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THE 4TH AND 5TH SEASONS OF THE NUBIAN EXPEDITION OF THE ANUCHIN RESEARCH INSTITUTE AND MUSEUM OF ANTHROPOLOGY, LOMONOSOV MOSCOW STATE UNIVERSITY AT THE SITES OF DERAHEIB AND ONIB (THE REPUBLIC OF SUDAN). PART II. THE TEST TRENCH NEAR NORTH-WESTERN WALL OF THE NORTHERN FORTRESS

Introduction. *During the fourth season of the Nubian Archaeological and Anthropological Expedition, organized by the Moscow State University Research Institute and the Museum of Anthropology, research was conducted in the Deraheib site in Sudan, from February to March 2022. A 2×2 m test trench with a depth of 2.2 m was opened during the season underneath the opening in the wall in order to clarify the structural features of the northwestern wall and determine the construction phases of the Fortress.*

Materials and methods. *The excavated soil was meticulously sieved. The archaeological material consisted mainly of pottery and animal bones. Their analysis allows us to draw basic conclusions about the nature of the layer in which the trench was laid and to date the time of its formation. The light green soil was also analysed. Architectural analysis also allowed us to draw some important conclusions about the site.*

Conclusions. *Based on the results of studies in the test trench and the data from the engineering and architectural survey of the Northern Fortress, we are able to propose a chronology for the early stages of its usage. We believe that the northwestern and northeastern walls built in the first construction phase were weakened by mudflows, and more powerful walls were built to reinforce them during the second construction phase. The northwestern wall from the second construction period was built on a layer of debris left from the first stage of fortress's usage. This layer, consisting of lustre ware fragments, dates back to the 10th century. The space between the northwestern walls, which belonged to the first and second construction phases, respectively, i.e. the 10th and 11th centuries or possibly later, was used as a dump for household garbage, toilet waste, or even as an outhouse.*

Keywords: Sudan; Central Atbai; Nubian Desert; Wadi al-Allaqi; Deraheib; Onib; pottery

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Introduction

The Nubian Archaeological and Anthropological Expedition of the Lomonosov Moscow State University Research Institute and Museum of Anthropology has been conducting field research in the Republic of Sudan since 2017. So far, work has been carried out at the Deraheib and Onib sites [Гордеев с соавт., 2024, с. 68-86; Krol et al., 2022, p. 100-124; Krol et al., 2023, p. 132-149] (Fig. 1).

The archaeological site of Deraheib, which has been identified with the city of Al-Allaqi mentioned in the medieval Arabic sources, presently consists of the following structural features: the Settlement; two rows of residential buildings along the eastern bank of the Wadi with a Friday Mosque at the centre; the Northern Fortress, i.e. the castle of a local ruler; the Southern Fortress, i.e. a fortified caravanserai; and the Southern Necropolis. Archaeological finds revealed in the Settlement buildings 2 and 3 (the Mosque) [Крол, 2024, с. 572-600], and near the southwestern wall of the Northern Fortress (hereafter referred to as NF), together with material from a test trench near the northwestern wall of NF, which this article focuses on, and data collected during excavations in the Southern Necropolis (SN), allows us to conclude with reasonable certainty that the city of Al-Allaqi existed during the 10th–12th centuries [Krol, Tolmacheva, 2023].

These data are confirmed by evidence found in medieval Arabic sources [Крол, 2018].

During this period, the city was the focal point of the gold-rich region of Wadi al-Allaqi, which encompassed the bed of a dry river and its many tributaries. One of the trade routes used by caravans to traverse the Nubian Desert also passed through Deraheib. Pilgrims on their way to Mecca for the Hajj used this same route [Крол, 2018].

The Northern Fortress marked the centre of power in the Wadi al-Allaqi region. It served as the residence of the ruler known as the 'Sultan of al-Allaqi' [Крол, Толмачева, 2024, с. 17; Krol, Tolmacheva, 2023, p. 251-262]. Excavations of the Fortress site began in 2020, when the southwestern wall and fortress entrance were explored [Крол с соавт., 2021, с. 127-133]. During the same season, the team sieved the fill from the robber trench in Room I, which is located inside the fortress and beneath an opening or 'window' in the northwestern wall of the NF, after which the trench itself was partially excavated.

The fill of Room I consisted of a porous dense material (faeces), fragments of slate, loose porous clay, plaster fragments, ceramics, textiles, leather fragments,

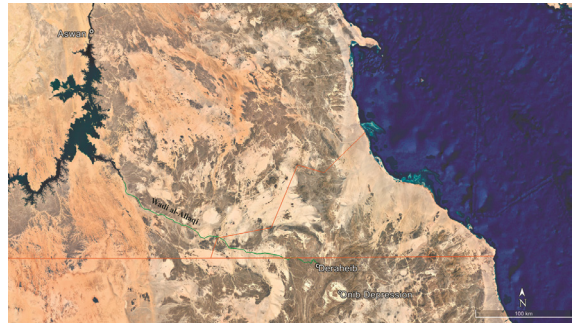


Figure 1. Geographical features mentioned in the article (Map made on the base of the Google Earth image)

Рисунок 1. Карта, сделанная на основе сервиса Google Планета Земля с указанием основных географических названий, упомянутых в статье

and animal bones. Analysis of the fill and find material suggests that Room I was likely used for the disposal of various waste materials and the contents of the latrines in the final stage of the Northern Fortress's existence [Крол с соавт., 2021, с. 141-142].

Analysis of the ceramics allows us to date the period of the deposit accumulation in the Room I to the 10th and 11th centuries. A fragment of a beam found within the fill of the room was dated using radiocarbon analysis (¹⁴C). The analysis yielded a date of 1133 ± 25 BP (2σ 774 – 993 cal AD) (median 924 AD)¹. All dates obtained through radiocarbon dating of textile samples from Room 1 and the spoil heap near the 'window' in the northwestern wall of the NF yielded calibrated dates between 1017 and 1034 AD.

A rectangular niche measuring 45×40 cm and covered on the top with a thick slate slab was discovered under the main opening or 'window' in the northwestern wall of Room I. The function of the niche has yet to be determined. Two archaeologically intact ceramic vessels were discovered at the level of the slate slab – an Aswan pot with a short neck (AIII according to W. Adams [Adams, 1986]), and a glazed bowl on a round base, also of Egyptian origin (Fustat or Aswan). Both objects date back to the 9th-10th centuries [Крол с соавт., 2021, с. 132].

¹ The dating was carried out in the Laboratory of Radiocarbon Dating and Electron Microscopy at the Institute of Geography of the Russian Academy of Sciences, by E. P. Zazovskaya, Ph.D, and in the Laboratory of Applied Research at the Department of Geology and Geoecology at the Faculty of Geography at the A. I. Herzen Russian State Pedagogical University, by M. A. Kulkova, Ph.D.



Figure 2. A 2×2 m test trench underneath the opening in the northwestern wall of the Northern Fortress. Photo: K. Samurskii
Рисунок 2. Шурф у Северо-западной стены Северной крепости. Фото К. Самурского

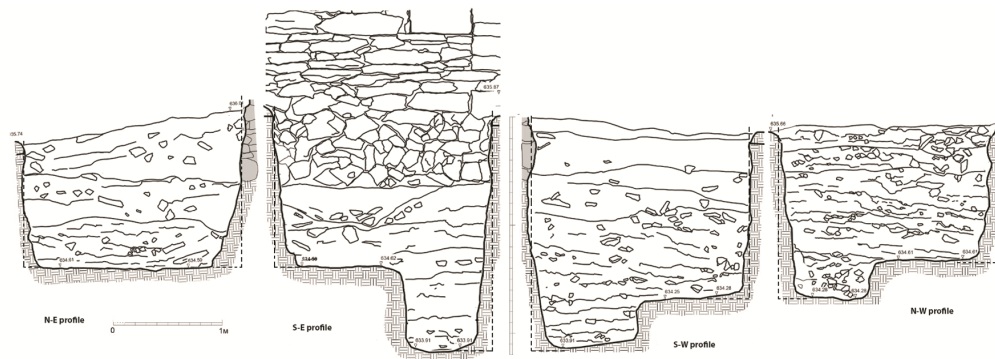


Figure 3. Profiles of the test trench. Drawing by Y. Zaitsev
Рисунок 3. Профили шурфа у Северо-западной стены Северной крепости. Рисунок Ю.П. Зайцева

A 2×2 m test trench with a depth of 2.2 m was opened during the fourth season (February–March 2022) underneath the opening in the wall in order to clarify the structural features of the northwestern wall and determine the construction phases of the Fortress (Fig. 2). Analysis of the archaeological materials recovered during excavation allows us to conclude that domestic waste of at least two me-

tres depth had been accumulated near the northwestern wall. Its structure was uniform, consisting of layers of sand interspersed with local microspheres and oversaturated with various kinds organic matter, ash, coal, and plenty of large and small slate slabs (Fig. 3). The pit also contained large quantities of animal bones, pottery sherds and thin-walled glass fragments. The soil density and colour in-



Figure 4. Absence of masonry connection facing along the northeastern wall.
Photo: D. Fedorova

Рисунок 4. Отсутствие перевязки кладки вдоль северо-восточной стены.
Фото Д. Федоровой

creased with increasing depth. The light brown layers had the characteristic smell of decomposing organic material. Moreover, the amount of archaeological material also increased with increasing depth.

Materials and methods

The excavated soil was meticulously sieved. The archaeological material consisted mainly of pottery and animal bones.

Their analysis allows us to draw basic conclusions about the nature of the layer in which the trench was laid and to date the time of its formation. The light green soil was also analysed. Architectural analysis also allowed us to draw some important conclusions about the site.

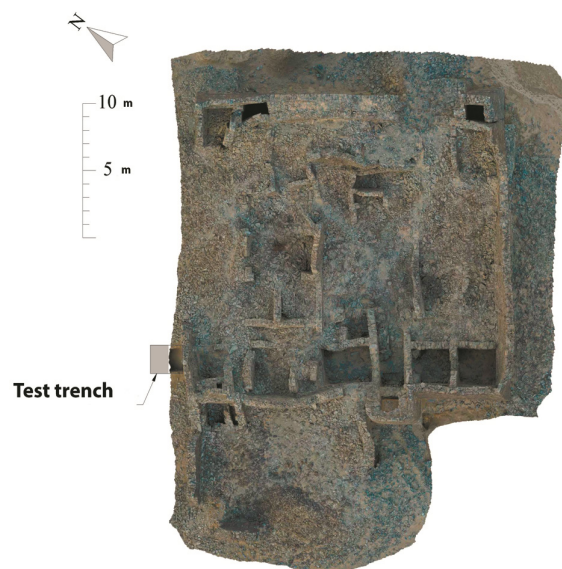


Figure 5. Orthophotoplan of the fortress.
D. Fedorova, O. Kalinina
Рисунок 5. Ортофотоплан крепости.
Д. Федорова. О. Калинина

Architectural analysis of the obtained data²

The structure of the Fortress is frameless. It consists of load-bearing walls of slate slabs on mortar. In its plan, the building is square in shape and measures 24.5×24.5 m, with an additional section of 10×13 m, which was added later to the southwestern wall. The height of the preserved wall sections averages ca. 10.4 m.

The interior of the Fortress can be divided broadly into an outer perimeter formed by the walls, which create small chambers measuring approximately 3×3 m, and a central open area measuring 7.5×11 m.

While examining the architecture of the Fortress, it was possible to identify sections where the NE and NW walls joined without any bonding masonry (Fig. 4). This was used to formulate a hypothesis regarding a later extension of these walls, which was later confirmed during the excavations in February and March 2022.

Despite the lack of a comprehensive stratigraphic record, the data obtained are still sufficient to propose the following phases of construction and reconstruction of the Fortress (Fig. 5):

The first construction phase: construction of structure's main body, measuring ca. 20.4×20.4 m, on an elevated area formed by diluvial deposits – the result of seasonal alluvium accumulated from

² This section was written by O. S. Kalinina, D. N. Fedorova.

adjacent mountainous crevices (gullies) to the west. The test trench of 2022 revealed a layer of more than two metres of domestic waste, which had accumulated on a natural slope adjacent to the northwestern wall during the usage of the Fortress.

The second construction phase constituted an extension of the northwestern gallery wall by two or three storeys and including new external fortification walls. The northeastern wall was additionally reinforced with a stone wall of 2.8 m thickness along its entire remaining height.

A second wall – 2.5 m thick in its lower section – was erected parallel to and at a distance of 1.6 m from the northwestern wall in order to increase the structural integrity of the fortress walls and enhance its inner perimeter from the Wadi side.

The space in the area between the walls of the first and the second construction phases was probably originally planned as a latrine with a sewage pit (Room I), for the periodic cleaning of which a window had been installed – the only opening in the entire Fortress at this low level. Seen from the outside, the window is located in the centre of the protruding section of the northwestern wall – possibly a tower-like extension with a centrally located window (above the excavated area of test trench).

Various artefacts (a coin found at the base of the ramp leading to the Fortress entrance [Крон с соавт., 2021, с. 129-130], fragments of ceramics and textiles) and a series of radiocarbon dates suggest that the construction and use of the fortress spans a period between the 9th (?) and 11th centuries, with an emphasis on the latter half of the proposed period.

The third construction phase constituted the strengthening of the foundations of the southeastern wall and southwestern wall and the corner of the southwestern wall with buttresses. This was probably necessary in order to counter the deformation of these walls caused by recurring mudslides eroding the foundations.

During *the fourth and final construction phase*, a southwest extension of 10×13 m was added to the main body of the Fortress.

Excavation of the test trench revealed the foundation base of the northwest wall of the Northern Fortress. The foundation was constructed on a bed of small stones approximately 20 cm thick. Larger stones were then placed on top of these, forming a layer of approximately 40 cm thickness. Based on work in the test trench, the total depth of the foundation is approximately 60 cm. The foundations are ribbon-shaped

and made of slate slabs laid on a mortar composed of metamorphic tuff (grus).

The shallowness of the foundation could be due to the extreme thickness of the northwest wall (approximately 2.5 m), preserved to a height of 10.4 m.

Analyses of the various types of masonry, together with the finds from the archaeological excavations, enable us to propose a reconstruction of the Fortress plan for its various construction phases (Fig. 5, 6).

*Pottery studies*³

The largest group of finds from the test trench consists of pottery. Ceramic material from the trench is represented by various types, the main ones of which are late groups of Aswan pottery (AIII–IV according to W. Adams), Nubian handmade pottery (groups DII–III according to W. Adams), Nile wares of alluvial clay (Egyptian and Nubian), glazed marl Egyptian pottery (splashed glazed pottery), and imported pottery (lustre wares and Palestinian storage jars, i.e. Nebi Samvil jars).

In terms of function, a large part of the pottery is utility ware, including quite a few vessels for transportation and storage (e.g. amphorae). Tableware constitutes a further category with numerous examples, including fragments of lustre bowls, as well as plates and bowls resembling relating Aswan Early Islamic W22 White Ware.

The pottery fragments were analysed according to their type in order to systematize the material collected (Fig. 7). The analysis of the material demonstrated an predominance of Aswan pottery.

The test trench was excavated by soil units of ca. 45 cm. About 121 ceramic fragments were collected from the first unit / Unit 1 (0 – ca. 45 cm). The main portion of these constitutes Aswan pottery (47%), followed by Nile wares of alluvial clay (20%), handmade pottery (18%), and glazed pottery (11%). A small amount of lustre ceramics was also discovered, constituting 3% of the pottery finds, while Palestinian wares (Nebi Samvil jars) made up a further 1%.

The second soil unit (ca. 45–90 cm) produced a total of 219 fragments, the majority of which constituted Aswan pottery (77%), followed by glazed and Nile wares of alluvial clay (7% respectively), handmade wares (6%), lustre wares and Palestinian jars (1.5% each).

³ This section was written by E. G. Tolmacheva and J. V. Dmitrieva

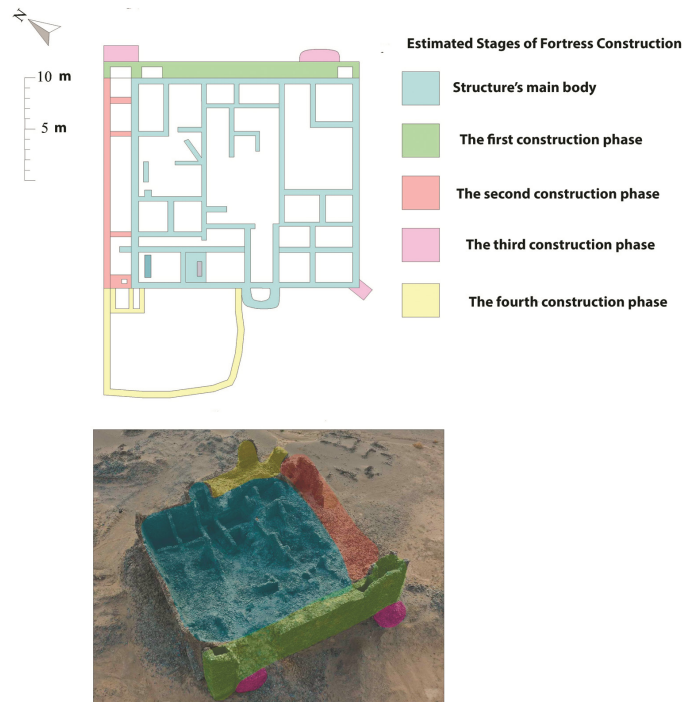


Figure 6. Reconstruction of the fortress layout based on an architectural investigation conducted by D. Fedorova and O. Kalinina
 Рисунок 6. Реконструкция плана крепости по результатам архитектурного обследования. Д. Федорова. О. Калинина

Total amount of ceramics from the test trench

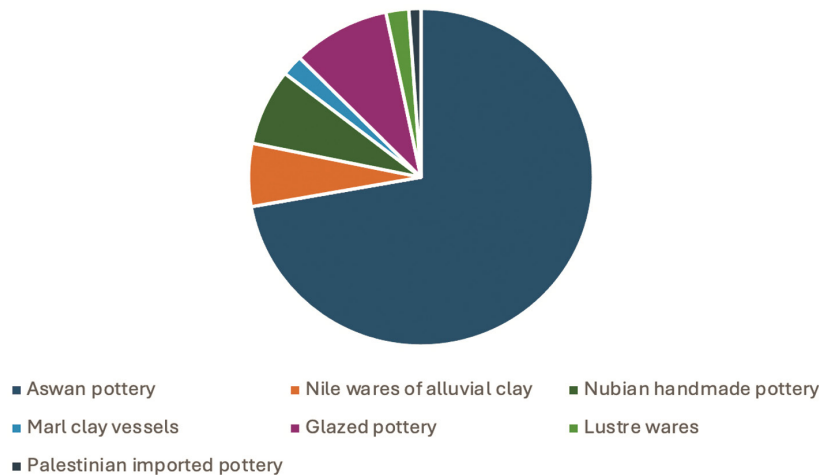


Figure 7. Diagram illustrating the proportion of different types of ceramic materials found in the test trench
 Рисунок 7. Диаграмма, показывающая соотношение типов керамического материала из шурфа

198 ceramic fragments were discovered in the third soil unit (ca. 90–135 cm). Most of these constitute Aswan pottery (89%). They also included small quantities of glazed pottery fragments (8%) and lustre wares (3%). No other types of pottery were found in this unit.

A total of 96 ceramic fragments was discovered in the fourth unit (ca. 135–180 cm). Aswan pottery also dominates here (its volume amounted to 62%), followed by glazed pottery (18%), handmade pottery (14%), lustre wares (3%), and Nile wares of alluvial clay (2%). The fragments also include a small percentage of water jars made of marl clay (1%).

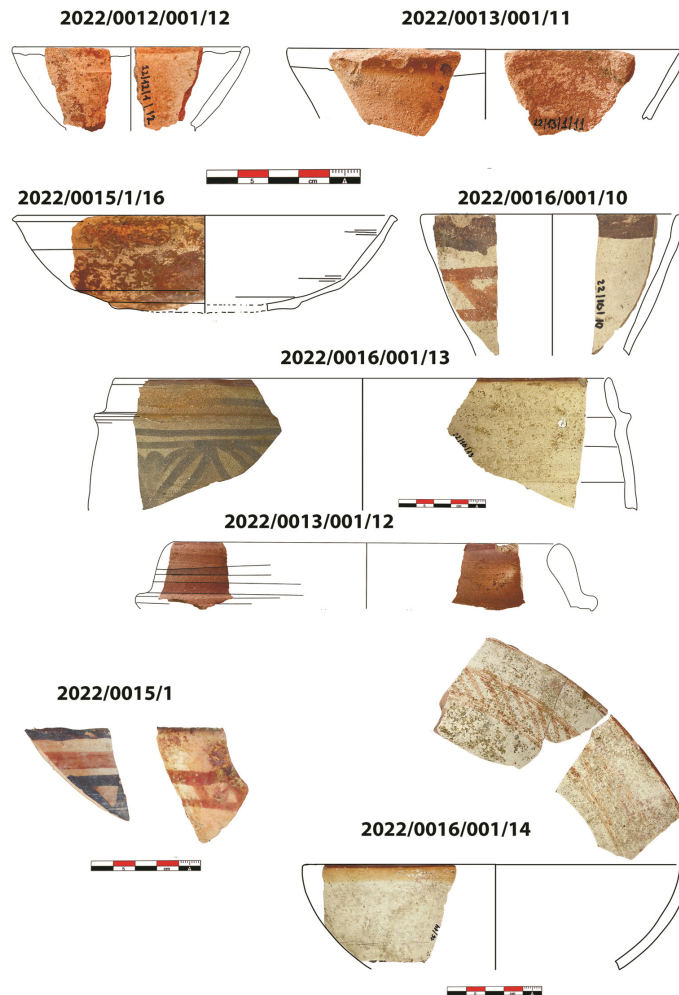


Figure 8. Aswan wares include the Aswan Early Islamic White Ware W22 and Aswan Medieval White Ware W12. Drawings by E. Tolmacheva
 Рисунок 8. Асуанская керамика. Типы W22 и W12. Рисунок Е. Толмачевой

The fifth unit (ca. 180–225 cm) revealed 161 fragments of pottery. As in the previous one, Aswan pottery dominates here (70%). However, we see an increase in the number of marl clay vessels here (9%). Glazed pottery is also present (7.5%), as are Nile wares of alluvial clay (5%), handmade wares (4.5%), Palestinian imported pottery (3%), and lustre wares (1%).

Thus, the analysis of the material from the test trench demonstrates a predominance of Aswan pottery, accounting for 72% of the total number of fragments studied (574 of 795). The highest concentration of this type is seen in the second and third units, with somewhat less in the fifth unit. The second largest group of pottery is glazed pottery, accounting for 9% of the total number of fragments studied (73). Glazed finds are evenly distributed throughout test trench. Nile wares of alluvial clay

make up 6% of the total number of finds, and are mainly found in the first and second units. Handmade pottery accounts for 7% of the total number of fragments discovered. Fragments of marl clay water jars were found in the fifth unit (15 fragments), with one in the fourth unit, making up 2% of the total pottery finds. Lustre ware fragments (also 2%) are distributed more evenly throughout the test trench: 30% in the third unit; 4% in the first unit, 18% in the second and fourth units, and 12% in the fifth unit. Palestinian jars are scarce, making up only 1% of the total quantity of pottery finds.

Most of the pottery fragments discovered belong to groups of Aswan ceramics classified by W. Adams as AIII–IV [Adams, 1986, p. 546–557] (Fig. 8). These groups are represented by the sub-groups of Aswan Early Islamic White Ware W22 and Aswan Medieval White Ware W12. The fabric

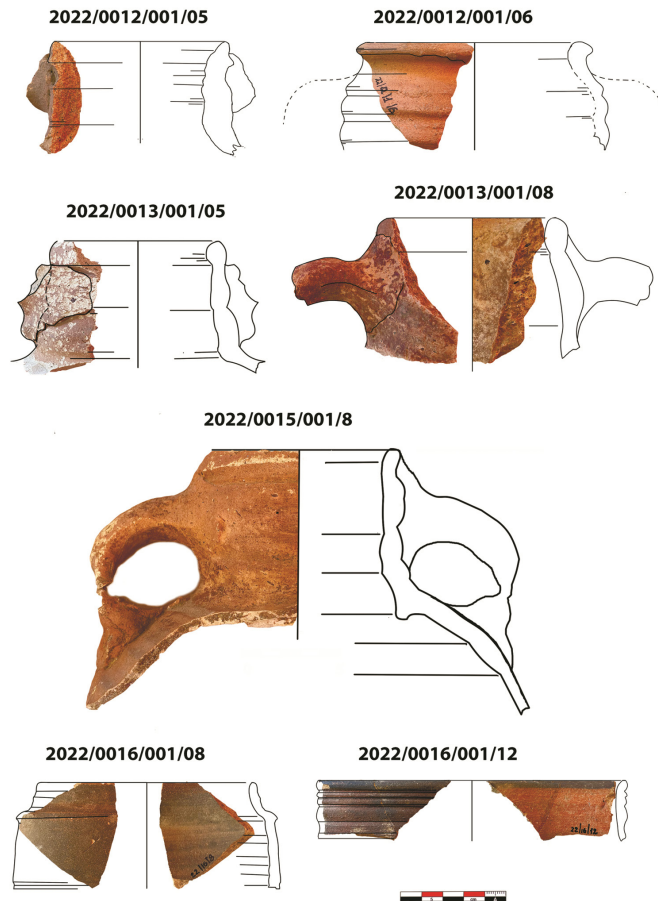


Figure 9. Aswan Early Islamic Utility Ware U8 and the Aswan Early Islamic Utility Ware U6.
Drawings by E. Tolmacheva

Рисунок 9. Асуанская керамика. Типы U8 и U6. Рисунок Е. Толмачевой

of the vessels from the test trench consists of kaolin clays of pale pink, pink and pinkish-beige colours with sand, grus, and chamotte inclusions, together with a small frequency of mica and organic inclusions.

Other common groups of Aswan wares include the Aswan Early Islamic Utility Ware U8 and the Aswan Early Islamic Utility Ware U6 (Fig. 9). These groups are distinguished by a characteristic dark red engobe resembling sandpaper. Red or red-orange slip is typical of Aswan Early Islamic Utility Ware U8 and more often found inside the vessel. The fabric of most of the vessel fragments discovered is either pink with grey veins – typical of AIV wares – or a soft orange or grey.

The necks and handles of the U6 and U8 amphorae were made of a coarser fabric than that of the vessel itself. The chipping is distinguished by a brown or light brown colour with numerous quartz-sand inclusions and cavities produced by the straw tempering. The surface colour ranges from red to

orange to almost purple, with white streaks visible in some of the darker samples.

The Aswan Medieval Decorated Red Wares R24 were also made of kaolin clay. This group is characterised by an orange or yellow slip and black-and-white or cream coloured ornamentation.

Group AIII and AIV ceramics are found in different soil units of the test trench. This is particularly interesting if we consider that these ceramic types usually occur some one or two centuries apart in other Nubian sites. Only in Aswan, where these particular wares were produced, we observe a similar picture in the layers of 9th – 10th centuries [Williams, 2022, p. 54; Krol, Tolmacheva, 2023]. Thus, the occurrence of both these ceramic groups at the same time may indicate close trade ties between Al-Allaqi and Aswan during this period.

There is, however, one main difference between the pottery deposits here and those of Aswan – namely the rather large percentage of a handmade pottery (DII–III groups according to W. Adams), suggesting

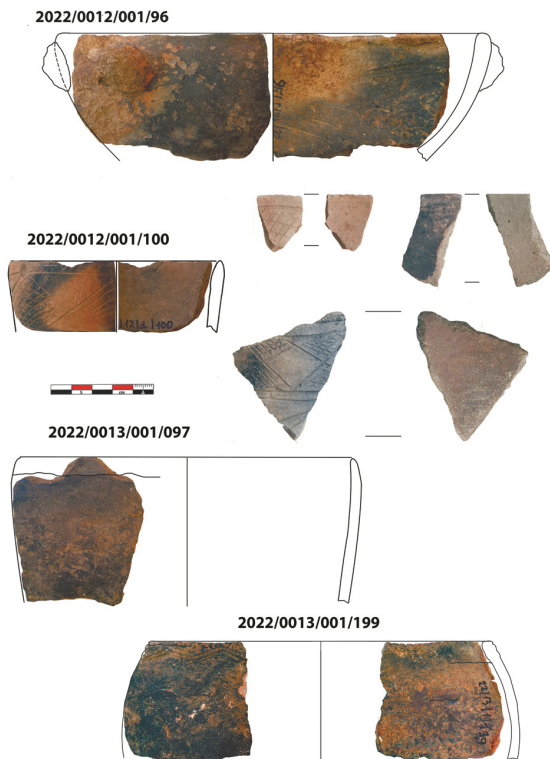


Figure 10. Handmade pottery (DII–III groups according to W. Adams) Numbers: 2022/0012/001/96, 2022/0012/001/100, 2022/0013/001/097, 2022/0013/001/199. Drawings by E. Tolmacheva
Рисунок 10. Лепная керамика (группы DII–III) Номера: 2022/0012/001/96, 2022/0012/001/100, 2022/0013/001/097, 2022/0013/001/199. Рисунок Е. Толмачевой

the presence of a local population of Lower Nubia and the Eastern Desert (Fig. 10, 11, 12). The fabric of this particular category of ceramics is characterised by a loose, porous structure containing numerous inclusions of sand, limestone, and organic material. The colour of the wares varies from dark brown to brown. The finds include both polished and non-polished vessels. We can identify an incised pattern of drawn lines on some of the items. Vessels of this type are distinguished by lattice decoration, which sometimes forms wavy lines as well as some geometric patterns.

In terms of its function, this category comprises mainly kitchen utensils and household vessels of medium or large sizes – mostly pots and bowls. Most of these vessels belong to the DIII group (10th–15th centuries) of W. Adams' classification.

A specific group of pottery deserves special attention – moulded incense burners with perforated

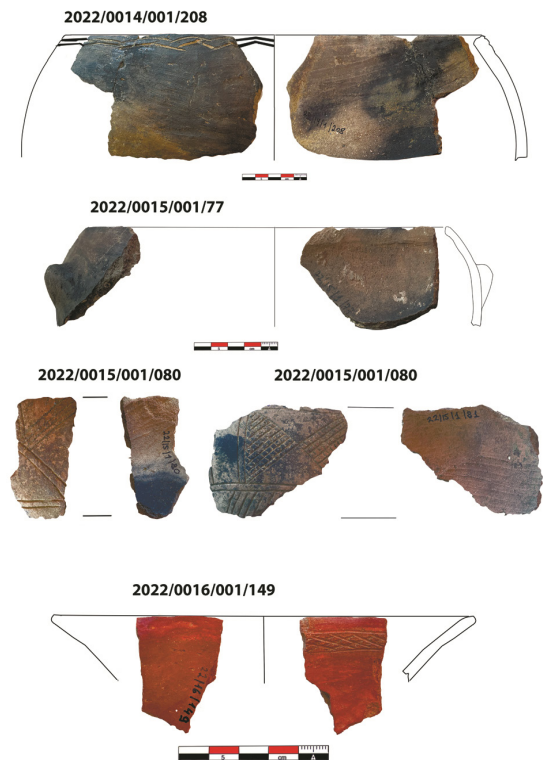


Figure 11. Handmade pottery (DII–III groups according to W. Adams). Numbers: 2022/0014/001/208, 2022/0015/001/77, 2022/0015/001/80, 2022/0016/001/149. Drawings by E. Tolmacheva
Рисунок 11. Лепная керамика (группы DII–III). Номера: 2022/0014/001/208, 2022/0015/001/77, 2022/0015/001/80, 2022/0016/001/149. Рисунок Е. Толмачевой

holes in the bottom. Their decoration consists of a sunken geometric pattern in form of a cross, the four sides of which are filled with diamond-shaped lattices (Fig. 12). The dating of these objects remains controversial. A similar object (identified as a ceramic stand) was published by K. Sadr, A. and A. Castiglioni [Sadr, Castiglioni, 1998, p. 221, fig. 26] and attributed to the Eastern Desert ceramics groups. However, all similar objects discovered at Deraheib come from layers also containing finds of glazed and lustre ceramics, which indicate a dating no earlier than the 10th century. Moreover, W. Adams attributes incense-burners with ornaments in a shape of an incised cross filled with a diamond-shaped lattice (N24) to the DIII group of medieval ceramic forms [Adams, 1986, p. 267]. Similar incense burners have also been discovered in the medieval layers of other Nubian and Egyptian sites [Phillips, 2004, fig. 7 B]. H. Williams also dates such vessels to the Middle Ages [Williams, 2022].



Figure 12. Handmade pottery (DII–III groups according to W. Adams). Numbers: 2022/0013/1, 2022/0012/1, 2022/0015/001/75.

Drawings by E. Tolmacheva
Рисунок 12. Лепная керамика
(группы DII–III). Номера: 2022/0013/1,
2022/0012/1, 2022/0015/001/75.
Рисунок Е. Толмачевой

The samples found also include a variety of glazed pottery (fig. 13, 14). These wares are finished with a solid light, yellow, pinkish, or blue glaze and often decorated with flecks of blue, green and black glaze. The fabric of these wares consists primarily of marl clay with admixture of Nile clay. The samples also include several fragments of so-called 'splashed glazed pottery' decorated with a distinctive smattering of coloured spots or glaze stripes. This pottery is considered to be an imitation of Iraqi vessels of the 10th century [Philon, 1980, p. 42, fig. 74; Monchamp, 2018, fig. 264; Abdel Naby, Dixneuf, 2013, p. 29–30], which, in turn, were inspired by Chinese Sancai wares of the Tang dynasty, which reached the Middle East in the 9th century [Abdel Naby, Dixneuf, 2013, p. 29].



Figure 13. Variety of glazed pottery. Numbers: 2022/0014/001/04, 2022/0015/001/04, 2022/0015/001/01. Drawings by E. Tolmacheva
Рисунок 13. Поливная керамика. Номера: 2022/0014/001/04, 2022/0015/001/04, 2022/0015/001/01. Рисунок Е. Толмачевой

The finds also include several water jars of marl clay, presumably imported from Fustat.

The pottery samples from the pits included imported Palestinian storage and transportation vessels – presumably olive oil jars [Gascoigne, Pyke, 2011; Williams, 2022]. They are made of very dense, beige-coloured fabric, greyish in its chipping. A distinctive feature of this fabric is the large quantity of white particles inclusions.

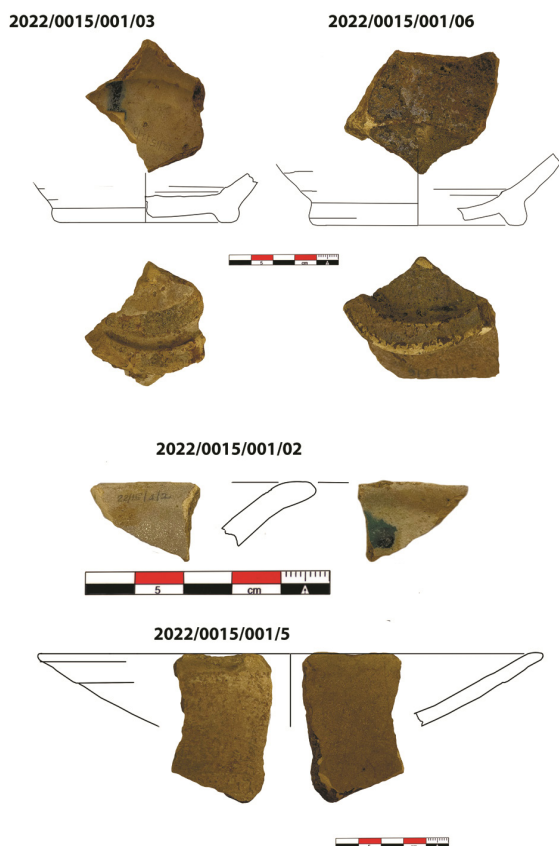


Figure 14. Variety of glazed pottery. Numbers:
2022/0015/001/03, 2022/0015/001/06,
2022/0015/001/02, 2022/0015/001/5.

Drawings by E. Tolmacheva

Рисунок 14. Поливная керамика. Номера:

2022/0015/001/03, 2022/0015/001/06,
2022/0015/001/02, 2022/0015/001/5.

Рисунок Е. Толмачевой

However, the fragments of lustre wares discovered in the test trench were most important, and the most decisive for dating (Fig.15). It should be stressed that numerous fragments of pottery with typical lustre decoration were found in various areas of the Deraheib site. The most significant concentration of lustre ceramics (about 20 fragments) was found in the test trench. It is worth mentioning that H. Williams, who has been studying the pottery of Medieval Aswan for many years, has only found four lustre fragments there so far [Williams, 2022, p. 61].

The precise origins of the lustre pottery discovered in Deraheib have yet to be established.

Currently, we are studying the lustre pottery from the pits together with specialists from the Department of Analytical Chemistry of Moscow State University using natural-scientific methods. This research will clarify whether the pottery fragments have a common or differing make-up, enabling us to understand whether the samples constitute a single group in terms of their composition, and whether they originate from one or multiple production centres.

Preliminary analysis of the fabric suggests that the material presented here is more or less homogeneous, possibly belonging to the group of monochrome Iraqi lustre wares of the 10th century [Mason, 2004; Pradell et al., 2008]. We have been able to identify and restore the motifs painted on several fragments of drinking bowls – scenes with musicians and dancers and scenes of ‘palace delights’ (see more details [Krol et al., 2022; Krol, Tolmacheva, 2023]). The origin of several other pottery fragments with lustre painting found in the trench remains controversial, requiring further study. It is difficult to understand whether they are of Mesopotamian or Egyptian origin. They include the rim of a vessel with an Arabic inscription on the inside and distinctive images of trees and birds on the outside, and a further rim of a bowl decorated with floral ornaments and the image of a hare. We know some analogies, for example, a vessel from the Metropolitan Museum (Inv. No. 63.16.3), and a bowl from the Benaki Museum [Philon, 1980, Pl. X, fig. 309], both of which are usually classified as Fustat lustre wares of the early Fatimid dynasty based on their iconography and dated to the end of the 10th century.

Luxurious and rare items of this kind testify to the high standard of living of the inhabitants of the Northern fortress. While kitchen utensils were of local production, dining utensils were imported, and served solely as expensive status items.

Several other vessel fragments continue to be studied, and have yet to be assigned to any of the groups presented above.

The pottery complex of the Deraheib site demonstrates exceptional diversity. The ceramic material can undoubtedly be dated to the 10th-11th centuries. The assortment and ratio of ceramic types are more typical for Egypt – Aswan in particular – than for Nubia. However, the high percentage of handmade pottery distinguishes this complex from the finds in the Aswan region.

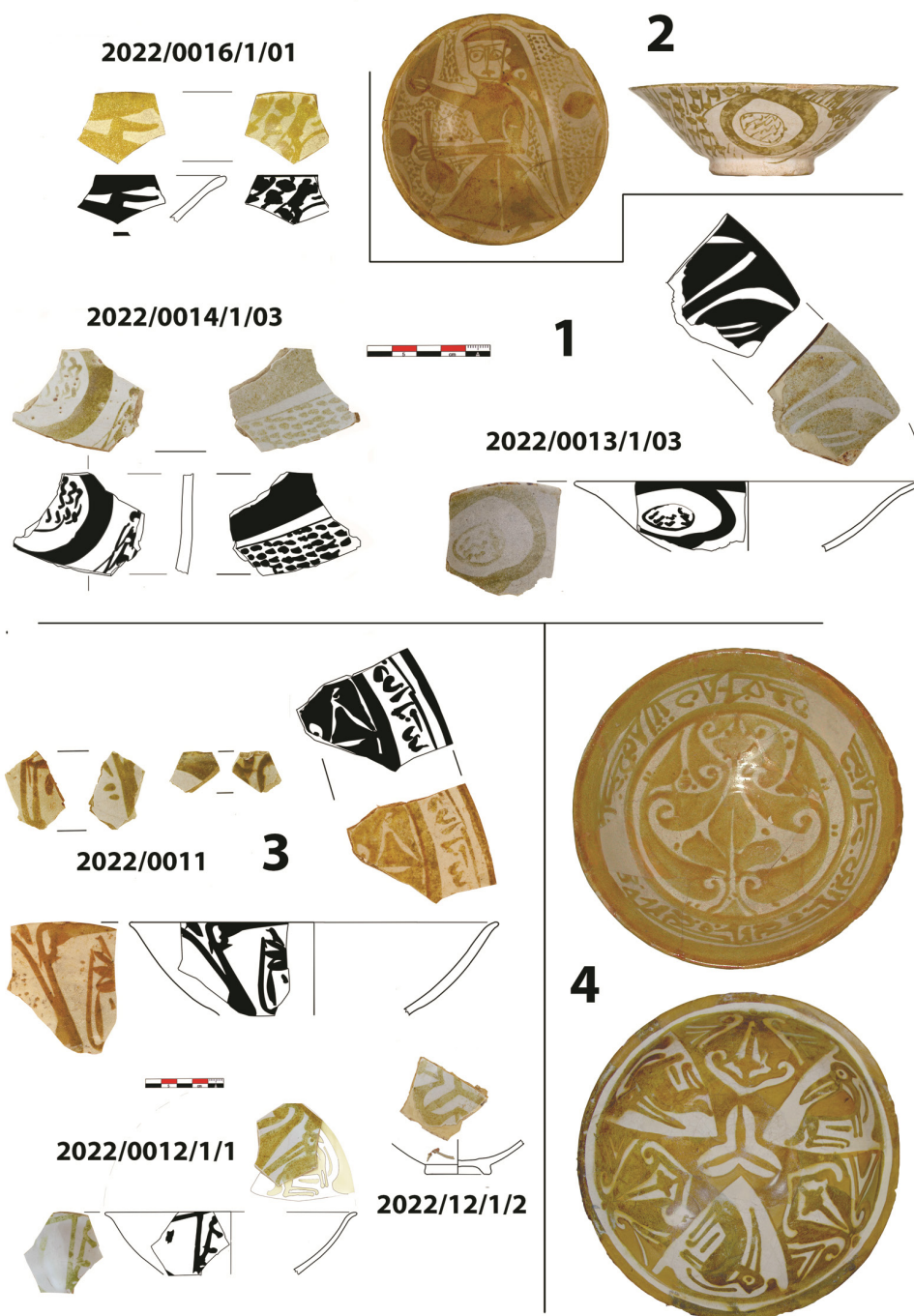


Figure 15. Variety of luster wares. 1.3 – luster from test trench. 2, 4 – analogies (2 – Metropolitan Museum of Art (Inv. No. 40.170.27); Sotheby's bowl, lot 94, 4 – Metropolitan Museum (Inv. No. 63.16.3); a bowl from the Benaki Museum [Philon, 1980, Pl. X, fig. 309]).

Drawings by E. Tolmacheva

Рисунок 15. Люстровая керамика. Рисунок Е. Толмачевой

Miscellaneous finds

In addition to the types from the trench described above, we also discovered a large number of glass vessel fragments, burnt clay fragments,

objects of processed quartz, fragments of stone grain grinders, stone vessel covers, metal objects, and cowry shells. Particularly interesting are the several fragments of a dark grey stone vessels (granite or diabase) richly decorated with incised



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Figure 16. Fragments of stone vessel. Drawings by E. Tolmacheva
Рисунок 16. Фрагменты каменного сосуда. Рисунок Е. Толмачевой

floral ornaments and covered with a thick layer of soot on the outer surface (Fig. 16).

Archeozoological analysis⁴

Numerous animal bone fragments were discovered during the course of the excavations in the test trench near the northwestern wall of the Northern Fortress. Palaeozoological analysis revealed the osteological spectrum to be dominated by bones of domestic animals: horse/ass, camel, cow, sheep, small cattle (*Ovis/Capra*), as well as remains of wild animals (Nubian ibex) (see Table 1). It is important to note the presence of cow bones in the material studied, as it indicates the presence of cattle in the herds of the nomads in the Central Atbai region (i.e. the region of the Nubian desert where the Deraheib site is located).

Table 1. Animal remains from Deraheib
Таблица 1. Животные останки
из Дерахейба

		N	%
Horse/donkey	<i>Equus</i> sp.	1	
Camel	<i>Camelus</i> sp.	4	2,7
Cow	<i>Bos taurus</i>	3	10,5
Nubian ibex	<i>Capra nubiana</i>	2	7,9
Sheep	<i>Ovis aries</i>	14	5,3
Sheep/goat	<i>Ovis/Capra</i>	14	36,8
Mammals un.		173	36,8

Results of the study of light-green soil samples⁵

Samples were taken from the test trench at a depth of ca. 100 cm below the surface.

Reagents

LC grade ethyl acetate, diethyl ether, methanol, C8-C40 Alkanes calibration standard and derivatization reagent N,O-Bis (trimethylsilyl)trifluoroacetamide (BSTFA) were obtained from Merck (Darmstadt, Germany).

Sample Preparation

Soil samples were prepared according to the procedure proposed by Reggio et al., with minor modifications [Reggio et al., 2023]. For each sample, 500.0 mg of soil was weighed in a 2 ml Eppendorf tube. 1 mL of diethyl ether and 0.5 mL of MeOH were added to samples, followed by incubation in a thermo-shaker (Biosan, Latvia) for 24 hours at 1400 rpm. The tubes were centrifuged at 20000G for five minutes, following which the supernatant was transferred to another Eppendorf 2 ml tube and evaporated to dryness. Residues were reconstituted using a 100 mkl mixture of ethyl acetate, BSTFA (1:1, v/v). This was followed by incubation for 30 minutes at 60°C, after which 1 mkl was injected into GC. Soils were analysed in three independent runs.

Samples

Blank — negative QC sample (an empty Eppendorf tube prepared as a soil sample); Gray 2 — spit 2, Northern Fortress, grey matter; Gray 3 — spit 3, Northern Fortress, grey matter; Green 3 — spit 3, Northern Fortress, green substance; Grave M36 — soil from grave M36, reference sample; Grave M50 —

⁴ This section was written by A.B. Savinetski.

⁵ This section was written by A.A. Bashilov, N.V. Malishev.

soil from M50 grave, reference sample; Sand – river sand for flowers purchased at a local flower store, reference sample.

GC/MS

Samples were analysed using an Agilent 6850 gas chromatograph system coupled with the Agilent 5973N mass spectrometer (Agilent, USA). Separation was achieved using an HP-5ms column (30 m, 0.25 µm, 0.25 mm) with a He flow of 0.9 ml/min in constant flow mode. The injector operated in splitless mode at 250 °C. The purge time was 1 min, and the flow rate 50 ml/min. The temperature gradient was as follows: at 60 °C for up to 2 min, then increasing at a rate of 10 °C/min to 290 °C, at which it was then held for 20 min. This gradient ensured elution of the C35 n-alkane. The mass spectrometer scanned ions (2.8 scans/sec) over a range of 50 to 550 Da, with the transfer line temperature at 250 °C. The solvent delay was 6 minutes.

The data was analysed using ChemStation software (Agilent, USA) and MSDIAL [Tugawa et al., 2020].

Various classes of bioorganic molecules were identified in the test trench. These may constitute fragments of larger biological substances, e.g. lipids and plant oils (oleamide, nonanoic acid, decanoic acid, dodecanoic acid, dodecanol, behenic acid, glycerine). A complete list of substances and their relative abundances are presented in Table 2⁶.

The higher presence (compared to reference samples) of urea, acetamide, glycols, phthalic acid derivatives may indicate living microflora. In addition to biodegradation markers, a bacterial substance with antifungal properties (7,9-Di-tert-butyl-1-oxaspiro(4,5)deca-6,9-diene-2,8 [Ghanem et al., 2022]) was found in this sample. This may indicate competition between the bacterial community and moulds for substrates, which these samples contain in increased quantities (in comparing to reference samples).

In summary, soil samples enriched with organic compounds may indicate a purposeful accumulation of biological material in the ash deposit near the Fortress' wall.

Results

The analysis of the finds (ceramics, animal bones, charcoal), together with the examination of the light green soil, suggest an ash deposit of several metres thickness near the northwestern wall,

⁶ The Table 2 can be requested from the authors of the section A.A. Bashilov and N.V. Malishev.

where household waste and waste products from the inhabitants of the fortress were deposited. The results of the pottery studies, particularly of the lustre wares, provide evidence to date the formation of ash deposit to the 10th century.

Excavations of the trench revealed the various phases of construction and reconstruction of the Northern Fortress.

Discussion

Based on the excavation finds previously discovered in Room I – i.e. imported pottery, bones of domestic and wild animals, local fruits such as cocculus and desert dates, exotic fruits such as coconut, and nuts such as almonds – it is certain that the inhabitants of the NF led a luxurious lifestyle, having access to overseas goods transported across the Nubian Desert from the Red Sea port of Aidhab to Aswan. The level of sanitation in Al-Allaqi, however, was very poor, similar to that of the Middle East and Europe at the time.

Household waste, including organic material, was disposed of in the immediate vicinity of the fortress walls (most likely dropped from the walls). This caused infectious diseases, as confirmed by paleo-parasitological analyses of samples from Room I [Крол с соавт., 2021, с. 141-142] and the Southern Necropolis [Крол с соавт., 2025].

The discovery of animal bones, including of cattle, was particularly significant. They correlate with data obtained in paleoparasitological studies of samples taken from Muslim burials in the Southern Necropolis and from the fill of Room I of the Northern Fortress, which were dated by radiocarbon analysis to the 10th and 11th centuries [Крол с соавт., 2021, с. 141-142]. The data revealed a high incidence of tapeworm infection among the inhabitants of Medieval Deraheib, indicating the significant role of cattle husbandry in the economy of this region's medieval population [Крол с соавт., 2025].

Archaeological data, together with some Ancient Egyptian records, demonstrate that the herders of Central Atbai, whom the majority of scholars associate with the Madjay, were raising cattle during the 2nd millennium BC [Bobrowski et al., 2013]. However, goats and sheep also formed a considerable part of their livestock [Näser, 2012, p. 85].

By contrast, cattle breeding today in this part of Atbai is impossible due to an insufficient fodder base [Krziwinski, 2001, p. 56-58]. The herds of the Beja nomads (Bisharin group) living in the vicinity of Deraheib consist of camels, goats and sheep only

[Weschenfelder, 2012], in spite of the considerable orographic precipitation falling with relative regularity in November and December in the upper reaches of Wadi al-Allaqi and the Red Sea Hills region on the border between Egypt and Sudan [Ball, 1912, p. 22-23, 226].

The high infectiousness with taeniasis in the medieval population of Deraheib indicates that beef was not an exotic product but rather part of the daily diet [Krol et al., 2025].

How cattle actually appeared in Al-Allaqi remains a subject of discussion. Either the climate of 10th-11th centuries was wetter than today, generating sufficient fodder for raising cattle, or the Beja of the southern Atbai – particularly in the valley of Wadi Baraka – were bringing their cattle to the mines of Al-Allaqi from elsewhere [Krol et al., 2025].

Conclusions

Based on the results of studies in the test trench and the data from the engineering and architectural survey of the Northern Fortress, we are able to propose a chronology for the early stages of its usage. We believe that the northwestern and northeastern walls built in the first construction phase were weakened by mudflows, and more powerful walls were built to reinforce them during the second construction phase. The northwestern wall from the second construction period was built on a layer of debris left from the first stage of fortress's usage. This layer, consisting of lustre ware fragments, dates back to the 10th century.

The space between the northwestern walls, which belonged to the first and second construction phases, respectively, i.e. the 10th and 11th centuries (based on the pottery studies and radiocarbon dating) or possibly later, was used as a dump for household garbage, toilet waste, or even as an out-house.

Further research on the Fortress will undoubtedly clarify the proposed chronology.

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ЧЕТВЕРТЫЙ И ПЯТЫЙ СЕЗОНЫ НУБИЙСКОЙ ЭКСПЕДИЦИИ НИИ И МУЗЕЯ АНТРОПОЛОГИИ МГУ НА ПАМЯТНИКАХ ДЕРАХЕЙБ И ОНИБ (РЕСПУБЛИКА СУДАН). ЧАСТЬ II. ШУРФ У СЕВЕРО-ЗАПАДНОЙ СТЕНЫ СЕВЕРНОЙ КРЕПОСТИ

Введение. В ходе Четвертого сезона Нубийской археолого-антропологической экспедиции НИИ и Музея антропологии МГУ (в феврале — марте 2022 г.) проводились исследования на памятнике Дерахейб (Судан). Для уточнения конструктивных особенностей северо-западной стены Северной крепости (СК) и выявления строительных этапов СК был заложен шурф 2×2 м., глубиной 220 см.

Материалы и методы. Выборка грунта проводилась пластами. Анализ полученного в ходе раскопок археологического материала позволяет заключить, что у северо-западной стены был обнаружен не менее, чем двухметровый зольник. Весь выбранный грунт был тщательно просеян. Основной археологический материал представлен керамикой и костями животных. Их анализ позволил сделать основные выводы о характере слоя, в котором был заложен шурф и датировать время его отложения. Был также проанализирован грунт светло-зеленого цвета. Важные выводы были сделаны благодаря проведенному архитектурному анализу.

Результаты. Результаты анализа материалов, найденных при шурфовке, данные инженерно-архитектурного обследования Северной крепости позволяют предположить хронологию ранних этапов функционирования Северной крепости. По нашему мнению, северо-западная и северо-восточная стены, возведенные на первом этапе строительства, были ослаблены селевыми потоками и для их укрепления на втором этапе строительства были возведены более мощные стены. Северо-западная стена 2 строительного периода была возведена в слое строительного мусора, образовавшегося в первый период функционирования Крепости. Слой этот на основании люстровой керамики датируется X в.

Заключение. Пространство между северо-западными стенами первого и второго этапа строительства в X-XI вв. (судя по анализу керамики и данным радиоуглеродного датирования), а, возможно, и позднее использовалось для сброса бытового мусора и содержимого туалетов или вообще как отхожее место.

Ключевые слова: Судан; Центральный Атбай; Нубийская пустыня; Вади-аль-Аллаки; Дерахейб; керамика

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