its side walls (Figs. 37 and 38).



Fig. 38: Detail of southeastern corner of the basin in trenches 601.27+28 (photo: Thomas Scheibner).

The inner faces of the side walls and the bottom of the basin are lined with lime plaster of high quality. The basin is trapezoidal in plan, with an obtuse-angled northwestern corner due to a shorter wall on its western side. It is preserved to a depth of up to 40 cm. The inner dimensions of the basin are c. 3.10 m in length on its eastern side and c. 2.80 m on its western side, and 1.60 m in width. The ferricrete walls measure about 20 cm in width, which brings the outer dimensions of the basin to c. 3.50 m (only 3.20 m in the west) by c. 2.00 m. The whitish-grey fill

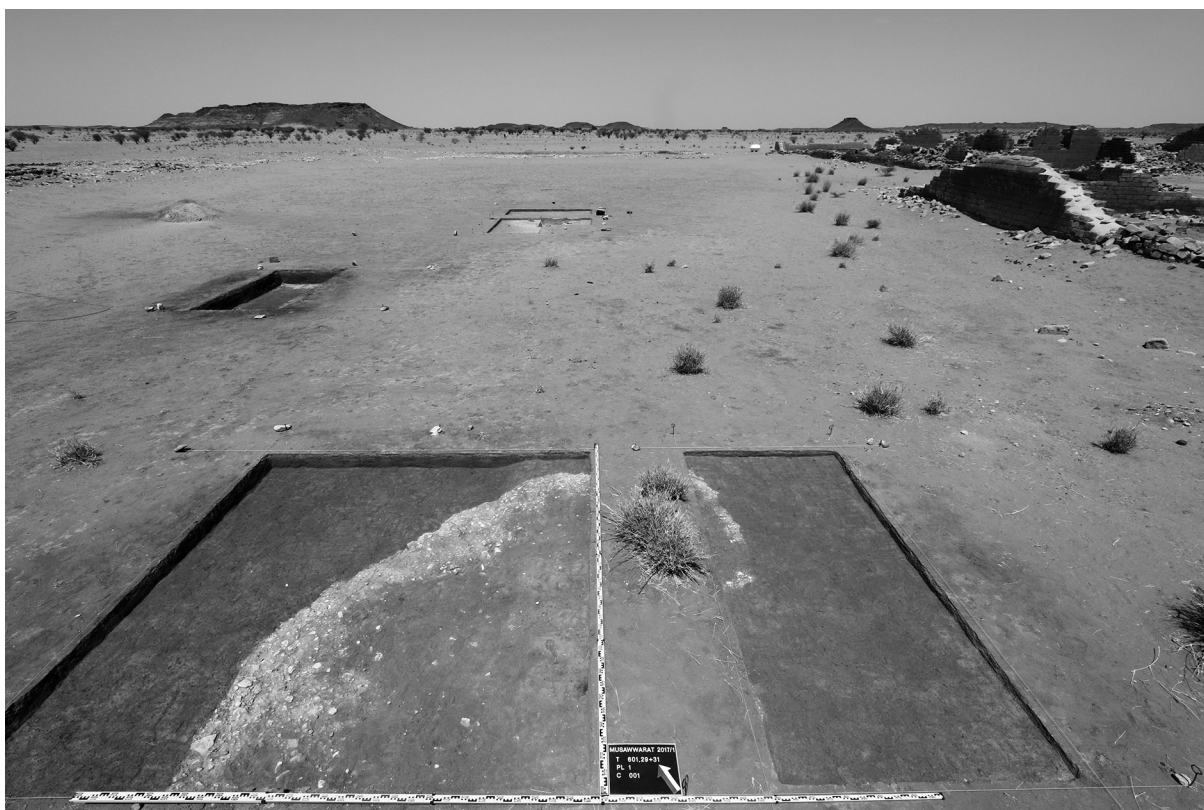


Fig. 39: Trenches 601.29 and 601.31 in the foreground and trenches 601.27 and 601.28 in the background (photo: Thomas Scheibner).

material very probably derives from the raw material which was prepared or used in the basin. The filling material was tested with hydrochloric acid and was shown to contain calcium carbonate, i.e. lime. Based on comparative archaeological features, building techniques and the type of material in the structure, the excavator has recently suggested a date of the first or second centuries AD for the basin.<sup>54</sup>

Further features excavated in courtyard 601 included a large and irregularly-oval shaped pit in trenches 601.29+31 (Fig. 39). The pit measures about 5.00 m in northeast-southwest direction and c. 3.00 m in northwest-southeast direction, it ends underneath the baulk between trenches 601.29+31 and trench 601.30. In depth the pit measures up to 60 cm. As a thin layer of earth mortar is preserved at the bottom of the pit, it was probably used for earth mortar extraction and preparation for building activities in the Great Enclosure. After its use, the pit was filled up with sandstone debris coming from the building activities. No archaeological features were identified in trench 601.26 and a linear structure visible in the geophysical map could not be validated.

<sup>54</sup> Scheibner 2017.

## 7. COMMUNICATING WITH THE LOCAL COMMUNITY

Led by Alfatih Mohamed Ali Saeed as part of his MA research at the University of Khartoum, a study of the relationship between the local pastoral community and the archaeological site and its various stakeholders was continued.<sup>55</sup> This research involved field stays of numerous months between 2015 and 2017, and more than 200 members of the local Shaygiya-Khufonja, Hassaniya-Nagiab and Hababda tribes were interviewed. The study provides valuable information on the local pastoralists, their social and political organisation, their lifeways and land use, and the economic and ideational aspects of being involved in the archaeological project as workmen. Ali Saeed's work also gives a voice to the people living close to the archaeological site, as it is they who are affected by management decisions that are made

<sup>55</sup> Alfatih Mohamed Ali Saeed, 'Living with monuments. Coping strategies and resource competition among pastoralists in Musawwarat es-Sufra', MA-dissertation submitted at the Department of Sociology and Social Anthropology, University of Khartoum; and presentation delivered together with C. Kleinitz during the Second Bayuda Conference 'Bayuda and its Neighbours', Gdansk, 12-14 October 2017: 'Pastoral communities and their relationship to archaeological heritage: A case study from Musawwarat es-Sufra'.



Fig. 40: Invited visits to the houses of the *sheikhs* provide an opportunity for conversations about local concerns as well as wishes by the local community in terms of the development of the archaeological site (photo: Alfatih Mohamed Ali Saeed).



Fig. 41: Interview with a former workman, who had participated in the excavations of the 1960s (photo: Alfatih Mohamed Ali Saeed).

by archaeologists and representatives of the regional and national governments in terms of protecting and presenting the site. Hence, this study provides the perspective of the local community on the archaeological site and its preservation, adding a valuable set of information for successful and sustainable management planning at Musawwarat (Figs. 40).

An additional study, ‘Workmen’s voices’, was launched during the 2016/17 field season. It was dedicated to researching in what ways the archaeological project over time has left its mark in the memory of the local community. This oral history project traced the ‘cultural encounter’ between the East German archaeological team and the local community back into the 1960s, when extensive excava-

tions and conservation-restoration measures were undertaken by the Musawwarat Project, then led by Fritz Hintze. Video interviews with elderly former workmen were conducted by Alfatih Mohamed Ali Saeed and Zaroog Bakri Mohamed Ahmed in early 2017 (Fig. 41).

The first results of this study were extremely illuminating as they – together with archival research undertaken by the author at the Sudan Archaeological Collection & Archive in Berlin<sup>56</sup> – illustrate how the archaeological team during the 1960s successfully engaged with the pastoral community and how this was perceived and appreciated locally.<sup>57</sup> On the part of the archaeologists this included acknowledging and respecting local sociocultural conditions, being inclusive and understanding themselves as (a temporary) part of the local social fabric, and being willing to readily communicate. This study demonstrates the important positive role(s) sustained community engagement can play in long-term archaeological projects, such as that at Musawwarat. Indeed, in the early years of the Musawwarat Project solid foundations were laid for good relations between the archaeologists and the local

people for decades to come (Fig. 42).

<sup>56</sup> See Kleinitz 2019.

<sup>57</sup> Presentations delivered during the conference ‘BERLIN-SUDAN. The History of Berlin-based Research on Northeast Africa. Change, Continuity and Scientific ‘Zeitgeist’ from the Kingdom of Prussia until the End of the GDR’, Humboldt-Universität zu Berlin + Berliner Antike-Kolleg, 30 June - 01 July 2017: C. Kleinitz: ‘The GDR-Expeditions to Sudan in the late 1950s and 1960s under Fritz Hintze. An exploration of the Sudanarchaeological Collection & Archive at Humboldt-Universität zu Berlin’; Al-Fatih Mohamed Ali Saeed + Zaroog Bakri Mohamed Ahmed: ‘Workmen’s Voices. An Oral History of the East German Excavations at Musawwarat es-Sufra in the 1960s’.





Fig. 42: *Sheikhs* and workmen (as well as family members) of the local Khufonja, Hassaniya and Hababda tribes at the end of the 2016/17 season (photo: Thomas Scheibner).

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## ZUSAMMENFASSUNG

Die Feldkampagne 2016/17 der Archäologischen Mission der Humboldt-Universität in Musawwarat es-Sufra konzentrierte sich mit finanzieller Unterstützung des Qatar-Sudan Archaeological Project (QSAP) auf die Planung und auf Maßnahmen des Site Managements. Es wurde eine konservatorische Bestandsaufnahme des gesamten archäologischen Ortes durchgeführt und ein erster Konservierungsmasterplan für Musawwarat entwickelt. Dieser Masterplan dokumentiert den aktuellen Erhaltungszustand der archäologischen Denkmäler von Musawwarat und skizziert kurz-, mittel- und langfristige Grundsätze, Strategien und Prioritäten für deren Erhalt und für die touristische Entwicklung des Ortes.

Angewandte Konservierungsarbeiten und 3D-Scannen widmeten sich den dekorierten frühmeritischen Säulen auf der Zentralterrasse der Großen Anlage, um diese Unikate schließlich für die Forschung und öffentliche Präsentation wieder zugänglich zu machen. Als Schutzmaßnahme wurde ein Maschendrahtzaun um die Große Anlage gezogen, der einerseits Tiere aus dem Baukomplex fern hält

und andererseits die Besucher über einen Haupteingang im Süden an den Beginn eines Besucherleitsystems führt, welches in den kommenden Feldkampagnen installiert werden wird. Der Bau des Zaunes wurde archäologisch begleitet. Darüber hinaus wurden Standardarbeiten zur Instandhaltung der archäologischen Denkmäler von Musawwarat durchgeführt, z. B. das Entfernen von größeren Sandansammlungen aus der Großen Anlage oder das Auffüllen von Auswaschungen in der Nähe des Apedemak-Tempels.

Forschungsgrabungen konnten nur geringem Umfang durchgeführt werden. Sie konzentrierten sich auf den Hof 601 und haben archäologisch zum ersten Mal nachgewiesen, dass dieser größte Hof der Großen Anlage Aktivitätszonen enthielt, die mit Bauarbeiten und verwandten Technologien verbunden waren. Schließlich wurde eine sozialanthropologische Studie der örtlichen Pastoralgemeinschaft von Musawwarat und ihrer Beziehung zum archäologischen Ort fortgesetzt, und es wurde ein neues Forschungsprojekt begonnen, das die Erinnerung älterer lokaler Arbeiter an das Musawwarat-Projekt in den 1960er Jahren unter Fritz und Ursula Hintze dokumentiert.