Early Makuria Research Project

Metal artifacts from the Tanqasi cemetery

Abstract: The article documents and discusses metal artifacts discovered in tombs explored by a joint Polish–Sudanese project from the PCMA UW and the NCAM in the tumuli field at Tanqasi in Sudan (Fourth Nile Cataract region). Metal finds from the first season in 2018 were in various states of preservation, allowing however the identification and interpretation of most of the objects through a thorough analysis that involves also metallographic studies and complex conservation. The results contribute to how the site is perceived from a social and cultural point of view.

Keywords: Tanqasi, Nubia, Nubiology, weaponry, iron, copper, conservation

The Tanqasi cemetery, which had been excavated once before in 2006, was now excavated by a Polish–Sudanese team from the Early Makuria Research Project (Godlewski 2008; for the current season report, see Wyżgoł and El-Tayeb 2018, in this volume). Of the five tumuli investigated in the first season, two—23 and 46—contained metal artifacts: a relatively rich set of iron weaponry and a copper bowl in Tumulus 23, and jewelry in the form of rings in Tumulus 46 [*Table 1*]. The present review of the assemblage, preliminary pending its full cleaning, documentation and study, contributes to how the site is perceived in a social and cultural sense.

In the following catalog, the broad categories are described in succession, including in each case a tabular listing of individual finds. Abbreviations used in the catalog: L. – length, W. – width, Th. – thickness, Dia. – diameter.

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WEAPONRY

The set from Tumulus 23 consisted mostly of iron arrowheads (19 complete examples and 48 fragments), found in the burial chamber, in a single clump of rusted objects on the southwestern side. The arrowheads are all leaf-shaped and represent two types: 1b – single-barbed and 6 – barbless [examples of both types are shown in *Fig. 1*]. They are typical of the post-Meroitic period. The documentation of the fragmentary artifacts still needs to be completed.

Found in a cluster together with the arrowheads was an iron knife broken into pieces, forged in layers that are clearly visible on the fractured surfaces in microscopic view. Its structure resembles a rolled-up pancake, in which all layers are of a similar thickness. It is heavily corroded and, although eight quite large fragments have been preserved, incomplete and its length cannot be reconstructed [see *Fig. 1*].

Table 1. Metal finds from Tumuli 23 and 46

Tumulus	Metal artifact: material, quantity, state of preservation
23	Arrowheads, iron – type 1b, 14, complete – type 6, 5, complete – types 6 and 1b, 48, fragmentary
	Javelin, iron, broken in two
	Long combat knife, iron, 8, fragmentary
	Bowl, copper, complete
46	Rings, copper, 4, complete

The fill of the burial chamber also yielded a javelin head, which was preserved in two parts that put together restituted the complete shape. The iron head is leaf-shaped, elongated, reinforced with a forged rib on both sides on the axis of symmetry, smoothly passing into a spindle for embedding in a shaft pole [see *Fig. 1*].

Below is a list of relevant finds.

Cat. 1. Arrowhead, leaf-shaped, single-barbed = Type 1b (Inv. No. Tnq23/34)
Iron, heavily corroded
L. 54.50 mm, W. 11.50 mm, Th. 3.14 mm; fixing spike 3.74 x 3.45 mm; barb length 9.58 mm; weight 2.10 g
Tumulus 23, southwestern part of burial chamber, 2.70 m below ground level
Parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420)

Cat. 2. Arrowheads, six fragments; at least two leaf-shaped, single-barbed = Type 1b (Inv. No. Tnq23/35)
Iron, heavily corroded
Dimensions: one rear part of arrowhead type 1b (L. 32.04 mm; barb 8.33 mm); arrowhead blade fragment of type 1b (L. 37.10 mm, W. 12.82 mm); two points and one fixing spike fragments (L. 21.15 mm), one barb fragment (L. 15.13 mm). Weight of the set: 5.40 g
Tumulus 23, southwestern part of burial chamber, 2.70 m below ground level
Parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420)

Cat. 3. Arrowheads, five complete, leaf-shaped, barbless = Type 6 (Inv. No. Tnq23/38)
Iron, heavily corroded
Dimensions not given
Tumulus 23, burial chamber, 2.50 m below ground level
Parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420)

Cat. 4. Arrowheads, 13, some leaf leaf-shaped, single-barbed = Type 1b (Inv. No. Tnq23/39)
Iron, heavily corroded
Dimensions not given
Tumulus 23, burial chamber, 2.50 m below ground level
Parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420)

Cat. 5. Arrowheads, 42 fragments, some leaf-shaped, single-barbed and barbless = Types 1b and 6 (Inv. No. Tnq23/40)
Iron, heavily corroded
Dimensions not given
Tumulus 23, burial chamber, 2.50 m below ground level
Parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420)

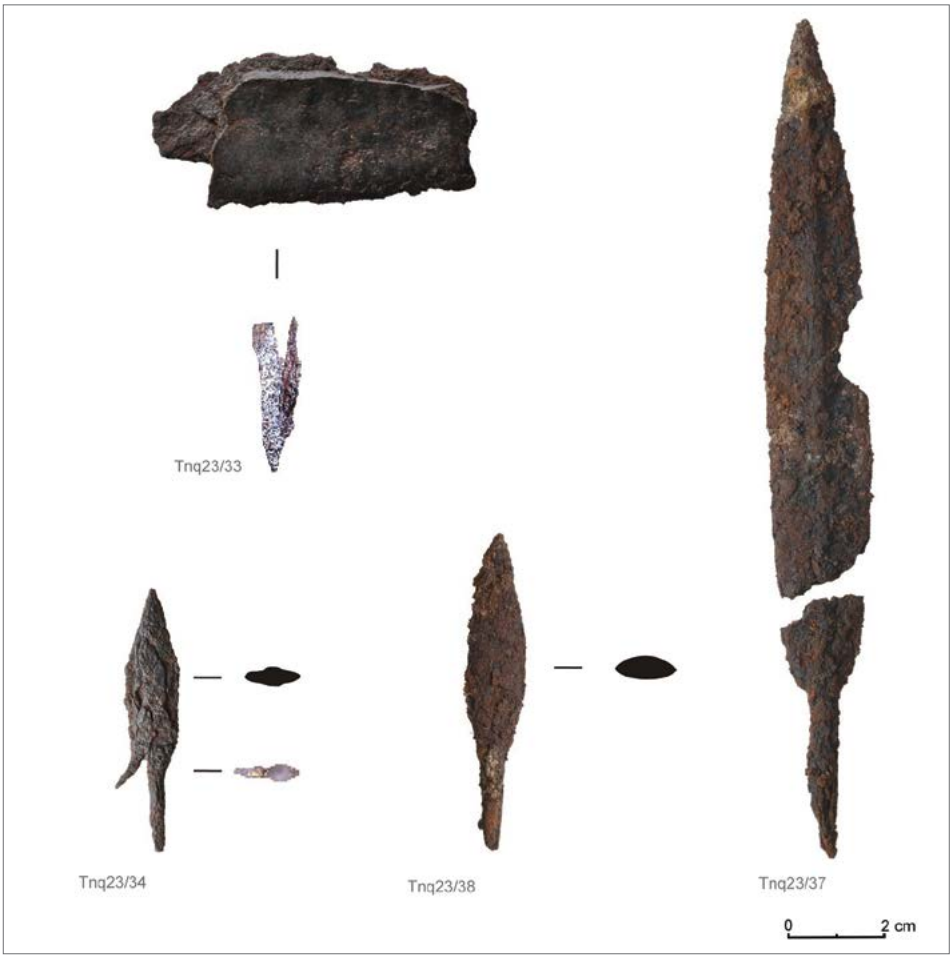


Fig. 1. Iron projectiles and weapons: from bottom left, arrowheads types 1b and 6, and javelin blade; top left, fragment of long combat knife with cross-section in microscopic view (EMRP PCMA UW/ photo A. Kamrowski, microscopic photo and drawing Ł. Zieliński)

Cat. 6.	Knife, eight fragments of a long combat knife (Inv. No. Tnq23/33) Iron, heavily corroded and broken Biggest fragment: L. 65.85 mm, W. 30.54 mm, Th. 8.72 mm; weight 21.20 g; other fragments no bigger than 10 mm Tumulus 23, southwestern part of burial chamber, 2.70 m below ground level Parallels from Missimina (Török 1988: 188), el-Zuma (Zieliński 2014: 376), Ballaña (Török 1988: 117)
Cat. 7.	Javelin head, complete in two pieces (Inv. No. Tnq23/37) Iron, heavily corroded and broken L. estimated 17 cm (exact dimensions to be given) Tumulus 23, burial chamber, 2.50 m below ground level Parallels from el-Zuma (Zieliński 2014: 377), el-Detti (Zieliński 2016: 420), and El-Hobagi (Lenoble 2018: 116–117)

BOWL

A bowl [*Fig. 2*] was found in the burial chamber of Tumulus 23 near the blocking wall. It has numerous parallels among metal artifacts from the Ballaña cemetery (e.g., Emery and Kirwan 1938: 283–312, Fig. 100), while its form is modeled on similar ceramic bowls (see Czyżewska-Zalewska 2018: 291, 296–297 and Fig. 2 top, in this volume). Its excellent state of preservation facilitated a thorough microscopic examination revealing nu-

Fig. 2. Copper bowl Tnq23/23, after conservation; letter markings indicate the location of the microscopic images in Fig. 3 (EMRP PCMA UW/photo A. Kamrowski)

Fig. 3. Microscopic images of details of the copper bowl Tnq23/23: A, B – micro-bubbles and traces in the negative of the mold; C, D – centers of symmetry with dents attesting the fixing of a hand lathe; E, F – horizontal scratches on the outer rim molding; G – undercutting groove of the rim part on the inside; H – grooving on the underside of the outer rim molding section (EMRP PCMA UW/microscopic images Ł. Zieliński)

merous traces of processing. One of them are micro-bubbles visible on the surface of its body. Dents were left on the axis of symmetry on the vessel floor and the underside [see *Fig. 3:C, D*]. A double deep groove under the molding has longitudinal scratches. There are also longitudinal scratches perfectly preserved under the rim of the vessel from the inside (see the discussion below).

Cat. 8. Bowl, complete; microscopic traces of casting and a hand lathe (Inv. No. Tnq23/23)
Copper alloy, very good state of preservation
H. 68.70 mm, Dia. outer 136.80–135.96 mm, Dia. inner 126.86–126.57 mm; depth 65.95 mm; weight 335.4 g
Tumulus 23, eastern side of the burial chamber at the southern end, next to mud-brick blocking wall, 2.70 m below ground level
Parallels from Ballaña, Qustul (Emery and Kirwan 1938: 283–312, Fig. 100) and el-Hobagi (Lenoble 2018: 161–177)

FINGER RINGS

Four open rings were found on a finger of the right hand of the skeleton in the burial chamber of Tumulus 46. This would not be the first such find from Tanqasi, as in 1953, two rings *in situ* on a big toe of one of the skeletons were excavated in the Mound II tomb (Shinnie 1954: 73).

The rings from Tumulus 46 are made of copper-based wire (probably alloy with tin). Three are alike while the fourth clearly stands out [*Fig. 4* right]. All are open for easy adjustment to the finger by folding or bending of the ends, however the one ring that is different (Tnq46/1=*Cat. 9* below) is made of tape with flat sides and rounded edges [*Fig. 4* top left]. Both ends were hammered and are wider than the middle section. One of the ends was clearly damaged during the hammering (longitudinal fracture well visible under the microscope). It may indicate cold-forging, the technique being more conducive to causing damage than hot-forging. The ring was apparently polished and chiseled (rounded edges and endings), although the poor state of preservation and corrosion of the original surface of the object make the traces of processing difficult to interpret.

The other three rings were made of forged wire, based on a regular polygon, round in cross-section and narrowing toward one end, and represent a completely different technique of production [*Fig. 4* bottom]. Both ends were cut with a chisel and the cutting marks are perfectly visible under a microscope [see *Fig. 4* bottom left]. However, no major traces of further processing were recorded. The wire was not polished further, because the original angles of the polygonal section are preserved on the surface, and the ends were also not polished in any way and remained sharply cut. They could have been chiseled delicately, but the degree of corrosion on all three rings does not allow this to be verified.

Cat. 9.	Ring, open, thicker on both ends, ends overlapping, edges of the ring ovate (Inv. No. Tnq46/1) Copper-based, alloy probably with tin, poor state of preservation and surface corrosion Dia. outer 17.73–20.32 mm, inner 16.50–17.93 mm, Th. 0.97–0.76 mm, W. 1.70 mm, weight 0.60 g Tumulus 46, burial chamber, on a finger of the right hand of the skeleton Parallels from el-Zuma (Then-Obłuska 2016: 752) and Tanqasi itself (Shinnie 1954: 73)
Cat. 10.	Ring, open, thicker at both ends, edges of the ring ovate (Inv. No. Tnq46/22) Copper-based, alloy probably with tin Dia. outer 23.65 mm, inner 19.36 mm, Th. 2.50–2.00 mm, weight 1.50 g Tumulus 46, burial chamber, on a finger of the right hand of the skeleton Parallels from el-Zuma (Then-Obłuska 2016: 752) and Tanqasi itself (Shinnie 1954: 73)

Fig. 4. Copper finger rings: right, four open rings from the burial in Tumulus 46, after conservation; left (from top), ring Tnq46/1 of copper tape, microscopic image of the hammered ends; rings Tnq46/23 and Tnq46/24 of copper wire, microscopic views of cut ends on left and polygonal surfaces on right (EMRP PCMA UW/photos A. Kamrowski, microscopic images and drawing Ł. Zieliński)

Cat. 11.	Ring, open, one end cut, other end hammered and intentionally broken; wire hexagonal in diameter (Inv. No. Tnq46/23) Copper-based, alloy probably with tin Dia. outer 22.84–22.47 mm, inner 19.45–18.79 mm, Th. 1.62–1.95 x 1.64–1.97 mm, weight 1.55 g Tumulus 46, burial chamber, on a finger of the right hand of the skeleton Parallels from el-Zuma (Then-Obłuska 2016: 752) and Tanqasi itself (Shinnie 1954: 73)
Cat. 12.	Ring, open, one end cut, other end hammered and intentionally broken; wire hexagonal in diameter (Inv. No. Tnq46/24) Copper-based, alloy probably with tin Dia. outer 23.09–22.70 mm, inner 19.54–19.31 mm, Th. 1.71–2.01 x 1.69–2.01 mm, weight 1.60 g Tumulus 46, burial chamber, on a finger of the right hand of the skeleton Parallels from el-Zuma (Then-Obłuska 2016: 752) and Tanqasi itself (Shinnie 1954: 73)

DISCUSSION

Weapons are the most numerous category of metal artifacts from the tombs excavated at Tanqasi in 2018, paralleling thus the makeup of finds from other cemetery sites, like el-Zuma, a site located just a couple of kilometers away, on the other side of the Nile, studied by the author (e.g., Zieliński 2014). The group is formed of the following: a set of leaf-shaped arrowheads of two types, single-barbed and barbless, a javelin head and a long knife. The arrowheads are clearly utilitarian pieces, used for hunting and fighting, and the circumstances of their discovery point to their deposition as a single assemblage in a quiver, the latter presumably of leather as signified by a specific kind of corrosion occurring when an iron object is in contact with skin and leather products. Regrettably no impression remains of the leather of which the quiver was made. A quiverful of arrows was found also in Tumulus 16 in el-Zuma (Zieliński 2014: 377).

The arrowheads from Tanqasi represent type 1b with an average length of over 5 cm, width of over 1 cm and thickness roughly 3–4 mm. The barbs are about 1 cm long and 3.5 mm thick at the base. The average weight (as measured in this case, see above, *Cat. 1* on page 318) of 2.10 g is not the original weight of an iron arrowhead; judging by their dimensions, they should be twice as heavy (corrosion has eaten away some of the metal). Although not standard in shape, these arrowheads represent multifunctional types that were simple to produce, resembling the types discovered to date at el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420). No specialized types, such as openwork igniting or multi-barbed poisoning points, have been recorded so far, although new finds may yet change the overall picture.

The fragmentary knife from Tumulus 23 apparently resembles the knife found in Missimina (Török 1988: 188) and the

nearest parallels are two similarly preserved combat knives from el-Zuma (Zieliński 2014: 376). The knife is single-edged, with a triangular cross-section blade, over 3 cm wide and 0.87 cm thick at the spine. From a user's perspective, it would qualify as a cleaver, far more suitable for chopping than for thrusting. Being fairly short (less than 50 cm) and quite heavy, it was ideal for fighting in crowded conditions and for being used as a machete for fieldwork. The surviving fragments of the blade indicate the center of gravity of the weapon placed slightly forward, toward its point, a solution commonly applied in machetes to increase their impact. Interestingly, Emery found a knife of this type with an asymmetrical shape of the blade and slightly curved hilt in a princely grave B6 in Ballaña (Török 1988: 117). Other knives like this were found also in other tombs in Ballaña. The shape typifies the well-known weapons, such as *makhaira* or *falcata*, and is intended to increase the cutting force. The Nubian long knife, however, has a simple blade compared to these weapons and does not seem to have been inspired by them.

The javelin head from the same burial has the shape of an elongated leaf with a forged rib on both sides on the axis of symmetry smoothly passing into a spindle for shafting, unlike parallels from el-Zuma (Zieliński 2014: 377) and el-Detti (Zieliński 2016: 420) which made use of other structural solutions, that is, a diamond or spindle cross-section instead of a rib. The rib solution made the Tanqasi javelin bulkier and more resistant to compression and bending when hitting a target. The javelin from el-Detti with no reinforcement in the middle (spindle cross-section) had obviously bent sideways and was broken when hit. Forging symmetrical ribs on both sides required somewhat greater skill from the blacksmith. Nevertheless, it is a typical post-Meroitic weapon and the two-sided rib is a common feature of sword spears found in the territory of Nubia from Ballaña to el-Hobagi (Emery and Kirwan 1938; Lenoble et al. 1994). The rib could increase injuries due to both additional weight (reflected in the force transmitted during impact), and the tip's geometry. An enlarged cross-section increases the surface of the inlet wound, be it a hunted animal or a man in armed conflict.

The copper bowl was carefully crafted with an almost perfect top–down diameter. The casting model must have been very well made. The slight waviness of the rim could suggest a two-part mold with the joining just around the rim, subsequently masked by not very precise processing. Nevertheless, the casting seams were removed by grinding and the surfaces around the rim were smoothed and rounded. The bowl was cast of a copper-based alloy of undetermined composition. The technique of casting is attested by micro-bubbles (places where air was not displaced by metal poured into the mold) [see *Fig. 3:A, B*] and negative traces of the mold (which was probably ceramic). The casting bubbles are undoubtedly a technological flaw, yet the vessel itself was thin-walled with a large surface area, a shape difficult for casting. Flaws of this sort usually result from a combination of factors: a defective mold, the material from which it was made, or the conditions in which the process was carried out. Other than casting bubbles, the

traces included marks left behind by fixing round pins along the axis of symmetry on the vessel floor and the underside [see *Fig. 3:C, D*]. The marks are thought by the present author to represent the clamps of a hand lathe, while the longitudinal traces, perfectly preserved under the rim of the vessel from the inside, could point to cutting with a lathe knife. Still, what is most striking about the bowl is the rim with a double deep groove under the molding, which maintains perfect dimensions around the perimeter, suggesting the use of a spatial marking tool with the possibility of turning at the same time. The molding also has longitudinal scratches from the use of a turning tool. This type of machining indicates a highly-qualified production workshop employing more than one specialist in the field. Metal vessels have been reported from other sites from the period, but have not been studied for evidence of production techniques. Thus, the bowl found by the Early Makuria Research Project opens up new avenues for the re-examination and analysis of these processes.

All the rings from Tumulus 46 were made in a rather primitive way, without decoration and of material that hardly added to their aesthetic value. It seems that three of them could even have come from the same producer, while the fourth one represents a different technique, which may indicate another workshop.

CONSERVATION

Conservation included not only artifacts found this season at Tanqasi, but also objects discovered in 2015 in the el-Detti tombs and in 2016 in tumuli 1 and 4 at el-Zuma [*Table 2*].

In the case of this year's finds, the treatment was of an immediate nature, while with regard to the other artifacts salvage conservation was undertaken since the condition of the objects kept in the store had deteriorated considerably. A detailed logbook documented the conservation process on a daily basis. The following comments and the catalog are based on this documentation, which is an integral part of the Project's field records.

The current condition of the artifacts selected for conservation was documented before taking any action. Then, the objects were subjected to mechanical and chemical cleaning, the methodology appropriate to the identified metal, whether iron, copper or gold. Mechanical cleaning was accomplished using a prosthetic micromotor with different tips (milling cutters, brushes and corundum disks of different diameters) as well as hand tools (scalpels, dental tools, brushes and glass fiber brushes). Chemical cleaning consisted of scarifying corrosion products (mainly oxides) with solutions with a slight acidic reaction in distilled water. Usually, a 10% citric acid solution in distilled water or acetic acid solution was used. Both solutions have a weak and slow effect on oxides, therefore the process can be adequately controlled, which makes the method quite safe for heavily corroded artifacts. In extreme cases, when the object was in a very poor state of preservation, compresses of cotton wool or gauze, saturated with a solu-

Table 2. Finds studied and treated during the season (8 February–6 March 2018). Site coding: Tnq=Tanqasi, Z=el-Zuma, D=el-Detti

No.	Artifact studied	Microscopic image	Cleaning/conservation
1.	Tnq23/23	√	√/–
2.	Tnq23/33	√	√/partial
3.	Tnq23/34	√	√/partial
4.	Tnq23/35	√	√/partial
5.	Tnq46/1	√	√/partial
6.	Tnq46/22	partial	√/–
7.	Tnq46/23	√	√/partial
8.	Tnq46/24	√	√/partial
9.	Z1/29	–	√/–
10.	Z1/32	√	√/partial
11.	Z1/33	√	√/partial
12.	Z1/34	–	√/–
13.	Z1/35	–	√/–
14.	Z1/36	–	√/–
15.	Z1/37	–	√/–
16.	Z1/38	–	√/–
17.	Z4/81	√	√/–
18.	Z4/82	√	√/partial
19.	Z4/84	√	√/–
20.	Z4/87	√	√/partial
21.	D4/20	√	√/partial
22.	D4/28	√	√/–
23.	D4/29	√	√/–
Total	23	16	23/11 (partial)

tion, were used instead of bathing; these acted mainly on the surface of the artifact without penetrating deeply into the corroded structure. Details of the conservation treatment undertaken in each case are presented below [*Table 3*].

Standard procedure called for conducting an active corrosion test on copper artifacts. When traces of corrosion were found, objects were subjected to corrosion neutralization using the Rosenberg method. Iron artifacts were boiled in distilled water to reduce salinity, which is at the root of corrosion. It was the only method of stabilizing iron available in the field. Artifacts were stabilized and secured, using sodium carbonate as a stabilizer and benzotriazole (BTA) as a corrosion inhibitor in the case of copper-based artifacts. Surfaces were ultimately protected with Paraloid B44. In the case of iron artifacts, stabilization was achieved in a sulfite alkaline bath and the object was protected with Paraloid B44, like the copper artifacts.

Objects selected for a metallographic research program in Poland, encompassing metallographic tests and, above all, XRF spectrometry, were not subjected to further conservation in the field as any kind of treatment would have disrupted the results. Conservation of these particular artifacts was planned to be completed in proper laboratory conditions after testing in Poland. Unexpected policy changes on the ground in Sudan made this part of the project impossible for the present.

Table 3. Catalogue of objects treated giving conservation treatment steps

No.	ITEM, state of preservation	Metal	Photographic record **Inv. No.** before and after conservation
	Conservation treatment steps: 1) mechanical cleaning 2) chemical cleaning 3) active corrosion test [+] [-] 4) neutralizing focus of active corrosion 5) stabilizing products of corrosion 6) applying corrosion inhibitor 7) recomposition (adhesive) 8) surface protection		*Before conservation* *After conservation*
1.	BOWL	Copper	Tnq23/23
	Conservation treatment: 1), 2), 3) [+], 8) PARALOID B44		

Before conservation *After partial conservation*

2.	EARRING, fragments	Gold, copper	Z1/32

Conservation treatment:
1), 7) further recomposition where necessary in Poland, 8) PARALOID B44

Before conservation *After partial conservation*

3.	BELL, broken	Iron	Z1/33

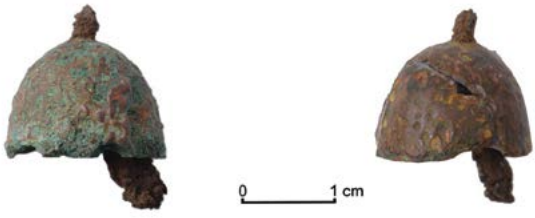
Conservation treatment:
1), 2), 3) [+], 4) Rosenberg's method, 5) sodium sesquicarbonate

Before conservation *After partial conservation*

4.	BELL	Iron	Z4/82

Conservation treatment:
1), 2), 3) [+], 4) Rosenberg's method, 5) sodium sesquicarbonate

Before conservation *After conservation*



5.	BUCKLE	Iron	Z4/81
	Conservation treatment: 1), 2), 3) [+], 4) Rosenberg's method; further treatment in Poland: 5) sodium sesquicarbonate, 6), 8) PARALOID B44		

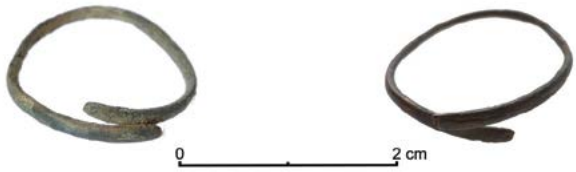
Before conservation *After conservation*

6.	RING	Copper alloy	Z4/84
	Conservation treatment: 1), 2), 3) [+], 4) Rosenberg's method; further treatment in Poland: 5) sodium sesquicarbonate, 6) BTA inhibitor, 8) PARALOID B44		

Before conservation *After partial conservation*

7.	RING	Copper alloy	Tnq46/1
	Conservation treatment: 1), 2), 3) [+], 4) Rosenberg's method, 5) sodium sesquicarbonate		

Before conservation *After conservation*



8.	RING	Copper alloy	Tnq46/23
	Conservation treatment: 1), 2), 3), 4) Rosenberg's method, 5) sodium sesquicarbonate, 6), 8)		

Before conservation *After conservation*

9.	RING	Copper alloy	Tnq46/24
	Conservation treatment: 1), 2), 3), 4) Rosenberg's method, 5) sodium sesquicarbonate		

Before conservation *After conservation*

10.	ARROWHEAD	Iron	Tnq23/34
	Conservation treatment: 1), 2), 3) [+], 4) boiling in H_2O, 5) boiling in H_2O		

Before conservation *After conservation*

11.	ARROWHEADS, fragments	Iron	Tnq23/35
	Conservation treatment: 1), 2), 3) [+], 4) boiling in H_2O, 5) boiling in H_2O		

Before conservation *After conservation*

12.	ARROWHEAD	Iron	Z4/87
	Conservation treatment: 1), 2), 3), 4) boiling in H_2O, 5) boiling in H_2O		

Before conservation *After conservation*

13.	ARROWHEAD, broken	Iron	D4/20
	Conservation treatment: 1), 2), 3), 4) boiling in H_2O, 5) boiling in H_2O		

Before conservation *After conservation*

14.	KNIFE, fragments	Iron	Tnq23/33
	Conservation treatment: 1), 2), 3) [+], 4) boiling in H_2O, 5) boiling in H_2O		

Before conservation *After conservation*

15.	TOOL: ADZE	Iron	D4/29
	Conservation treatment: 1), 2), 3) [+], 4) boiling in H_2O, 5) boiling in H_2O; further conservation treatment in Poland: 6), 8) PARALOID B44		*After partial conservation*

Before conservation *After partial conservation*

16.	TOOL: CHISEL	Iron	D4/28
	Conservation treatment: 1), 2), 3) [+], 4) boiling in H_2O, 5) boiling in H_2O; further conservation treatment in Poland: 6), 8) PARALOID B44		*After partial conservation*

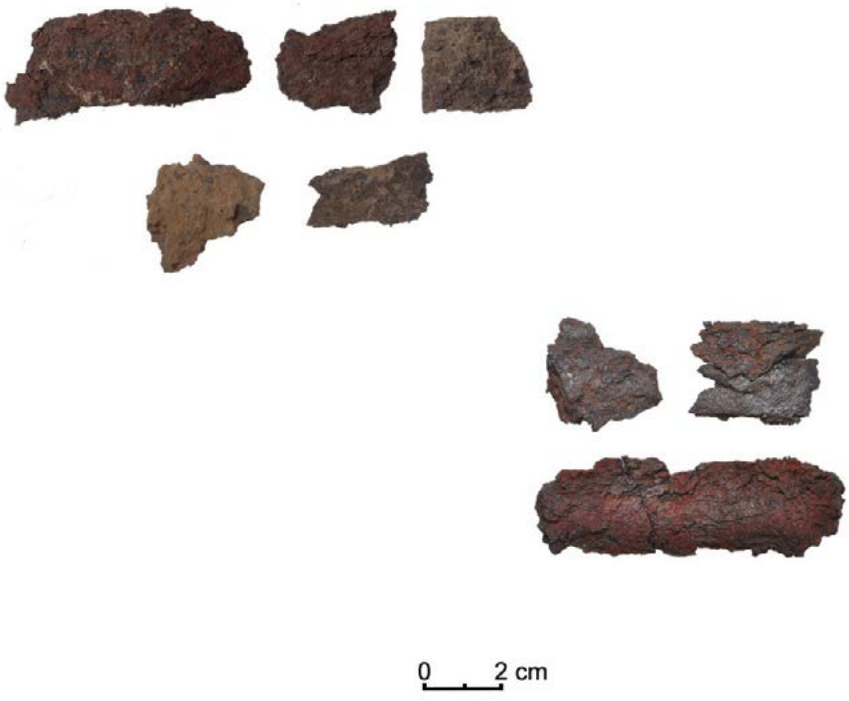
Before conservation *After partial conservation*

17.	FITTING, fragments	Iron	Z1/37
	Conservation treatment: 1), 2), 7)		

After conservation

18.	FITTING, fragment	Iron	Z1/34
	Conservation treatment: 1), 2), 7)		

Before conservation *After conservation*



19.	ROD & FITTING, fragments	Iron	Z1/29
	Conservation treatment: 1), 2), 7)		

After conservation

20.	NAIL & FITTING, fragments	Iron	Z1/36
	Conservation treatment: 1), 2), 7)		

Before conservation *After conservation*

21.	NAIL, fragment	Iron	Z1/38
	Conservation treatment: 1), 2)		

After conservation

22.	NAIL	Iron	Z1/35
	Conservation treatment: 1), 2)		

Before conservation *After conservation*

SUMMARY

The assemblages of metal finds from tumuli 23 and 46 at Tanqasi are complementary in a way. The former burial yielded a relatively rich set of weaponry and a bowl for everyday use, the latter some personal adornments still on the skeleton. In graves from el-Zuma such jewelry occurred together with weaponry and other utilitarian equipment. Moreover, weapons of the same type appeared there usually in sets of more than one piece, a phenomenon observed even more prominently in el-Hobagi (Lenoble et al. 1994). In the case of the Tanqasi burial, weapons were represented with a single piece per type (arrowheads should be counted as the content of a single quiver) and were present in only one of five excavated tombs. This precludes more far-reaching conclusions at this stage of research. Interestingly, so far none of the excavated tombs in Tanqasi, either now or in the past, have yielded any bed frames with fittings of a kind prevalent in the tumuli at el-Zuma (Zieliński 2014) and it was not because of the size of the burial chambers in Tanqasi which could have accommodated such furnishings with ease.

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References

Czyżewska-Zalewska, E. (2018). Early Makuria Research Project. The vessel assemblage from Tanqasi. *PAM*, 27/1, 289–302

Emery, W.B. and Kirwan, L.P. (1938). *The royal tombs of Ballaña and Qustul* I. Cairo: Government Press

Godlewski, W. (2008). MtoM. Early Makuria Research Project, season 2006. *PAM*, 18, 463–476

Lenoble, P. (2018). *El-Hobagi: une nécropole de rang impérial au Soudan central. Deux tumulus sur sept* [=*FIFAO* 79]. Cairo: Institut français d'archéologie orientale

Lenoble, P., Disseaux, R.-P., Ali Mohamed, A., Ronce, B., and Bialais, J. (1994). La fouille du tumulus à enceinte el Hobagi III, A.M.S. NE-36-o/7-N-3. *Meroitic Newsletter*, 25, 53–88

Shinnie, P.L. (1954). Excavations at Tanqasi, 1953. *Kush*, 2, 66–85
Then-Obłuska, J. (2016). Trade and faith in Nubian Early Makuria (AD 450–550): macroscopic examination of personal adornments from el-Zuma in Nubia. *PAM*, 25, 741–760
Török, L. (1988). *Late antique Nubia: History and archaeology of the southern neighbor of Egypt in the 4th–6th c. A.D.* [=*Antaeus* 16]. Budapest: Archaeological Institute of The Hungarian Academy of Sciences
Wyżgoł, M. and El-Tayeb, M. (2018). Early Makuria Research Project. Excavations at Tanqasi: first season in 2018. *PAM*, 27/1, 273–288
Zieliński, Ł. (2014). Metal objects from el-Zuma cemetery, 2011. *PAM*, 23/1, 375–390
Zieliński, Ł. (2016). Metal objects from the el-Detti cemetery, appendix to: M. El-Tayeb et al., Early Makuria Research Project: interim report on the excavation at el-Detti in 2014 and 2015. *PAM*, 25, 420–430