

THE DANISH-GERMAN JERASH NORTHWEST QUARTER PROJECT 2014 PRELIMINARY REGISTRATION REPORT

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with contributions by

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Introduction

This report presents the general characteristics of the material evidence from the five trenches excavated in 2014 in the Northwest Quarter of Jerash during a six week campaign from 21st July until 31st August 2014. The registration team consisted of the head of registration, students, a conservator, a bone specialist, two geologists and an architect¹. Furthermore, four interns from the Department of Antiquities in Jerash worked with the team for three weeks during the campaign.

The presentation and the descriptions of the ware types refer to the terminology applied in the preliminary reports of the 2012 and 2013 campaigns². This report focusses on general observations of the finds, and includes a catalogue of 188 representative objects³. Furthermore, it also includes a report on selected metal finds from the 2014 campaign by Christoph Eger, a report by zooarchaeologist Pernille Bangsgaard on the animal bones, (primarily those from trenches J and K, but also trenches A and B which were excavated in 2012)⁴, and finally a report on XRF scanning results by geologist Peter Fink-Jensen.

With extensive ancient fill layers, especially in Trench J, and trench extensions into well pre-

served Evidences, especially in Trench K, the total number of registered objects is over 186,000. All finds were documented by the registration team using the following system; every find is documented within the “total registration” process in the first instance, which includes statistical documentation (photographic and written) of all objects from all find categories. From this documentation, it is possible to sequence the evidence, and to prepare statistics of finds for each find category as well as for the project as a whole. The second step in the process is “basic registration”, in which selected objects are described, drawn and photographically documented; these objects are representative of the shapes, wares and chronological timeframe of a specific trench, and include all finds categories. 3,129 objects, 1.68% of the total number, were retained for further registration, beyond mere statistics. All bone, metal and glass finds were retained and, as bones and glass were found in almost all contexts, they add significantly to the total amount of stored objects⁵. 1,441 pottery sherds have been retained from the total number of registered objects.

The pottery of the Northwest Quarter is generally characterized by locally produced plain wares, with a reddish or yellowish-red hue⁶, together with a significant amount of the charac-

1. Head of registration Annette Højen Sørensen, conservator Margit Pedersen, zooarchaeologist Pernille Bangsgaard Jensen, geologist Peter Fink-Jensen, geologist Alf Lindroos, architect Jens Christian Pinborg and archaeology students Philip Ebeling, Pawel Grüner, Niels Benjamin Hansen, Ditte Maria Damsgaard Hiort, Charlotte Bach Hove, Signe Bruun Kristensen, Sara Ringsborg, Nadia Schmidt-Larsen and Janek Sundahl. Drawings were prepared for publication by Janek Sundahl.

2. Lichtenberger, Raja and Sørensen 2013 and 2017.

3. The coins and glass finds will be discussed in forthcoming publications.

4. Lichtenberger, Raja and Sørensen 2013.

5. The bones and glass pieces are usually counted in bags and not separately as single finds. Special glass pieces and most metal objects are, however, numbered individually.

6. We have discussed the research history of the pottery production and local wares of Jerash in the 2012 report (Lichtenberger, Raja and Sørensen 2013). The most comprehensive studies are Uscaescu's monograph from 1996 on the Macellum excavation, the Jerash International Project during the 1980's (Zayadine 1986) and the Hippodrome excavation (Kehrberg 1989 and 2009).

teristic, locally produced, reduction fired Grey Ware, which is also found almost everywhere⁷. The total assemblage mostly consists of undecorated household pottery, but numerous glass, metal and stone objects, coins, bones, mortar and plaster have also been documented.

A statistical table illustrating the frequency of some of the pottery wares described in this report⁸ has been made; the statistics in the tables below are based on the total amount of clay objects from the trench in question. The general picture is that very low numbers of special ware types have been found. The vast majority of the material, as noted above, consists of plain reddish yellow and reddish brown wares, most forms of which were made from the Roman period to the Umayyad period, with pale yellowish-red variants during the Roman era. These common local wares are included in the tables below as part of “other ceramic finds”, along with other clay objects such as tiles and bricks.

General Characteristics of Trench I

The structures in the trench are characterized by sets of walls (which were built over several phases) in front of a small cave in the southern part of the trench (cf. Kalaitzoglou, Lichtenberger, Raja, this volume). There is an L-shaped cut in front of the cave; a long, deep sounding to the north of it brought to light only a few structures. The total number of registered objects from Trench I was 41,226; of these, 558 (1.35%) were kept for further documentation. 40,376 pottery objects were registered, and constitute the majority of the finds; of these, only 267 were kept⁹. The finds in Trench I are characterized by mixed deposits, which are mainly dated to the Byzantine/early Umayyad period; this generally concurs with the second phase of the structures in the trench, but is particularly apt for the southern part of the trench, where Handmade Geometric Painted Wares (HMGPW) from the Ayyubid/Mamluk period were found in several Evidences. An almost complete HMGPW jug (cat. no. 26)¹⁰ was found close to the small cave

entrance, which most probably belonged to Building Phase 5 (Kalaitzoglou, Lichtenberger, Raja, this volume).

Ayyubid/ Mamluk HMGPW	0.23%
Ayyubid/ Mamluk undecorated	0.3%
Green Ware	0.03%
Islamic Glazed	0.005%
Grey Ware	20.75%
Painted Buff Ware	0.035%
Dark Brown Ware	0.005%
Reddish Red Brown Ware	0.023%
Jerash Bowls	0.2%
Orange Ware	0.04%
Red Slipped Fine Ware	0.2%
Other Ceramic Finds	78.128%

Trench I: Ceramic Finds

As can be seen from the table, there is a low percentage of fine wares, with a corresponding high proportion of Grey Ware. The material in the southern part of the trench was generally more worn, suggesting re-deposition of the material.

General Characteristics of Trench J

Trench J consists of a street (‘Central Street’) and several rooms, from which a rock-cut staircase descends into a cave complex, with one large cave to the south and two smaller caves to the north and to the west. Immediately south of the staircase, near the cave entrance, a further rock-cut shaft leads down to the cave.

The total number of registered objects is 104,665; of these, 959 (0.92%) were kept for further documentation. The number of clay objects (pottery, tile, brick, terracotta etc.) from Trench J is 100,085; of these, 542 pieces were kept. Although this is a small sample, the large fill layers encountered were very homogenous; hence, the objects which were kept from the total number registered are representative of the material as a whole¹¹.

As in all other trenches excavated in the Northwest Quarter, the number of fine ware

7. Cf. also Lichtenberger, Raja and Sørensen 2013 and 2017, for references and material.

8. Cf. for earlier reports: Lichtenberger, Raja and Sørensen 2013 and 2017.

9. Some objects from Evidences 32, 35, 40 have not been completely registered at this point. A number of objects from some Evidences appear in the statistics but have not been completely registered (Evidences 13, 14, 35, 36, 39, 40, 50, 59, 60, 75).

10. Deco.: Franken *et al.* (1975), p. 180; fig. 7; Shape: Avissar (1996), p. 170; fig. 1-2.

11. Objects from some Evidences (8, 13, 32, 35, 36, 39, 42, 43, 48, 50, 55, 58, 60, 61, 62, 65, 66, 67) remain unregistered in the archaeological camp at Jerash; they will be registered during the 2015 campaign. A number of objects from some Evidences appear in the statistics but have not been completely registered (Evidences 13, 29, 55, 60, 61, 62, 66, 67, 68, 69, 72, 73, 77, 82, 84, 87).

sherds was low. Red slipped fine wares (Jerash Bowls, ARS, local red slipped and ESA) amount to only 0.25% of the total number of objects from the trench.

Ayyubid/Mamluk HMGPW	0.003%
Ayyubid/Mamluk undecorated	0.01%
Islamic Glazed	0.002%
Sandy Buff Ware	0.002%
Dark Brown Ware	0.02%
Grey Ware	13%
Reddish/ Red Brown Ware	0.29%
Jerash Bowls	0.08%
ARS	0.05%
Local Red Slipped	0.11%
ESA	0.009%
Orange Ware	0.01%
Green Ware	0.05%
Other Ceramic Finds	86.364%

Trench J: Ceramic Finds

Trench J was characterized by large pottery depositions (Evidences 32, 35, 39, 43, 47-48) stemming from fill layers which sealed the staircase in the third building phase (Kalaitzoglou, Lichtenberger, Raja this volume). This fill material consisted of well-preserved pottery, primarily from the Late Roman era (3rd – 4th century AD) and is characterized by a few ARS imports, mainly Hayes Form 50 (cat. no. 2)¹² and a large number of locally produced, plain household wares of a pale yellowish-red fabric. The larger shapes and the cook pots were ribbed, but the table wares were not. Hayes Form 50 was also imitated within the repertoire of local red slipped wares (cat. no. 4)¹³. Grey Ware was found in the upper part of the fill from Evidence 32; frequency decreased in the lower layers. Grey Ware was probably produced from the Byzantine period¹⁴ to the Abbasid period¹⁵. Grey Ware sherds can be explained as intrusions in the otherwise homogenous fill of the staircase shaft in Evidence 32. Additionally, a few Green Wares (which were produced during various periods) were also found in Evidence 32. Only a very few, tiny pieces of Grey Ware were found in the lower fill layer of the stair-

case shaft (Evidence 35). None of the typical Byzantine local products, such as Jerash Lamps or Bowls, were found in this large fill. Furthermore, no white painted Grey Ware sherds were found. The general nature of the fill layers in the staircase shaft can thus be described generally as containing well preserved Late Roman pottery of high quality. The cook wares have traces of use, and the radiocarbon dates of the tabun and fill support a Late Roman date for most of the material in the staircase shaft (cf. Kalaitzoglou, Lichtenberger and Raja, this volume, third building phase). Apart from the imported ARS wares, the fill also yielded a Late Roman stamped amphora handle (cat. no. 68)¹⁶.

Grey Ware sherds were detected within the first blocking wall (Evidence 71) of the cave (Evidence 49), as well as local red slipped fine wares. A Jerash lamp fragment was found in the second blocking wall, stemming from the fourth building phase (Kalaitzoglou, Lichtenberger, Raja, this volume) of the large cave (Evidence 75). Also, Jerash Bowls and white painted Grey Ware pottery were found in the fill behind Evidence 75 and in the fill layer Evidence 77. Chronological markers were detected in the lower layers (Evidences 88 and 89, 95, 96 and 97), including ribbed and white painted Grey Ware, Jerash Bowls and Jerash lamps. The cave fill (Evidence 80) thus seems to be slightly later than the redeposited fill layers in the staircase shaft; these results were confirmed by ¹⁴C dates (Cf. Kalaitzoglou, Lichtenberger, Raja, this volume). No Ayyubid-Mamluk wares were present in any of the fills discussed here. The cook wares from all Evidences, both from the staircase fill and in the larger cave, showed traces of use over open fires.

Trench J yielded the first inscription finds within the current excavations of the Northwest Quarter. Two Roman period inscription fragments (cat. nos. 68 and 180) were uncovered, as well as one *dipinto* on an amphora (cat. no. 74)¹⁷. Another possible red *dipinto* of a similar type was found in Trench K (Evidence 73; J14-Ke-73-1).

HMGPW was scarce, and occurred only

12. Dentzer (1986), p. 247; pl. 8, no. 2; Hayes (1972), ARS Form 50, Type A; Hayes (2008), p. 220; no. 986-987; fig. 31.

13. The Byzantine Jerash Bowls likewise copy later ARS shapes and imitate it to a certain degree. Shape: Dentzer (1986), p. 247; pl. 8, no. 2; Hayes (1972), ARS Form 50, Type A; Hayes (2008), p. 220, no. 986-987; fig. 31.

14. Cf. Watson 1992, 237; Uscatescu 1996, p. 46; Clark *et al.*

1986, pp. 249-250; Schaefer 1986, pp. 425-429.

15. As suggested by Watson 1992, 237.

16. Cf. Smith (1973), pl. 44, fig. 1255. The handle and stamp require further study.

17. Shape: Smith (1973), pl. 85. For *dipinti*, see: (5th – 6th century AD) Segal *et al.* (2013), p. 275-276, fig. 341; (8th century AD) Walmsley *et al.* (2008), p. 131, fig. 25.19.

in the Evidences close to the surface, and no intrusions beyond a few Grey and Green Wares were found in the northern fill. These fills on either side of the blocking walls were homogeneous, and had been filled in antiquity, although not at the same point in time.

General Characteristics of Trench K

11,860 objects were registered from Trench K; this includes 10,651 ceramic objects. 991 (8.35%) objects were retained for further study, including 329 pottery sherds.

Ayyubid/ Mamluk HMGPW	0.23%
Ayyubid/ Mamluk undecorated	0.084%
Glazed	0.05%
Green Ware	0.19%
Dark Brown Ware	0.54%
Islamic Red painted pale; Yellowish Sandy, Painted Buff a.o. plain wares	0.56%
Grey Ware	17.95%
Reddish/ Red Brown Ware	0.45%
Jerash Bowls	0.084%
Red Slipped Fine Ware (ESA, Local fine)	0.056%
Other Ceramic Finds	79.806%

Trench K: Ceramic Finds

The material from Trench K consisted of material from cooking installations, with associated pottery in the lower levels on top of the kitchen; a thick homogenous context covering all sectors. It is a closed context which is of special importance, as it belongs to the destruction which was probably caused by the earthquake of AD 749. Many well preserved finds were uncovered; among them was a Byzantine and Arab-Byzantine coin hoard¹⁸. The number of tiles found in the trench was low; thus the roof of the building was not tiled (cf. also the report by Kalaitzoglou, Lichtenberger

and Raja this volume). Grey Ware finds fit the same pattern as those of the trenches described above; however, they were primarily found in relation to kitchen installations, and were used as cooking vessels. The use of Grey Ware for cooking may indicate a change in general usage during the later Umayyad period; a transformation from primarily being used for storage to being used to prepare food. The general appearance of Grey Ware likewise seems to change during the latter part of the Umayyad period¹⁹; a new feature within the repertoire being the bi-ansulate cook pot (cat. no. 64).

Most of the objects were found in the collapsed room excavated towards the west, in Evidences 3 and 34. From the upper floor of this house, tools connected with textile production were encountered, including scissors (cat. no. 96)²⁰, a heckling comb (cat. no. 97)²¹, spindle whorls of bone, steatite and rock crystal (cat. nos. 154-158)²², as well as jewelry (cat. nos. 159-172)²³, consisting of beads of semi-precious stones, glass and bone. Furthermore, a bronze ring with a glass bead was found (cat. no. 173)²⁴, as well as fragments which possibly belong to a lead mirror frame (cf. the report by Eger below) and a possible bone mirror handle (cat. nos. 112-113, 152)²⁵. Many of the metal objects were concentrated in a small area, and might have belonged to the contents of a wooden box (Evidence 34, the report by Eger below).

The lamps from Trench K display late Umayyad to early Abbasid period traits, such as a channel nozzle (cat. no. 36)²⁶, figuratively decorated bases (cat. nos. 40-42)²⁷, a hybrid-lamp combining the upper part of a Jerash lamp (without, however, the “cross” at the handle) and an Umayyad/Abbasid lamp base (cat. no. 35)²⁸. Red Painted Pale Ware and Yellowish Sandy Ware also point to a late Umayyad/early Abbasid date. As already observed in our 2013

18. Lichtenberger and Raja (forthcoming).

19. The statistical appearance of Grey Ware may be slightly distorted due to the large quantity of glass and metal in the trench.

20. Patrich (2008), p. 448, 458; no. 229; from Late Roman context: Künzl and Weber (1991), p. 89-90; fig. 5.

21. Gaitzsch (2005), p. 42; pl. 58, 75, no. 1-2.

22. Riis (1969), fig. 39, no. 8; Riis and Buhl (1990), fig. 97, no. 752-765; McNicoll *et al.* (1982), pl. 132, no. 7; (1992), pl. 69, no. 8; Platt and Ray (2009), fig. 11.5, no. 6-11; Lichtenberger, Raja and Sørensen (2012 report, 2013), no. 158, 159; (2017), no. 143, 144; Dever, Lance and Bullard (1986), pl. 56, no. 4; pl. 59, no. 9; McNicoll *et al.* (1992), pl. 46, no. 3, 9.

23. Ploug (1985), 209; Riis (1948), fig. 203, 204; Smith (1973),

pl. 80.

24. Ploug (1985), fig. 54 I.

25. Patrich (2008), p. 425, 430; no. 73-79; McNicoll *et al.* (1992), pl. 72, no. 6; Findlater *et al.* (1998), fig. 7, 9; Ayalon (2005), fig. 1, no. 1-3; Wapnish (2008), fig. 34.5; Kotter and Ray (2009), fig. 9.27, no. 8; Panitz-Cohen, Yahalom-Mack and Mazar (2009), fig. 16.12, no. 2; Lichtenberger, Raja and Sørensen (2017), no. 152.

26. Al-Khouly (2001), fig. 1, no. 196; ‘Amr *et al.* (1998), fig. 9.

27. ‘Amr *et al.* (1998), fig. 10, 12, 15; Al-Khouly (2001), fig. 4, no. 196; Day (1942), pl. XIV, fig. 1.

28. Kehrberg (2005), fig. 64; Da Costa (2001), p. 255, fig. 2; Zayadine (1986), pl. VI, no. 11.

Campaign Registration Report, it is clear that some shapes continued into the Abbasid period. However, due to stratigraphic reasons, the objects excavated during the 2014 campaign clearly belong to the Umayyad period.

The collapse (Evidence 3) of Trench K includes Ayyubid/Mamluk HMGPW; a join was found between the surface and Evidence 3 (cat. no. 23)²⁹. However, Ayyubid/Mamluk pottery, both painted and unpainted, were concentrated in Sector G. As the few glazed objects were located in Sector H (cat. nos. 19-20)³⁰, these factors together indicate a slight disturbance of the stratigraphy in these sectors. This disturbance may be ascribed to the activity of rodents or other animals moving the soil and the objects within it.

General Characteristics of Trench L

There are 27,139 registered objects, 573 (2.1%) of which were kept for further analysis; 26,423 objects were ceramic (pottery, tile, bricks, terracotta etc.), of which 290 were kept. Some of the material from Trench L awaits further registration³¹. The material in Trench L was, in general, worn and lime incrustated.

Ayyubid/ Mamluk Undecorated	0.01% ?
Buff Painted Ware	0.02%
Yellowish Sandy Ware	0.008%
Green Ware	0.04%
Dark Brown Ware	0.008%
Grey Ware	16.62%
Reddish/ Red Brown Ware	0.7%
Jerash Bowls	0.2%
Red Slipped Fine ware	0.19%
Other Ceramic Finds	82.2%

Trench L: Ceramic Finds

There is a smaller number of objects from the early Islamic period, apart from Grey Ware. As described below, Grey Ware underwent a transition in the later phase of the Umayyad period. However, in Trench L, Grey Ware from the Byzantine and early Umayyad period is present, whereas types from the late Umayyad are absent. No HMGPW or Ayyubid/Mamluk fragments were detected, apart from a few very small fragments in Evidence 2, 29 and 34, which

have tentatively been assigned to this period. Trench L thus fits into the general picture of the southern slope, as it appears it was not used for domestic purposes during the Ayyubid/Mamluk period.

General Characteristics of Trench M

Trench M was first excavated in 1983 by J. Schaefer, in order to trace the course of the possible North Decumanus. It was decided to re-investigate this trench in 2014 (cf. report by Kalitoglou, Lichtenberger and Raja, this volume).

The total number of registered objects was 1,911; 48 (2.5%) were kept for further analyses. This included 1,862 ceramic objects, 13 of which were kept for further analyses.

The finds from Evidences 0, 8-9, 11-12, 14, 17-18 in Trench M were registered fully, whereas Evidence 16 was only partially sorted for statistical purposes. The material from this trench was not processed further than statistical collection; for this reason, none of the objects has been catalogued and the notes given here are based on the statistics only.

Ayyubid/ Mamluk HMGPW	0.05%
Grey Ware	15.84 %
Reddish/ Red Brown Ware	0.16%
Jerash Bowls	0.16%
Red Slipped Fine Ware	0.32%
Other Finds	83.63%

Trench M: Ceramic Finds

Grey Ware was found in all Evidences, and the assemblages can be roughly dated to the Byzantine period.

Observations on Ware Types

The contexts of Trench K yielded reduced amounts of Grey Ware, primarily in the shape of flat based handmade basins. Unlike the Grey Ware described and found during the 2012 and 2013 campaigns, some Grey Ware basins found in Trench K had been used as cooking vessels (cat. nos. 82)³², and have traces of secondary firing, which has made the clay flaky and dark. In these contexts, the Grey Ware is rougher and darker. Furthermore, a bi-ansulate Grey Ware cook pot was introduced in this period;

29. Deco.: Franken *et al.* (1975), p. 186; fig. 39; Lichtenberger, Raja and Sørensen (2017), fig. 34; Shape: Franken *et al.* (1975), p. 189; fig. 1; p. 191; fig. 19; Thuesen (1988), p. 220; fig.3.

30. Walker (2012); p. 551; fig. 4.14, no. 9; Milwright (2008), p. 317, no. 13.

31. Objects from Evidences 2, 43/47, 50, 61, 70, 77, 80, 81 await further registration.

32. Deco.: Smith (1973), fig. 1192; shape: McNicoll *et al.* (1992), pl. 114; fig. 8.

this variant of Grey Ware was also found in the North Theatre, and was described as Ware B from the 8th century AD³³. New decorative patterns are likewise found, such as a pie crust lip decoration (cat. no. 78)³⁴, which is also known from the 8th century AD repertoire from the North Theatre³⁵, and a combination of combed decoration with white paint (cat. no. 79)³⁶, which is also tentatively placed in the later part of the Umayyad period. All these traits, along with the remaining material in the contexts, point to a later phase of Grey Ware production as well as an altered use of the ware from its onset, probably in the Byzantine period.

Ribbed cooking and storage vessels were both found in Trench K. Based on the cook pot repertoire of Jerash, it can be observed that the ribbing becomes more decorative than functional over time. Due to the general date of the finds and Evidences in Trench K, it can be proposed that this development takes place during the late Umayyad period.

A characteristic red painted ware, which is painted red on a pale buff/white slip, was first detected in Trench K; the decoration mainly consists of parallel bands or wavy lines. This ware and decoration is well known from the Umayyad Houses and the North Theatre in Jerash; it is described as Ware D from the 8th century AD in the latter³⁷. We have provisionally called it Red Painted Pale Ware (cat. nos. 12-14, 18)³⁸.

A Green Ware was described and noted as belonging to the early Islamic periods in the 2013 Report. However, during the analyses from the 2014 campaign, it has become clear that a Green Ware was also in use during the Late Roman period, although the Late Roman Green Ware is of a different fabric to the early Islamic variant. So far, Green Ware has not been found in Evidences connected with the Byzantine phase. Further studies in Jerash

Green Wares are required, in order to establish firm conclusions about the chronology of types represented in the Northwest Quarter³⁹. The overall number of sherds for this ware is low, and almost exclusively found as small fragments in fill layers.

Dark Brown Ware

New wares were described during the 2014 campaign. Among these was a Dark Brown Ware, which was found in Trench K, and used for ribbed wheel-made cooking pots (cat. no. 65)⁴⁰. The clay is flaky and dark brown on the surface, with few to some golden mica, golden flakes, quartz, lime, a few red brown pebbles and a few black inclusions. The core is fired reddish brown/dark brown, although some examples are 'sandwich layered', with a reddish-brown to grey core. There are many air pockets in the clay, which occasionally appear as bubbles on the surface.

Munsell: Surface: ext. 5YR 5/4 – 2.5 YR 5/4; int.: 5YR 5/6; Core: ext.: 5 YR 4/4 – int./centre: 2.5YR 5/6-4/8 – 5/8.

The core can be either red in the centre and brown in the outer core, or vice versa. The appearance of Dark Brown Ware seems to primarily coincide with the darker and rougher variant of Grey Ware in Trench K. The largest quantity of this ware was found in trench K, primarily as cook pots.

Yellowish Sandy Ware

A distinct but fairly rare ware in the 2014 repertoire was Yellowish Sandy Ware, with very sandy, yellowish clay which is finely levigated, with a few reddish brown and black inclusions. It was fired at a low temperature, and is rather crumbly. Known examples are all wheel made. (cat. nos. 52-53).

Munsell: core: 10YR 7/4; Surface: ext.: 2.5 Y 8/3; int.: 10YR 8/2.

33. Clark and Falkner 1986, 251.

34. Clark and Falkner 1986, fig. 21.5; deco.: Smith (1973), fig. 1192; McNicoll *et al.* (1992), pl. 115; fig. 1.

35. Clark and Falkner 1986, fig. 21.5

36. Deco.: Smith (1973), fig. 1192; shape: McNicoll *et al.* (1992), pl. 114; fig. 8.

37. Gawlikowski 1986, pl. XII-XIII; Clark 1986, 251

38. Deco.: Walker (2012), p. 517; fig. 4.4, no. 20; p. 510-511; fig. 4.1, no. 27; fig. 4.2, no. 1, p.517; fig. 4.5, no. 1; Rasson and Seigne (1989), p. 127, no. 7; fig. 5, 5; Najjar (1989), p. 314, fig. 5, no. 4; 'Amr (1988), p. 247-254, fig. 1, no. 7, 11; Walmsley,

Macumber and Edwards (1993), p. 213, Ware II; p. 215; fig. 23, no. 3-4; Smith (1973), pl: 91, C; shape: Gawlikowski and Musa (1986), pl. XII, second top on right column; Walker (2012), p. 512; fig. 4.1, no. 13-18, p. 517; fig. 4.4, no. 22; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215; fig. 23, no. 3-4; Schaefer and Falkner (1986), p. 314; fig. 13, 7.

39. Cf. Kenkel 2012 for descriptions of the Green Wares from Tell Zīrā'a.

40. Shape: Kenkel (2012), Taf. 43, group 7, no. 23.9a.; taf. 63, kt. 25.

This ware was primarily found in Trench K, and may belong to an early Islamic repertoire.

General Remarks on the Material

As occurred in previous project seasons, HMGPW was rarely found on the southern slope. It is more frequent on the northern slope, but in general medieval glazed wares are remarkably scarce. Trench K (on the eastern terrace) yielded considerably more evidence for the late Umayyad period, with quantities and closed contexts hitherto unknown in the Northwest Quarter.

Trench J (in the Northwest Quarter) yielded large quantities of Late Roman material, providing more information about Roman period activity in that area. Roman period activity in this quarter was evidenced by the material from Trench A in the 2012 campaign; however, the staircase fill in Trench J, which was excavated in 2014, has significantly enhanced our knowledge of the Roman period occupation in the quarter⁴¹. Moreover, the past three excavation campaigns have yielded large amounts of Late Roman to Early Umayyad material in this quarter. Pottery wasters have been found across the area, and unfired clay lumps or clay lining, as well as rough flat tiles with traces of firing were found in Trench J, particularly in Evidence 35. These objects may have been used to line kilns, ovens or fireplaces.

Although the 2014 campaign in general added valuable evidence about Late Roman and Late Umayyad material culture, the closed context from the AD 749 destruction layers in Trench K need to be singled out. Furthermore, our previous theories regarding the spread of Ayyubid/Mamluk material in the Northwest Quarter have been confirmed by the 2014 excavation. Finally, Byzantine-Early Umayyad material still appears to be significantly present throughout the Northwest Quarter.

Some Metal Objects from the Northwest Quarter in Jerash

Christoph Eger

The 2014 Danish-German excavation campaign produced a remarkable number of metal objects, of which 45 are presented in the cata-

logue below (cat. nos. 91-135). Most of the objects are made of iron, with smaller numbers made from either lead or copper alloy (which includes all kinds of copper base alloys such as bronze, amongst others). Due to the poor state of preservation, particularly of the iron artefacts, it is difficult to determine the exact shape or function of a number of the items, although future restoration or X-ray examination may assist in interpretation. However, other objects or fragments are easier to identify, as they belong to well-known types; at this stage of analysis we can divide the metal objects into several functional groups:

- Architectural fittings
- Casket fittings and locks
- Cosmetic implements
- Dress accessories
- Horse trappings (?)
- Household appliances and tools
- Locks and keys
- Weighing equipment

There are additional objects which cannot be clearly assigned to a specific group, as well as objects of unknown function.

Architectural Fittings

Two objects (nos. 91 and 92) are both made from copper alloy, and have an almost identical shape; an oblong bar with one rectangular end, while the other end narrows to a small peg and bends upwards to form a hook. Although they differ in size (length: 7.1 and 8.9 cm), they belong to the same category of fitting, the so-called revetment pegs, which were used to clamp marble slabs to the wall behind. They are known from Roman-Byzantine contexts in, amongst others, *Caesarea Maritima*⁴². Two other objects from the 2014 campaign in Jerash are of similar shape, with lengths of 7 cm and almost 10 cm; however, no. 93 is made of iron, which was not commonly used for this type of fitting. All four artefacts were definitely not used as revetment pegs for the building in which they were finally deposited, as their context indicates a secondary usage. They were found close together, along with some other objects, which were all probably contained in a box (below).

41. See Lichtenberger, Raja and Sørensen, 2013; Lichtenberger and Raja, forthcoming b.

42. Patrich (2008), p. 441, 456; no. 101-107; Waldbaum (1983), p. 66-67; pl. 19, no. 266-277.

Household Appliances and Tools

The largest artefact among the objects assigned to “household appliances” is an iron ladle, c. 70 cm in length, with a plain, oval bowl. Similar objects have been found in Olympia, Greece, and interpreted as coal ladles, which were used to heap up glowing coals in the cooker. Scissors, knives, and different sized sewing needles were used in every household; therefore, their appearance is not a surprise. However, large iron scissors (such as the fragments from no. 96), which have a total length of 31 cm, are much bigger than one would expect for daily use. Scissors of this size were more likely used for agricultural or manufacturing activities, especially sheep-shearing. Another find has yielded even more evidence for textile production activities. Although broken into many fragments, object no. 97 can be identified as a comb (or heckling comb) for either wool or flax, because of the typical design of two rows of long, needle-shaped teeth. This instrument is used to remove the fibrous core and impurities from flax, or to untangle wool fibres prior to further treatment. A good parallel for a wool comb has been found in Pergamon, Turkey⁴³.

Locks and Keys

Beside the casket's lock (see below) three objects which are categorised as locks and keys have been found, which is not unusual within the spectrum of household findings. Circular keyhole plates of copper alloy (such as no. 103), which are thought to be of Byzantine and Late Byzantine date, are also known from Sardis in Turkey, as well as Olympia and Isthmia in Greece⁴⁴. They would have covered rotary locks, which were opened and closed by rotary keys. In fact, the 2014 campaign yielded one example of this type of key; a key with a ring (no. 104), which can be dated to the same period⁴⁵. The dolphin shaped ends of the ring are typical of the Byzantine period. In contrast to this type of key, object no. 105 is a large slide key, which was created for a tumbler lock. Similar to nos. 101 and 102, which are probably

casket locks. Slide keys are a standard form in the Roman period, but appear in even larger quantities throughout Late Antiquity.

Weighing Equipment

The most striking evidence for weighing equipment in the area excavated during the 2014 campaign is a flat, square commercial weight. Incised Greek letters (Gamma and Alpha) indicate the standard weight of one ounce, ca. 27 g. The square type is one of three standard, differently shaped Byzantine weights, and was the principal type in the Byzantine and Late Byzantine period⁴⁶. Two other items are components of a balance; nos. 110 and 111, which are suspensions. They belong to fairly small, slender balances, which have a horizontal beam; the movable suspension has two long legs, which are attached to the centre of the beam. Complete preserved examples of this type of balance were found in the Byzantine period shops in Sardis, Turkey, which were destroyed in the early 7th cent. AD, perhaps during the Persian attack in AD 616⁴⁷.

Horse Trappings (?)

There is no clear evidence for horse trappings. However, two items could possibly be assigned to such a use. An iron buckle (no. 118) has a pivot-mounted axis, which is quite unusual for belt buckles from the Byzantine and Late Byzantine periods. Buckles of this type were more often used for saddle girths or other parts of a horse harness. A related item is a fragment with missing axis (no. 119), made of copper alloy. Quite similar buckles have been dated to the 6th – 7th cent. AD, and were rarely used for belt buckles⁴⁸.

Cosmetic Implements

There are some cosmetic implements among the metal objects of the 2014 campaign, although jewellery is largely absent (only one finger ring and a small number of beads, made from gold, carnelian, and glass have been found [cat. nos. 159-173]). Fragments (cat.

43. Gaitzsch (2005), p. 42; pl. 58, 75, no. 1-2.

44. Waldbaum (1983), p. 72-73; pl. 24, no. 385; Baitinger and Völling (2005), p. 138-142; pl. 56, no. 634; Jantzen (2004), pl. 32, no. 1184.

45. Patrich (2008) p. 422 and 428; no. 16; Waldbaum (1983), p. 76; pl. 25, no. 403-407; Jantzen (2004), pl. 33, no. 1189.

46. Bendall (1996), p. 29-38.

47. Waldbaum (1983), p. 82-84; pl. 29, no. 448 and 460.

48. Jantzen (2004), pl. 20, no. 748; similar buckles of copper alloy, with only one pivoted axis: Patrich (2008), p. 458, no. 211-212.

nos. 112 and 113) of an open work, wheel-like frame made of lead were found; it is not clear if all of the fragments originate from a single frame. They were very probably part of a now lost glass mirror, which was attached to the frame. Parallels of such open work lead frames, spanning a wide chronological range, from the Byzantine to the Crusader periods, were uncovered in Caesarea Maritima, but the precise function of these pieces is unclear⁴⁹. However, lead mirror frames are often found in Roman and Byzantine contexts. A single kohl stick (cat. no. 115), made of copper alloy, is a double-ended variant with a moulded centre. Almost a dozen good parallels have been found at Tell Hesban in the same vicinity, dated to the Islamic period⁵⁰. Finally, a copper alloy lid, (cat. no. 114)⁵¹, is assigned to this category, as it might may have been part of a needle or kohl tube.

Dress Accessories

Two strap ends from separate belts, (cat. nos. 116 and 117), were found during the 2014 campaign, both of which can be dated to the Late Byzantine period. The decorated strap end (no. 116) deserves particular attention. It was probably part of a composite belt; a distinctive belt type which was fashionable in the Byzantine world and its surrounding regions from the mid-6th century AD onwards⁵². The stylized vegetable ornamentation of no. 116 is typical of a series of belt plates which are well known from Langobardic Italy, although the ornamental style is clearly Byzantine. However, there has previously been little evidence for such belt plates in the Near Eastern provinces.

Casket Fittings and Lock

Some 30 metal objects were found close together, some of which were fused together by corrosion. This feature was interpreted by the excavators as a box and its contents (cf. Kalaitzoglou, Lichtenberger and Raja this volume). Among the metal finds are several items which can possibly be interpreted as the box fittings, such as a box-like hinge (cat. no. 106). Furthermore, fragments of a probable tumbler

lock and its closing device were also discovered (nos. 101 and 102)⁵³. The reconstruction of the box, however, still remains to be done. No firm decision regarding the function of the box has been made so far; therefore, a contextualised interpretation of its contents is not possible at this stage. The objects assigned to the box include weighing instruments as well as tools and dress accessories. However, none of the objects appear to be complete or to belong to a complete unit; they are comprised of a single weight, a single suspension from a balance/scale, a single strap end, and even more astonishingly, some revetment pegs which would have originated from monumental buildings. Hence, the ensemble of artefacts looks more like a collection of recycled, unimportant metal objects than a box of useful instruments for household and/or handicraft use.

The Faunal Remains from the Northwest Quarter, 2012-2014

Pernille Bangsgaard

The faunal remains presented in this report include materials excavated during the 2012 and 2014 campaigns. The remains originate from four distinct excavation areas (Trenches A, B, J and K). The majority of the material was analysed on site in Jerash during the 2014 field campaign. A small selection of faunal material was, however, taken to Denmark and analysed at the Natural History Museum of Denmark, using the large comparative skeleton collections available there. The exports were mainly comprised of various game and bird species, which are not currently represented in the small comparative collection available on site in Jordan.

All faunal material was identified to skeletal element and species, or to the nearest possible taxon (*order*, *family* or *genus*). The registration of each bone fragment includes section of bone, side and observation of various changes, whether human induced or other, such as cut-marks, fire damage and evidence of pathology. The bones are quantified by the number of fragments, NISP (*number of identified specimens*) and weight. When possible, all long bone fragments

49. Patrich (2008), p. 425-430; no. 73-79.

50. Platt and Ray (2009), p. 209-211; fig. 12, no. 7-8.

51. Waldbaum (1983), p. 108; pl. 41, no. 644.

52. Schulze-Dörrlamm (2009), p. 268-270; Kazanski (2003), p. 122; fig. 14, no. 37.

53. Waldbaum (1983), pl. 23.

were registered with age categories (*foetal, pullus, unfused and fused*), and all mandibles were registered with ontogenetic age if the information was available.

The Faunal Material

The material studied so far represents only a small selection of the entire faunal collection from the 2012-2014 excavations; as a consequence, the results presented here are preliminary.

2,426 fragments in total were registered (weight: 16.17 kilograms). A small selection of material has been analysed from the 2012 season, originating from Trenches A and B; material from 22 of the 27 Evidences has been included from Trench A, whereas material from only 30 of the 66 Evidences from Trench B which contained faunal remains has been identified. A total of only 475 fragments are included here, and thus the results are of limited statistical value at the present.

A larger selection of material was analysed from the 2014 season, originating from Trenches J and K; the majority of faunal material from these contexts are represented. 1,951 fragments in total were identified, including material from 38 recorded Evidences from Trench J⁵⁴. The material from trench K is comprised of 84, from a total number of 106 Evidences. The limited number of bones, particularly from the 2012 contexts, has resulted in limitations to the analysis and statistics.

Faunal remains were hand collected during excavation, with little sieving or flotation in the majority of contexts. Only two individual cases, when two complete pots were found, were the contents sieved to increase the likelihood of retrieval for small bones. It is therefore possible that there has been some loss of small bones as a result, in particularly in terms of retrieval for fish, bird and rodent bones, along with the minor bones of various small mammal species. State of preservation is generally very good, meaning that most of the original bone surface has been preserved. Additionally, post- and pre-excavation fragmentation is limited, which means that cut marks and other minor changes

are still visible on the surface of the bone.

Bones with traces of burning or calcinated fragments are extremely rare, and in total only 22 fragments were identified in the entire collection, which account for just under 0.9% of the collection. The group includes 11 fragments which were burnt black to some extent, 8 which were completely burnt black, and only 3 which were burnt white; this implies that the bones were mainly exposed to low temperatures, or exposure was limited to short intervals. The limited amount of burning could indicate that preparation of meat either did not include the bones, or that foods prepared primarily included dishes where the meat would not have been directly exposed to a fire, such as a pot of meat and other ingredients simmering in liquid; the latter type of dish is well represented in the Early Islamic cookbooks known from the 9th century AD onwards⁵⁵. Bones with cut- and chop-marks are slightly more common in the collection, including 204 fragments. The marks represent over 40 different locations and types, but the majority are typically associated with the skinning and dismembering process. They are mainly found on bones of domesticates, such as sheep, goat, cattle and pig, but fish is also represented.

The Species

More than twenty species were identified in the collection; all of which are quantified in (Table 1 and Fig. 189), according to their trench of origin. A general overview of the entire identified collection, including the percentage of total NISP, is presented in Figure 190. Domesticates are by far the most common group of animals, and include sheep, goat, pig, cattle and chicken as the main contributors. These species generally contribute as much as 95% or more of all identified bones (NISP), although in the case of Trench K, it is limited to c. 92 %, mainly due to a small collection of fish bones.

The small remaining group of wild species includes mammals, birds, fish and tortoise. Some of these are probably more likely to be commensal species rather than a food source,

54. Material from a few further Evidences from Trench J have not been analysed yet (cf. registration report above). However, the faunal material from one of these Evidences has been

analysed, which brings the total count of analysed Evidences from Trench J to 39.

55. See for example Nasrallah (2007).

Table 1: Mammals, bird and rodent species found at Jerash, according to trenches

	Trench A	Trench B	Trench J	Trench K
Domesticated Animals				
Dog, <i>Canis familiaris</i>	2	-	31	-
Pig, <i>Sus</i> sp. *	9	56	37	36
Donkey, <i>Equus asinus</i>		1	26	
Horse/donkey, <i>Equus</i> sp.	4	1	115	-
Dromedary, <i>Camelus dromedarius</i>	-	-	1	1
Cattle, <i>Bos Taurus</i>	-	3	14	6
Goat, <i>Capra hircus</i>	2	2	11	12
Sheep, <i>Ovis aries</i>	2	5	10	34
Goat/sheep, <i>Capra hircus/ Ovis aries</i>	13	37	48	171
Chicken, <i>Gallus gallus domesticus</i>	8	6	10	8
Wild Animals				
Red fox, <i>Vulpes vulpes</i>	-	-	-	3
Gazelle, <i>Gazella</i> sp.	-	-	2	-
Cape hare, <i>Lepus capensis</i>	-	-	-	1
Rat, <i>Rattus</i> sp.	-	1	1	2
Mice, <i>Muridae</i> sp.	-	-	1	-
Rodents, <i>Rodentia</i> sp.	-	-	7	1
Tortoise, <i>Testudo</i> sp.	-	-	1	-
Chukar partridge, <i>Alectoris chukar</i>	2	-	1	4
Partridge and francolins, <i>Phasianidae</i> sp.	9	7	14	24
Pigeon and doves, <i>Columba</i> sp.	-	1	-	1
Ostrich, <i>Struthio</i> sp. #	-	-	-	1
Bird, <i>Aves</i> sp. #	44	7	6	50
Fish, <i>Pisces</i> sp.	-	-	-	12
Molluscs, <i>Mollusca</i> sp.	-	-	-	56
Ungulate, <i>Ungulata</i> sp.	3	6	131	42
Unidentified	89	155	598	477
Total number of fragments	187	288	1065	942
Total weight of fragments	442	1742	9771	4668

* Two mandible and one maxilla fragments have been identified as *Sus domesticus* based on the size of the third molar.

The single ostrich and 51 of the avian fragments are eggshell fragments. The latter were found in Trenches A and K.

for example, the small group of rodents. However, many of the remaining species would almost certainly have been consumed by humans, including gazelle, cape hare and the chukar partridge. Apart from the fish, all of the wild species identified are still found in the general vicinity today⁵⁶. Unfortunately, the fish bones included mainly smaller fragments and other non-diagnostic elements, which could not be identified to family. Thus it is not currently possible to attribute these remains, not even to freshwater or marine species.

Overall, sheep and goat are the most common species in the collection, although percentages vary significantly between trenches. Generally, sheep are more than twice as common as goat, which corresponds well with the typical pattern of traditional sheep and goat husbandry in the Middle East and elsewhere⁵⁷. Due to the higher number of fragments from these two species, it was possible to generate a small amount of data for age categories and body-part distribution. The time of death distribution, based on fusion of the long-bones, can be seen in (Table 2). Trenches A and B have been combined, due to the very small amount of data available from each. The table clearly identifies similar distribution for age-categories across all three areas, suggesting that most of the animals were butchered at an age of 2 years or older. All three areas also include a small group of animals which were killed before the age of 1-1½ years. Body-part distribution is illustrated in Figure 191, and some variation can be discerned between the trenches. Most of the meat would have been sourced from the upper leg and central body; hence, they also represent the majority of the cuts, whereas the head and lower leg would typically be separated from the rest of the carcass during the initial butchering and dismembering⁵⁸.

Most of the dog remains originate from two Evidences in Trench J, amounting to 25 of a total of 33 fragments⁵⁹. Three complete long-bones indicate that the dog had a shoulder

height of c. 50 cm⁶⁰. With no duplicates of any individual bones among the dog remains from Trench J Sector C, it is likely that the fragments originate from a single individual. All long bones are fused and the animal would therefore have been more than two years of age when it died⁶¹. Among the remaining 8 fragments from dogs, three are metapodiams with excessive new bone deposition, which thus fused three otherwise separate bones together; an x-ray of the material in Copenhagen revealed clear fractures of all three, with bone regrowth stabilising the fractured remains and dislocating the bones into a permanent position (see Figure 192)⁶².

The overwhelming majority of the equid remains originate from two Evidence numbers in Trench J Sector C (140 fragments of a total of 147)⁶³. Among these 140, 26 could be identified as donkey (*Equus asinus*) based on a series of distinct morphological markers⁶⁴. As no elements could positively be assigned to any other equid species, it must be considered likely that the remaining fragments were also from donkey. Five measurements from the collection can be used to calculate the shoulder height of the animals⁶⁵; they indicate a shoulder height between 115 and 133 cm. Also included in the collection are 19 fragments which display signs of various pathologies, none of which appear to be from a traumatic origin. Rather, all are consistent with old working animals; see Figure 193 for an example. It could therefore be suggested that the bones were from old caravan donkeys which had been retired as pack animals.

Domesticated chicken is the main avian species in the collection, with both bones and eggshells represented. Additionally, both the *Phasianidae* family and the 'general' bird categories are likely to contain mainly elements from chicken that were simply too fragmented to be assigned to a more specific category. Apart from representing a significant addition to the daily diet in Jerash, it is worth noting that chicken were considered a good and light form

56. Harrison-Bates (1991); Porter-Aspinall (2010).

57. Dahl-Hjort (1979).

58. Loyet (1999).

59. From Evidences Jc-67 and 68.

60. Two radii with GL: 147 mm and 171.4 mm and one femur with GL: 170.1 mm. These and all other measurements in this report are based on von den Driesch (1979).

61. Based on Silver (1969).

62. Trench J, Evidence 35.

63. Trench J from Evidences 67 and 68.

64. Johnstone (2004).

65. Two metatarsals with GL: 230 mm and 217.4 mm, two tibia with GL: 305 mm and 280 mm and one radius with GL: 288.5 mm.

Table 2: Distribution of goat and sheep bones which could be aged, according to trench¹.

	Time of fusion (months)	Trench A and B		Trench J		Trench K	
		Unfused	Fused	Unfused	Fused	Unfused	Fused
Early Fusion							
Metapodium, proximal	At birth		3		3		14
Radius, proximal	3-10				2	1	1
Humerus, distal	3-13		1	2	2	2	5
Scapula	5-13			1			2
Pelvis, acetabulum	6-10	2	1	1	4		7
2. Phalanges	6-16		2		1		5
1. Phalanges	6-16		1		3		6
Early Fusion total		2	8	4	15	3	40
Middle Fusion							
Tibia, distal	15-24		1			2	8
Metapodium, distal	18-36		4		3	1	4
Middle Fusion total		0	5	0	3	3	12
Late Fusion							
Tibia, proximal	23-60			1		5	
Calcaneus	23-60		1	1		2	2
Femur, distal	36-60	1		1			1
Femur proximal	23-84			2		3	1
Radius, distal	33-84		1			2	
Vertebrate		7	1	1	4	14	8
Late Fusion total		8	3	6	4	26	12

1. Reitz -Wing (1999).

of meat in both Byzantine and early Islamic written sources⁶⁶.

Comparative Faunal Collections at Jerash

During two brief seasons in 2010 and 2012, another collection of faunal remains was studied within the context of the Islamic Jerash Project, directed by Alan Walmsley. Excavations in the central part of the city, at the junction of two main streets (the *Cardo* and the *South Decumanus*) revealed the remains of a Byzantine bathhouse, shops along the *cardo* and a large midden. The latter was located among private houses to the west of the bathhouse, and is of a later date than the early Islamic congregational mosque. Distribution of main species for each of these areas is illustrated in Figure 194. Variation between the areas is significant, but is clearly not area specific. For example Trench K, the E shops and the Bathhouse have a similar distribution, being comprised mainly of sheep and goat, whereas Trench A is clearly distinctive from the remaining areas, with a significant amount of chicken and bird remains. It would appear there is some potential for distinguishing even smaller units from one another with regards to food preferences and use pattern, although the apparent high resolution may relate to a local pattern of waste disposal, with nearby empty ground used for convenience.

The low quantity of burnt bones (under 0.9%) mentioned previously contrasts with the evidence from the central area, where c. 6% of the bones were affected by burning. The pattern generally fits well with slightly later textual evidence from early Islamic cook books, where meat dishes cooked in a pot with water predominate, thus the bones are not burnt. The higher quantity of burnt fragments in the central area of the town could perhaps be related to a higher presence of public food outlets, where foods such as grilled meats were likely to have been more predominant⁶⁷.

Concluding Remarks

The small collection of 2,426 fragments, from four excavation areas, was analysed during a single week of fieldwork and more than 20 species were identified. The preliminary results

testify to the potential output of a detailed faunal analysis, with significant diversity of data regarding species, body part preferences and food preparation. This diversity is evident, both within the four areas in the Northwest Quarter and when compared to results from the central town, thus verifying the presence of a diverse and multicultural population. Significantly, not one single human bone was identified in the material from the Northwest Quarter.

Although a significant number of species has been identified in the collection analysed so far, it would both enhance the validity of the results, and probably expand the list of identified species, if a program of targeted flotation was carried out in selected contexts during future excavations.

XRF Analysis of Selected Artefacts from the Northwest Quarter

Peter Fink-Jensen

Introduction

The work presented in this report was carried out between 5th and 10th August 2014 with a hand held XRF scanner (Innov-X Alpha-8000 LZS Handheld X-Ray Fluorescence scanner). This report consists of two parts: text and a table (**Table 3**), which include both data results and data interpretations for each artefact which has been analysed.

During the fieldwork in Jerash, a large number of artefacts (pottery, glass, sculptures, coins and metallic objects), which had been collected during the 2012, 2013 and 2014 campaigns, were analysed by X-ray fluorescence scanning, in order to determine the content of a number of metallic elements. The instrument which was used only measures concentrations for elements ≥ 22 in the Periodic Table (element 22 is titanium). Thus, concentrations of a number of common elements, e.g. hydrogen, oxygen, carbon, silicon, calcium, sodium, potassium and magnesium, are not included in the results. The scanner is, however, useful for detecting most metals, which, apart from metal objects, are typically present as minor or trace elements. The analyses included in this report are:

- Compositional analysis of a large number of pottery samples, which appeared to be

66. Dalby (2010), 71, 143; Nasrallah (2007), 104.

67. Nasrallah (2007); Dalby (2010).

Table 3: XRF analysis of selected artefacts.

Cut bowl	J12-Abe-22-14	06-08 52 06-08 53	Ext, reddish surface Ext, "black" surface	29794 27839	278 252	7790 7602	29 30	317 345	20 16	48 57	316 298	76 74	198 188	56 88
<i>High titanium and cobalt content suggests that the clay could be made from an igneous rock (magmatic or volcanic). Quite similar to J12-Cd-42-16 & J12-Cd-42-17, which could indicate that the clays were made from the same type of material.</i>														
Islamic, green glaze	J12-cbd-1-159	05-08 08	Green surface	24544		78959	335	4233		151	453	182	9950	64
<i>Very high lead concentration in this glaze. Also high cobalt and arsenic, although the high arsenic concentration is partially an error related to the high lead content. Relatively high cadmium is also significant.</i>														
Mamluk unpainted	J12-Cd-42-17 J12-Cd-42-16	06-08 51 06-08 44 06-08 46 06-08 49 06-08 50	Ext, reddish surface Ext, reddish surface Ext, brown surface Raw side Int red surface	25496 26375 27795 21656 29320	184 229 254 268 327	4548 4582 4314 <4000 5292	23 15 231 14 20	304 326 326 279 306	21 15 16 16 29	57 50 47 49 76	135 144 165 130 140	59 119 72 46 100	352 347 340 291 333	139 119 138 103 100
<i>Very uniform values, both for red/brown colours and raw clay, indicates that the colouring does not contain anything different. Relatively high titanium- and cobalt content suggests an igneous signature. Quite similar to J12-Abe-22-14, which could indicate a common origin for the clay, although according to Sr- and Zr-conc. not necessarily from the exact same location.</i>														
Year 2013														
HMGW	J13-D-9-3	05-08 26 05-08 27 05-08 28	Int, no paint Int, red/brown Ext, red/brown/light	10052 82524 36130			14 19 13	421			32 60 53	128 132 135		156 161 160
<i>The red-brown colouring contains both iron and manganese. High cobalt concentration on unpainted surface indicates an igneous signature in the clay.</i>														
HMGW	J13-D-9-4	05-08 29 05-08 30	Ext, red/brown/light Piece with hole	45025 25518	558 209		18 32	220	40		101 48	121 141		290 128
<i>For both J13-D-9-3 and J13-D-9-4, the red-brown colour appears to contain more Fe-, Mn and Zn, but less Co than base material.</i>														
HMGW	J13-D-9-9	06-08 29 06-08 33 06-08 15	Ext, red-brown colour Ext, white colour Raw	43403 8333 55503	1427 264 878	8414 438 10100	13 11 22	745 259 33	114 26 33	149 64 91	297 218 299	103 214 214	231 242 214	95 115 Mo: 6
<i>Relatively high titanium and cobalt content suggests an igneous signature in the clay. The red-brown colour has higher Mn, Cu, Zn and Sr than the clay. The white colour layer shows lower conc. of most measured elements, metals. Perhaps a calcite or silicate layer?</i>														
Abbasid	J13-Dab-13-70	06-08 18 06-08 19 06-08 22 06-08 23	Raw, black Outer white surface Ext Int	16242 19511 27398 32461		6775 10300 3904 5066	27 35 448 337	188 18 9 337		50 54 42 32	228 241 170 175	100 241 67 175	165 172 132 118	
<i>Relatively high titanium and cobalt content indicates an igneous composition of the clay for both J13-Dab-13-70 & 71. White surface has values similar to clay and thus does not appear to contain vastly different metallic content.</i>														
Amphoriskos - import from Asia	J13-Dab-13-76	06-08 03 06-08 04	Ext Int	43616 43430	205 434		17 19	452 530	18		48 54	174 161	11 116	
<i>High iron and cobalt content suggests that the material perhaps has an ultramafic origin.</i>														
Spindle whorl	J13-D-25-7	06-08 05 06-08 06	Ext Raw	72917 83044	800 993	17600 17100		859 953	31		58 72	114 109	418 395	92 71
<i>High iron, titanium and cobalt content suggests that the material has an igneous origin.</i>														
Bronze Age	J13-D-25-8	06-08 42 06-08 08	Ext with waves Raw	33914 32846		9609 9244	27 27	327 538		81 68	240 231		253 231	
Bronze Age Egyptian import?	J13-D-25-9	06-08 39 06-08 40 06-08 41	Grey-green spotting Light brown surface Mostly reddish, raw	38303 23854 32668		10100 5939 7778	37 25 32	417 394 422	14	49 45 44	350 305 319	186 63 185	186 181 185	56 74 51
<i>High iron, titanium and cobalt content suggests that the material has an igneous origin. Uniform values in both coloured and non-coloured areas indicate that the measured values stem primarily from the clay. J13-D-25-8 and J13-D-25-9 have very similar values, which could indicate a common origin, however due to different Zr and Sr concentrations not necessarily from the exact same location.</i>														
Grey Ware	J13-Ed-18-5	06-08 43	Ext, grey surface	25051	224	8024		237		41	302		151	67
<i>High titanium and cobalt content suggests an igneous composition. Similar in composition to analysed green ware and the grey mold (J13-Fr-53-17).</i>														
Green Ware tile	J13-Fd-40-13	06-08 36 06-08 35	White weathering surface Greenish (raw) surface	26687 31652	352 289	5688 6672	12 16	301 300	17 14	38 59	287 268	87 88	236 207	98 115
Amphora - compare with Green Wa	J13-Ed-18-84	06-08 34 06-08 37	Ext greenish surface Int, white surface	33660 24583	529 353	5090		290 390	34 20	63 54	125 114	55 57	532 460	81 96
<i>Items J13-Fd-40-13 J13-Ed-18-84 have similar compositions. My guess would be that the material in these artefacts is derived from a metamorphic rock, such as a greenschist, based on the colour and apparent layering. Typically of green ware it has retained a lot of the original rock structure, as a consequence of only being exposed to low temperatures. Zr and Sr content suggests that the two samples do not necessarily have the exact same origin. White layer differs slightly from raw, green surface.</i>														

Islamic - white/buff	J13-Ed-18-86	06-08-59	Ext. light	20830	386	6198	234	11	120	277	60	321	90	06-08-2013
Islamic - white/buff	J13-Ed-18-87	06-08-54	Ext. light	17261	298	4178	10	165	104	268	85	346	74	06-08-2013
Somewhat high titanium and cobalt concentrations indicate an igneous signature in the clay.														
Sandy/white	J13-Ed-19-23	05-08-09	Exterior	15432	545		12	222	19	54	139	232	318	07-08-2013
		05-08-15	Interior	11197	189		12	158		44	170		305	
Slight igneous signature.														
ARS	J13-Ec-27-12	05-08-24	Red surface	42546		6543	36	375	26		71	278	91	
	J13-Ec-27-13	05-08-23	Red surface	39364		7192	30	564	20		81	272	118	
	J13-Ec-27-15	05-08-22	Red surface	44777		8062	33	404		66	300		259	
		06-08-57	Raw	44810		6952	39	507	20	81	308		277	
The high iron-, cobalt- and titanium concentrations indicate an igneous origin in the clay. Red colour is either made from the same material or the measured elements come from the clay underneath.														
Jerash Lamp	J13-Fd-40-45	05-08-31	Ext. Bottom, red	21416	263	9242	10		19		43	491		193
		05-08-32	Ext. Top, light brown	7296			10	257			36	359		198
		05-08-33	Ext. Top, light brown	7155			9	173	14	40	347		198	84
Interestingly, the bottom and top sections of this lamp exhibit quite different elemental concentrations. The high iron- and titanium concentrations in the bottom part could stem from the red colouring.														
The top has concentrations not far removed from those of sandstone (albeit with slightly high Co). This might be a lamp made from sandstone, that had a red colouring containing an igneous material applied to the top.														
Grey Ware mould	J13-Fi-53-17	10-08-15	Dark grey surface	25343	331	7236	50	590	21		54	339	71	168
		10-08-16	Dark grey w. metallic specks	26978	434	7703	69	318	31		74	334	103	179
		10-08-17	Mostly red-brown surface	23612	194	5239	68	302	39		99	306		167
The elemental concentrations in this mould are strikingly similar to those of the green ware tile (J13-Fd-40-13). It is my guess that these two pieces are made from the same material, but that this mould has been exposed to higher temperatures, thus "destroying" the green ware texture. The high titanium content is probably responsible for the tiny metallic specks that can be spotted in some places. Red-brown colour does not distinct itself from the gray mold.														
ESA	J13-Ha/Ha1-13-26	05-08-34	Ext. Surface, red	47686	522			533	29	221	60	85		330
		05-08-35	Int. Surface, light	35969	383		22	483	35	190	74	91	102	344
High cobalt content suggests a non-local material. The colouring does not appear change concentrations significantly.														
Generally, the above artefacts (J12-Abe-22-14 to J13-Ha/Ha1-13-26) are characterized by a high iron, cobalt and, for the most part, titanium content. The measured concentrations of particularly cobalt and titanium indicate that the material has a magfic/ultramafic origin; that is dark volcanic or magmatic rocks, such as basalts, dolerite, gabbro etc. Nickel content is generally low for magfic/ultramafic rocks (see Table 5). The values listed in Table 5 are world averages, and there are variations in elemental content in such rock types. Rocks found locally at or near Jerash are primarily either sandstones or limestones, which would not have such Co- and Ti-concentrations. However, volcanic regions exist north of Jerash, which could perhaps be the origin of the igneous signature seen here, whether the materials were imported or transported here suspended in the local river and deposited in river beds. A petrological/geochemical study of the local geology and the volcanic regions could perhaps shed light on the provenance.														
Plain Ware with glass int.	J13-Ha/Ha1-13-27	06-08-32	Glaze	7932	13300		2007		182		159	167	243	5b-59
Mn and Pb were most likely added as a temper to lower the melting point of the silicate (which probably comprises most of the glass), so that the glass mass wouldn't melt/alter the pottery surface. Mn and Pb could also have been added as colourants. The glass also contains antimony.														
	J13-Ha/Ha1-13-48	05-08-07	Bottom flat surface	2704			21		33		83	18		Hg: 10
			Limestone	420							10			Hg: 9
Typical low metal concentrations in the limestone. The bottom surface has higher iron, zinc and strontium values. This could indicate a surface layering or perhaps just be due to heterogeneity in the limestone.														
Palmette	J13-Ha/Ha1-13-31	05-08-17	Bottom exterior	47444	955		54		19	78	113	255	21	154
		05-08-18	Interior edge	44219	864		53			113	132	256		Rb: 199
		05-08-20	Interior inside surface	41665	827		42				117	242	16	147
		05-08-21	Raw surface	35975	855		44	327	20		109	263	17	169
Relatively uniform values all over this palmette, both on coloured surfaces and on raw surface. The colour contains nothing significant.														
Lime stone Palmette	J13-0-5	07-08-18	Limestone	420							10			Hg: 9
		07-08-24	Limestone w. black specks	1177			12		14		11	6		262
		07-08-25	Limestone	646					12		13			561
		07-08-17	Yellow/brown, high amount	9180	279		139		14		89	8	28	391
		07-08-19	Y/b, very high	7222	334		94		14		81	62	23	416
		07-08-20	Y/b, very little	802			15		22		26			278
		07-08-21	Y/b, high	4511	270		51				52		12	353
		07-08-22	Y/b, medium	2837	237		124		14				302	
		07-08-23	Y/b, high	3765			60		17		32			Hg: 12
Typical low concentrations in the limestone. The yellow/brown layer probably has its colour from its content of Fe, which could indicate that it's yellow ochre. Traces of Pb, Mn, Zn and As can also be found in the this layer, which are probably due to trace minerals in the ochre. Concentrations of iron and manganese correlate very well with amounts of colouring.														

Year 2014

Glass slag		J14-4g-2-18 Glass slag made from (or having been added) a volcanic or magmatic material. Perhaps it can be referred to as an obsidian slag. It has a composition similar to analysed Green Ware and Grey Ware, and thus could be a waste product related to them.															
		31600	399	6176	31	237	26	39	38	318					150		
Green Ware handle		J14-Jb-11-7															
Green Ware fragment		J14-Jd-18-21															
These samples are quite similar to the other sampled green ware (J13-Fd-40-13, J13-Ed-18-84). The spectrum from reading 09-08 16 shows that J14-Jb-11-7 does contain titanium, but below the measurements LOD, somewhere around 3500 ppm.		26900	407	<4000	5	389	24		70	107		23		308			
		31200	493	5249	14	279	21		31	137		9		235			
Raw, black rock fragment		J14-Kc-3															
The low metal values could perhaps indicate a burned limestone fragment. It is not a piece of a volcanic or magmatic rock		2061					15	54	15					140			
3 glass: white, red (ball), blue		J14-lab-1-1															
Modern glass ball. Very high As.		1269	90		214		13		78		61	1782				Cd: 32	
Plaster		J14-lab-1-1															
Elemental concentrations resemble those of a sandstone or similar.		5606	241		15			41		42	(55)			163			
		7272	156		12		11		24	46				179			
		3600			8		12	30	20	27				135			
Mamluk plaster, painted		J13-Da-10-31															
		4464	226		11		9	44	16	56				136			
		4555	158				16		13	36				142			
		4769	app 150		8		13		17	49				133			
		8861	167		36		11		12	31				134			
		6165			23					21				121			
		7691	176		8				13	21				151			
		4034	414		12		9	36	13	30				164			
		7585	131		27		15	41	21	31		(6)		184			
		6052	178		34		12		13	19		(11)					
		11332	170		56		12	69	41	23	66	(12)		212			
		68309	505		74			84	8	35		(15)		197			
		87475	509		85			82	32			(18)		174			
		94859	668		110			91		25	85	(27)		147			
		24925			38		12	139	86	30	70	(14)		164			
		23587	289		33		18	120	79	24		(14)		153			
		30450			98		18	191	108	27		(27)		159			
		11173	175		28			60	32	25				219			
		8089			5783		11	52	18	40	76	(541)		207			
		9130			6702		19		14	25		(623)		243			
		8426	187		16		11	35	34	19				250			
		9412	318		20		26		29	44				243			
Colouring on the Mamluk murals (J13-Da-10-13) show a variety of elemental concentrations. Green, blue, purple and grey colour has values resembling those of uncoloured mortar, indicating none of the measured elements coming from the colour. The red colour has high concentrations of iron, manganese, lead and nickel, which could indicate a red ochre, or another metal-rich compound. The yellow colour also has higher concentrations of iron, nickel and zinc, indicating a yellow ochre. The pinkish colour has a very high lead content. Perhaps this is a mixture of red lead and lead white pigments.																	
No igneous signature in these plasters. Raw mortar surfaces resemble sandstone composition.																	
Terracotta																	
Terracotta head		J12-Aa-4-1x															
		8113	178	low	16		20	39	24	38				250		17-08-2013	
		8674	194	low	18	81	11		83	36				365			
		8268	192	low	29	50-100	20		53	35	84			330			
There are no significant concentrations variations on the 3 measured areas. Differences in colour do not appear to influence these elemental concentrations. Could originate from a sandstone.																	
Terracotta fragment		J13-Gb-9-?															
		13647	411	app 2000	17	199	31		46	106				211		17-08-2013	
		13177	744	low	12	158	25	72	91					194			
Relatively uniform values throughout, despite the exterior exhibiting a reddish colour, whereas the interior does not appear to have been coloured. Could the difference be a result of burning technique or weathering?																	
Terracotta fragment		J13-Gb-12-56															
		27574	246	<2000	46	234	112	44	79	69				267		06-08-2013	

Uniform values externally and internally													
10-08 14 Int													
22754 144 <2000 6 368 27 74 242													
Terracotta fragment J13-Gd-28-17													
10-08 06 Ext. Red-brown surface													
10-08 07 Int. Red-brown surface													
This piece contains more iron and titanium than the terracotta pieces above. This suggests an igneous signature in the clay.													
Terracotta foot J13-Ga-12-22													
10-08 08 Ext. Red-brown surface													
Raw fracture surface													
The clay itself (raw surface) has a lower iron content (and a more neutral colour) than the red-brown surface. This could indicate that a red ochre was applied to the red-brown surface, but since the values are not that much higher it could just be a matter of burning technique or weathering. The titanium and cobalt content indicates an igneous signature in the clay.													
Terracotta piece with flowers J13-Ga-28-18													
10-08 11 Ext. red-brown surface													
Terracotta fragment J13-Gb-12-55													
10-08 13 Ext. red-brown surface													
Generally, the above 6 Terracotta pieces do not exhibit significant differences in composition based on colour variations. Colour variations may be due to burning techniques or weathering.													
Terracotta pieces J13-Gd-28-17, J13-Ga-28-18 and J13-Gb-12-55 all exhibit similar elemental concentrations. Their titanium and cobalt content suggest that the clays are derived from mafic sources, as opposed to Terracotta pieces J12-Aa-4-1x, J13-Gb-9 and J13-Gb-12-56, that have a lower titanium content, and could be made from a different material. This could be an issue of the first-mentioned pieces being subjected to an additive to added to the clay, perhaps as a hardener, or it could simply be a question of these clays having a mafic origin.													
Statues													
Artemis, marble J13-Da-10-2x													
07-08 07													
07-08 08													
07-08 09													
07-08 10													
07-08 11													
07-08 12													
07-08 13													
07-08 14													
Measurements 07-11 have low concentrations of the shown elements, which is typical for pure carbonate materials, such as white marble. Measurements 12-14 have higher iron concentrations, which could very well stem from a red iron pigment. In regards to provenance of the marble, it is unknown to me if marble exists in the vicinity of Jerash.													
Limestone J11-801													
07-08 37													
07-08 38													
07-08 39													
07-08 40													
07-08 41													
07-08 42													
07-08 43													
07-08 44													
07-08 45													
07-08 46													
07-08 47													
The limestone statue has relatively high iron-, nickel-, zinc- and silver concentrations in some areas, but unfortunately the compositions of the limestone rock is not known. There are some variations in the concentrations of the mentioned elements, which could be due to surface colouring. In regards to provenance of the limestone, analysis of local limestone is required.													
Alloy Analysis (see alloy iPAQ)													
All values in %													
Metal													
Metal J14-Ic-3-1													
J14-Ia-3-3													
07-08 07													
07-08 08													
85.73 3.76 4.24 3.24 77.22 5.49 3.03 11.48 Yes 0.20 Nb: Low, Cr: Low Sb: 0.39													

Metal lump	J14-Le-2-12	07-08 09	99.39			0.29	0.14				0.18					W: Low, Cr: Low
	J14-L-1-4	07-08 10	99.08		0.14	0.78										Mo: Low
	J13-Da-10-31	07-08 11	98.21	0.70				0.66						0.18		Mo: 0.25
	J14-K6-9-4	10-08 02	98.09		0.35					0.42						Mo: Low
	J14-Ka-3	10-08 17	98.78			1.22										Mo: low
6 iron alloys and 1 copper alloy.																
Metal slag	J14-Kc-3	10-08 19	84.99		3.41	2.77					2.83	low				Mo: low
	<i>These values are actually lower as there is also some aluminium in this piece, but probably not a whole lot</i>															
		10-08 20	98.82		0.13		0.85	0.20								Mo: low, Cr: low
	<i>These are 2 measurements from opposite sides of the same piece of metal slag. It is interesting that the metallic concentrations differ on each side. It would seem that this is a heterogeneous iron alloy.</i>															
Metal slag	J14-Ja-8-5	10-08 21	92.69	0.70	4.49	low			0.55		1.58					
	<i>These values are actually lower as there is also some aluminium in this piece, but probably not a whole lot</i>															
Metal slag	J14-lac-18-7	10-08 22	92.07	0.88	5.69						1.35					Nb: low, Cr: low
	<i>The 3 metal slags presented above (J14-Kc-3, J14-Ja-8-5, J14-lac-18-7) are all fairly similar iron alloys, with minor titanium and zirconium content. I doubt the zirconium or the titanium were added intentionally, but rather indicate that these are slags of and from the same material. Perhaps they are related to the same production, and could very well be composed of material from the same iron ore.</i>															
Metal key	J13-Db-19-15	10-08 23	98.81				0.61	0.12						0.42		Mo: low
	<i>Where the handle meets the "blade"</i>															
Large metal "blade"	J13-Da-22-1	10-08 24	99.60				0.40									Mo: low
		10-08 25	99.71				0.29									W: low, Cr: low
<i>The analysed metal artefacts, apart from J14-Ja-3-3, all have iron as their primary component. This differs from the coins, where cobber and lead are the main components.</i>																

different from the majority of material which has been found in Jerash. It was suspected that these samples contained material from a non-local source.

- Two sculptural fragments (one marble, the other limestone).
- A few metal objects.

Methodology

All measurements were executed using an Innov-X Alpha-8000 LZX Handheld X-Ray Fluorescence scanner, which has a scanning field of 10x10 mm. The instrument detects the concentration of elements within the field specified above; that is, elements ≥ 22 in the Periodic Table. Elemental concentrations are measured on the outer surfaces, but the scanner may penetrate somewhat through most materials, although the degree of penetration varies for different materials, based on factors such as elemental composition and matrix (e.g. evenness, hardness and porosity). This means that sediment surfaces, such as sandstone or limestone, should be more easily penetrated than metal surfaces.

All concentrations are in ppm (points per million), except for metal artefacts, including coins, which are given as percentages (%). The scanner has two different settings, a “Soil Mode” and an “Alloy Mode”. “Alloy Mode” was used for materials with a high metal concentration (in this case coins and metal objects), while “Soil Mode” was used for materials which contained less than 10% metal (pottery, glass, limestone sculptures).

Results

Concentration data and data interpretations for all samples are provided in Table 3. Raw data from pottery, limestone and glass is provided in the “Soil iPAQ” datasets. Raw data from metal artefacts is provided in the “Alloy iPAQ” datasets of **Table 3**.

Summary of Interpretations

Below are the main points which can be drawn as conclusions, based on the results from the data which was provided:

Pottery/Ceramics:

The pottery which was analysed were

‘special samples’ for the most part, which were thought to have been produced in another location, rather than in Jerash, because of the material, shape or inclusions. Thus, the results do not reflect the composition of typical Jerash pottery. Most of the samples contain high concentrations of elements which are indicative of an igneous rock signature (magmatic, volcanic), particularly titanium (Ti) and/or cobalt (Co). Only a handful of the samples which were analysed do not have this igneous signature, such as some plaster and terracotta fragments, which appear to have an elemental signature more in line with sandstone, and some limestone pieces which have low concentrations of metal. Some Green Ware samples could have a metamorphic origin, as indicated by their texture.

Tables 4 and 5 show average elemental concentrations in some sedimentary rock types (shales, sandstones, carbonates) and in igneous rocks. It is worth noticing the higher levels of Ti in mafic rocks and Co in ultramafic rocks (**Table 5**), compared to the levels in sedimentary rocks (**Table 4**). The sedimentary rock type “shale” may exhibit relatively high titanium concentrations, but has relatively low cobalt concentrations.

Comparison of measured titanium and cobalt concentrations with the table (**Table 5**) indicates a mafic/ultramafic signature. Mafic rocks are volcanic or magmatic, magnesium and iron rich igneous rocks, such as basalt, dolerite and gabbro, which contain a large proportion of dark minerals (e.g. olivine, amphibole, pyroxene and biotite). Ultramafic rocks contain even higher concentrations of iron and magnesium and low silica content ($< 45\%$). Mafic and ultramafic rocks are not believed to occur in the local geological landscape at Jerash, which consists primarily of sandstones and limestone bedrock; it is unlikely that the observed Ti and Co concentrations originate from these sandstones or limestones. However, volcanic regions are found north of Jerash, and are perhaps the origin of the igneous signature. It is possible that volcanic minerals were transported fluvially along the local river, and deposited along the riverbeds in Jerash. Another option is that these are imported materials/artefacts.

The measured concentrations do not

Table 4: Rough average concentrations of selected minor elements in shales, sandstones, and carbonate rocks (in parts per million): (Based on: Values from Kraus Kopf and Bird, 1995).

	Shales	Sandstones	Carbonates
Mn	850	1-100	1100
Ti	4600	1500	400
Pb	20	7	9
Co	20	0.3	0.1
Cu	50	1-10	4
Ni	80	2	20
Zn	90	16	20
Zr	180	220	19
As	10	1	1
Sr	400	20	610

Table 5: Rough average concentrations of ions of selected elements in igneous rocks (in parts per million): (Based on: Values from Kraus Kopf and Bird, 1995).

	Ultra-mafic rocks	Mafic rocks	Intermediate rocks	Felsic rocks
Fe²⁺ & Fe³⁺	99000	86000	59000	27000
Mn²⁺	1500	2000	1200	600
Ti³⁺	300	9000	8000	2300
Pb²⁺	<1	8	15	20
Co²⁺	200	45	10	5
Cu⁺	20	100	35	20
Ni²⁺	2000	160	55	8
Zr⁴⁺	30	100	260	180
Sr²⁺	10	440	800	300

completely mimic the average values for mafic and ultramafic rocks listed in Table 5, as significant compositional variations exist within the various igneous rocks. One also has to take into consideration that the clays which have been analysed may be composed of a mixture of different rock types. In general, relatively high concentrations of cobalt, nickel (Ni) and zinc (Zn) are indicative of mafic rocks. Nickel is not abundant in the analysed pottery and in most cases it falls below the scanner's limit of detection (**Table 3**). Furthermore, cobalt concentrations are often higher in the analysed pottery than the average values for mafic and ultramafic rocks. However, high Ti and Co concentrations are solid indicators of an igneous rock signature. This is also supported by the fact that some of the analysed pottery fragments are composed of darker clay than that of most Jerash pottery.

Sculptural Fragments

Two sculptures found respectively during the 2011 and 2013 campaigns were analysed by XRF. The first was a marble sculpture (1), depicting Artemis⁶⁸, which had red/brown colouring on the surface in areas belonging to the clothing. The second was a limestone sculpture (2), which also contained red/brown colouring on some surface areas, also belonging to the clothing⁶⁹.

- (1) The Artemis sculpture had low metallic concentrations, which is typical of pure limestone, such as this marble. Iron-content was slightly higher in certain areas, which could indicate the use of an iron-based colour, such as red ochre.
- (2) The limestone sculpture had relatively high iron, nickel, zinc and silver concentrations. The type of limestone is not known. There is some variation in the concentrations of the elements mentioned above, which possibly indicates that the surface colouring contains these elements.

Metal Artefacts

The analysed metal artefacts were all, apart from one sample, composed of almost pure iron.

Conclusions

This study provides an overview for some of the compositional variations which exist in the artefacts found in Jerash:

Based on the sample size selected, the clay objects can be divided into three elemental signatures: sandstone, limestone and igneous rock signatures. This indicates the use of different rock types for pottery/ceramic production.

It was hoped that this study could not only identify the range of materials used for production of pottery and metal objects in Jerash, but also the provenance of these materials. However, it became apparent that in order to make sound conclusions on provenance, a thorough petrological and geochemical study of Jerash and its hinterland is required. The origin of the igneous signature found in most of the analysed pottery can perhaps be revealed by geochemical analysis of local river sediments and volcanic rocks from the volcanic regions north of Jerash.

Analyses of the two carbonate rock sculptures are not conclusive in terms of identifying the composition of colored surfaces. Red-brown coloring on the Artemis sculpture could be red ochre, while it is unclear whether the red-brown color on the limestone sculpture contains any of the measured metals. A study of the local carbonate bedrock could perhaps shed some light on whether the carbonates have a local origin.

Chronology

Hellenistic: 332 – 63 BC

Roman: 63 BC – early 4th century AD

Byzantine: early 4th century AD – late 5th century AD

Late Byzantine: late 5th century AD – mid-7th century AD

Umayyad: 7th century AD – mid. 8th century AD

Abbasid: mid. 8th century AD – 10th century AD

Fatimid: 11th century AD – 12th century AD

Ayyubid: 12th century AD – mid. 13th century AD

Mamluk: mid-13th century AD – 15th century AD

68. Lichtenberger, Raja and Sørensen, 2017, cat. no. 146.

69. Lichtenberger, Raja and Sørensen, 2013, addendum, pl. 1.

Arrangement of the Catalogue:

Inventory number

Title

Figure

Measurements (in cm)

Munsell

Description (incl. material)

References

Date

Catalogue Abbreviations:

AE: copper-alloy ('bronze')

D.: depth

Diam.: diameter (in cm)

ext.: exterior

FE: iron

H.: height

int.: interior

L.: length

PB: lead

T.: thickness

W.: width

Wt.: weight (in g)

All measurements are given in cm.

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CATALOGUE

Fine Ware

Slipped Fine Ware (PE)

Eastern Sigillata A (ESA)/ (Çandali Ware)

Rim

1.

J14-Ih-60-5

Bowl, rim, fragmented.

Fig. 1.

H.: 6.8; T. (max.): 0.5; (min.): 0.3.

Munsell: core: 7.5YR 7/6; int.: 7.5YR 7/6; ext.: 7.5YR 7/6; slip: 10R 4/8.

Bowl, hard fired, rather finely levigated, including a few air pockets, lime and black spots. Thick, lustrous but worn slip on int. and ext.

References: Hayes (1985), p. 39, forma 58; tav. VII, 11; p. 40, forma 60b; tav. VII, 14.

Roman (1st half of 2nd cent. AD).

African Red Slip (ARS)

Rims

2.

J14-Jd-32-191

Bowl, intact profile, fragmented.

Fig. 2.

Diam. 23; H.: 4; L.: 7.4; T. (max.): 0.4; (min.): 0.3.

Munsell: core: 2.5YR 5/8; slip: 2.5YR 5/8.

Bowl, hard fired and very finely levigated clay with only a very few lime and black inclusions,

covered in a thick, lustrous, but worn slip.

Rounded rim with slightly curved body and flat base.

References: Dentzer (1986), p. 247; pl. 8, no. 2; Hayes (1972), ARS Form 50, Type A; Hayes (2008), p. 220; no. 986-987; fig. 31.

Late Roman (2nd half of the 3rd – 1st half of the 4th cent. AD).

3.

J14-Jcd-32-87

Plate rim, fragmented.

Fig. 3.

Diam.: 16; H.: 2.6; L.: 8.8; W.: 4; T.: 4.

Munsell: core: 10R 4/6 – 10R 5/6; slip: 10R 4/6. Plate, hard fired and rather finely levigated clay with some lime and a few black and reddish brown inclusions. Slipped on both sides.

References: Hayes (1992), pl. 43, no. 28; Hayes (2008), p. 219, no. 976 (P21685), fig. 31.

Late Roman (Late 3rd – early 4th cent. AD).

Local Fine Ware

Rims

4.

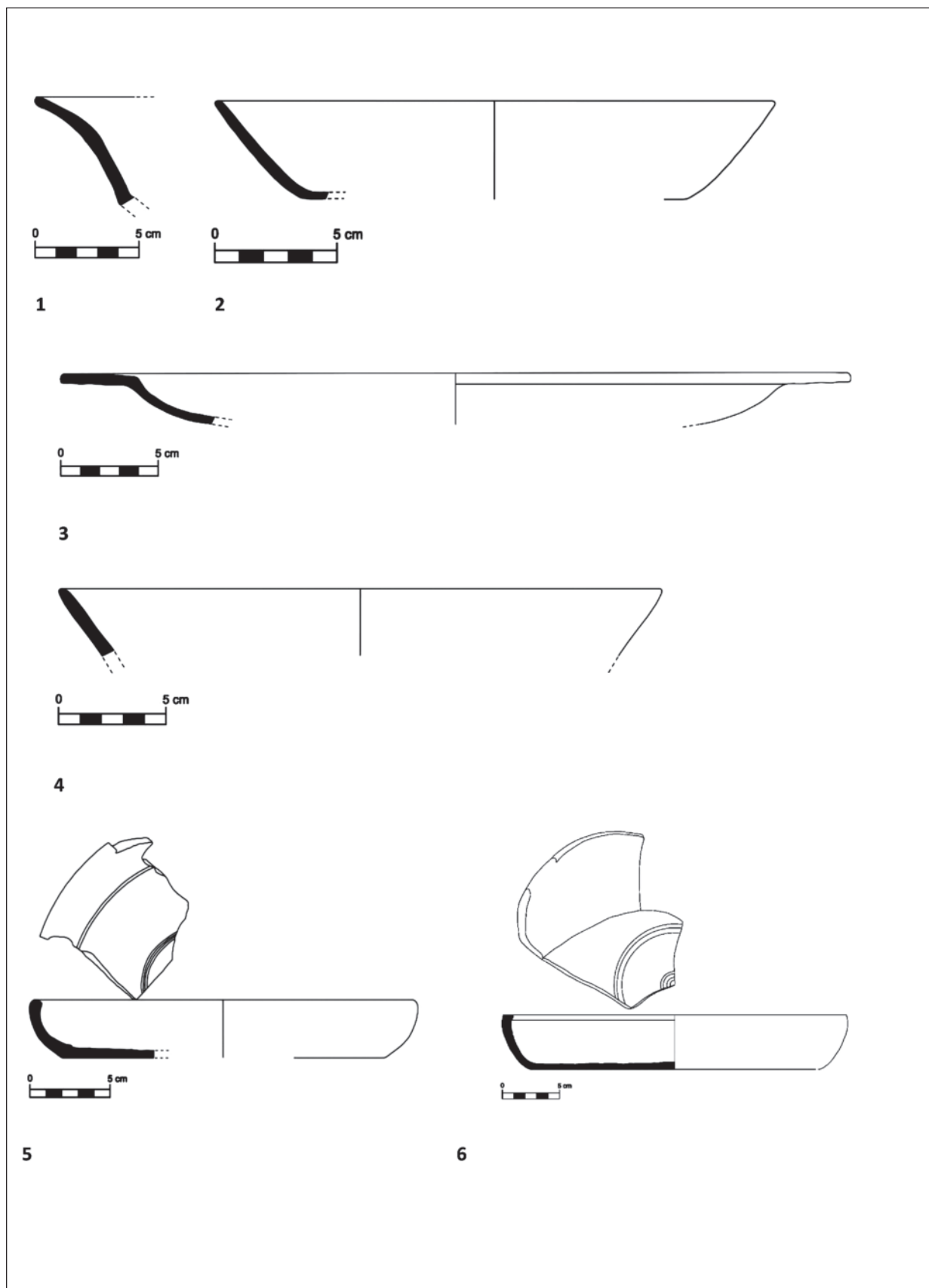
J14-Jcd-32-65

Bowl, rim, fragmented.

Fig. 4.

Diam.: 28; H.: 3.1; L.: 7.9; T.: 0.6.

Munsell: inner core: 2.5YR 5/8; outer core:



7.5YR 5/3; ext.: 2.5YR 5/6; int.: slipped: 10R 5/4.

Bowl, imitating ARS. Hard fired and medium finely levigated clay including many lime inclusions, some smaller stone grits and a few quartz particles. Thick but worn slip covering the surface.

References: shape: Dentzer (1986), p. 247; pl. 8, no. 2; Hayes (1972), ARS Form 50, Type A; Hayes (2008), p. 220, no. 986-987; fig. 31.

Late Roman (AD 230/ 240 – AD 325).

5.

J14-Jd-32-193

Bowl rim and base, fragment.

Fig. 5.

Diam.: 24; H.: 3.5; L.: 8.1; T. (max.): 0.7; (min.): 0.4.

Munsell: core: (inner): 2.5YR 5/4; (outer): 2.5YR 5/6; int.: 5YR 6/6; ext.: 2.5YR 5/6; slip: 5YR 4/3.

Bowl, imitating ARS form. Hard fired and medium finely levigated clay including air pockets, many lime, some quartz and occasionally black spots.

Flat base and rounded, thickened rim. Covered in a thin, matt and worn slip. Two incised circular grooves close to centre and a little ledge at the connection between rim and base.

References: Rasson (1986), p. 67, no. 2; fig. 17; Shape: Hayes (1972), ARS, Form 181.

Late Roman (3rd cent. AD).

6.

J14-Jd-32-163

Bowl rim, base, fragmented.

Fig. 6.

Diam. (max.): 30; H.: 4.8; L.: 14.9; T.: 0.6.

Munsell: core: 2.5YR 5/8; int.: 10R 5/8; ext.: 2.5YR 6/4; slip: 10R 5/8.

Bowl, local imitation of ARS. Hard fired and finely levigated clay including a few lime spots partly erupted during firing. Covered in a thick matt slip. Inwards rounded rim, flattened on top, with triple incised grooves surrounding the centre of the base. Ca. 4 cm from the centre another set of two incised concentric grooves are seen.

References: Shape: Uscatescu (1992), p. 246, no. 114; fig. 44; Parker (1994), p. 385f.; fig. 5.

Late Roman – Early Byzantine (1st half of the

4th cent. AD).

7.

J14-Jd-32-99

Juglet, almost intact.

Fig. 7.

Diam. (max.): 7.8; (base): 3.4; H.: 11.1; L.: 7.8; T.: 0.4.

Munsell: core: 7.5YR 8/4; int.: 7.5YR 8/4; ext.: 10YR 8/3; slip: 7.5YR 4/1.

Juglet, hard fired and rather finely levigated clay including a few air pockets, some lime spots. Covered in a thin, matt but worn slip. Two pieces (one handle and quite intact body, standing on a flat disc base) forming an almost complete juglet, with some burning on ext.

References: (resemblance in shape, but smaller) Uscatescu (1992), p. 257, no. 440; fig. 78; (form of the lip) Uscatescu (1992), p. 257, no. 445; fig. 78; (slight resemblance) Palumbo *et al.* (1993), fig. 9, no. 1.

Roman.

Painted Fine Ware (PE)

Jerash Bowls

Base

8.

J14-Jb-8-16A

Base, fragmented.

Fig. 8.

Diam.: 9; H.: 1.5; L.: 9.7/ 7.2; T.: 4.8.

Munsell: core: 5YR 6/8; int.: 5YR 6/8; ext.: 5YR 6/8.

Hard fired and finely levigated clay including some air pockets, a few black and red-brown spots. Stamped octagonal motif in centre, evocative of a spider web, which is surrounded by concentric circles. Covered in lime.

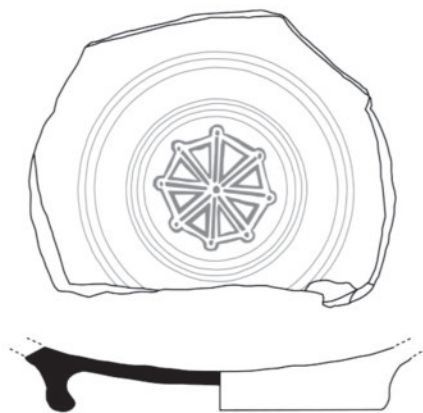
References: deco.: The deco. is known as a common motif for painted Jerash Bowls. See: Uscatescu (1992), fig. 26, no. 19C; fig. 48, no. 152; Watson (1989), Motif IIb-1, p. 252; fig. 7, no. 2.

Shape, ring base: Uscatescu (1996), p. 251, no. 239; fig. 59; Uscatescu (1995), p. 398, no.: 17; fig. 16; General shape, except the ring base, imitates: Hayes (1972), ARS Form 105, 2; 17.

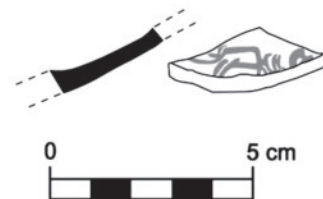
Late Byzantine – Early Umayyad (Late 6th – 2nd half of 7th cent. AD).



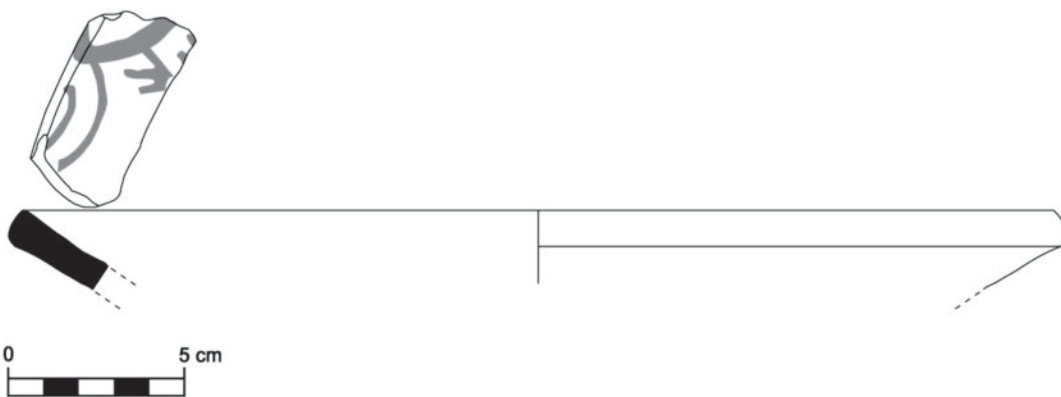
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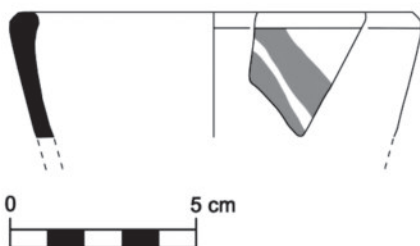
8



9



10



11

Body

9.

J14-Kb-78-2

Body, fragmented.

Fig. 9.

L.: 3.33; H.: 3.17.

Munsell not available.

Body fragment of a Jerash Bowl. Hard fired and finely levigated clay, with some lime inclusions. Deco.: Painted fine lines in dark red on a pale whitish background may resemble a bird.

References: deco. technique: Uscatescu (1996), p. 251, no. 263; fig. 62; (for an example of the deco. technique on a pale-ocre background) Uscatescu (1996), p. 249, no. 183; fig. 53; p. 251, no. 264; fig. 62.

Late Byzantine.

Other Painted Fine Wares

Rims

10.

J14-Kh-3-490

Bowl rim, fragmented.

Fig. 10.

Diam.: 30; H.: 2.3; L.: 5.5; T.: 1.

Munsell: core: 5YR 6/9; int.: 10YR 8/3; ext.: 5YR 6/6; deco.: 2.5YR 5/6.

Bowl, hard fired and finely levigated clay. Flat rim fragment, painted deco. on ext.: two red half circles, hanging down from rim top like garlands, under them red connected lines (floral motif?).

References: deco.: Uscatescu (1996), p. 188, no. 9b,d; fig. 26, no. 9a, b, d; p. 189, no. 13a, 14c, 14d; fig. 26; Shape: Uscatescu (1996), p. 249, no. 196; fig. 54.

Late Byzantine – Umayyad.

11.

J14-Kg-3-381

Jug rim w. handle, fragmented.

Fig. 11.

Diam.: 8; H.: 8.19; L.: 8.78; T. (min.): 0.343; (max.): 0.531.

Munsell: core: (inner): GLEY1 5/N; (outer): 2.5YR 6/8; int.: 2.5YR 6/8; ext.: 2.5YR 5/4; deco.: white 7.5YR / 8.5/.

Jug, hard fired and medium finely levigated clay, occasionally including air pockets. Rounded rim with flat handle vertically attached. White

deco. on ext.: wavy lines on body, diagonal lines on rim, forming no distinctive motif.

References: Ball *et al.* (1986), fig. 1, 6; Clark (1986), p. 251, no. 8; fig. 21; pl. XVII, 2; Schaefer and Falkner (1986), fig. 12, 2.

Umayyad (8th cent. AD).

Red Painted Pale Ware

12.

J14-Kh-3-549

Bowl rim, fragmented.

Fig. 12.

Diam.: 11; H.: 3.3; L.: 3.3; T.: 0.4.

Munsell: core: (inner): 7.5YR 6/4; (outer): 7.5YR 7/4; int.: 7.5YR 6/4; ext.: 10YR 7/2; deco.: 2.5YR 5/4.

Hard fired and medium finely levigated clay, including a few air pockets. Wheel-made rim fragment with red painted deco. on ext.: two thick, diagonal lines.

References: deco.: Walker (2012), p. 517; fig. 4.4, no. 20; p. 510-511; fig. 4.1, no. 27; fig. 4.2, no. 1; Rasson and Seigne (1989), p. 127, no. 7; fig. 5, 5; Najjar (1989), p. 314, fig. 5, no. 4; 'Amr (1988), p. 247-254, fig. 1, no. 7, 11; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215; fig. 23, no. 3-4; shape: Gawlikowski and Musa (1986), pl. XII, second top on right column; Walker (2012), p. 512; fig. 4.1, no. 13-18; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215; fig. 23, no. 3-4.

Umayyad (7th – 8th cent. AD).

13.

J14-Kh-44-25

Bowl rim, fragmented.

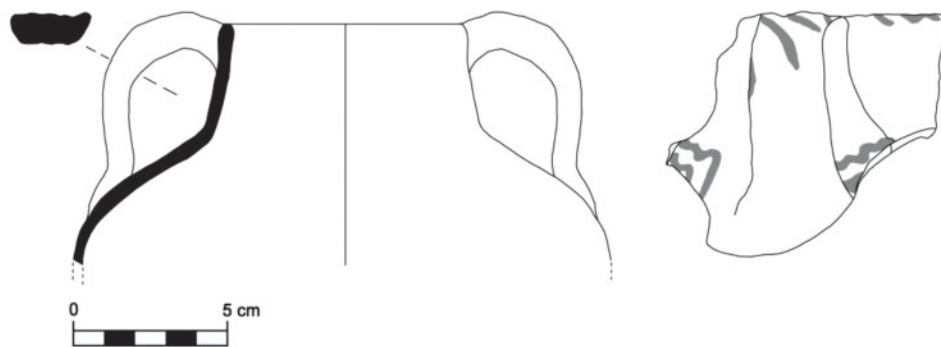
Fig. 13.

Diam.: 10; H.: 2.9; L.: 2.8; T.: 0.3.

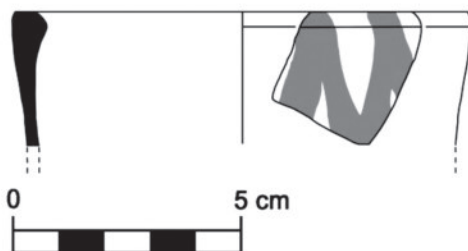
Munsell: core: 7.5YR 6/4; int.: 7.5YR 6/4; ext.: 10YR 7/4; deco.: 10YR 4/3.

Bowl, hard fired and rather finely levigated clay, including a few air pockets. Flattened rim fragment with red painted zig-zag lines.

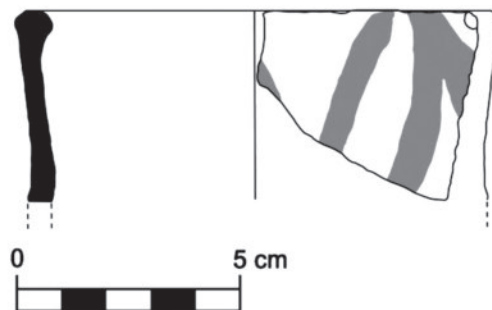
References: deco.: Walker (2012), p. 517; fig. 4.4, no. 20; Najjar (1989), p. 312; fig. 5, no. 4. Rasson and Seigne (1989), p. 127, no. 7; fig. 5, 5; Walmsley, Macumber and Edwards (1993), p. 213 Ware II; p. 215; fig. 23, no. 3-4; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215, no. 3-4; fig. 23; shape:



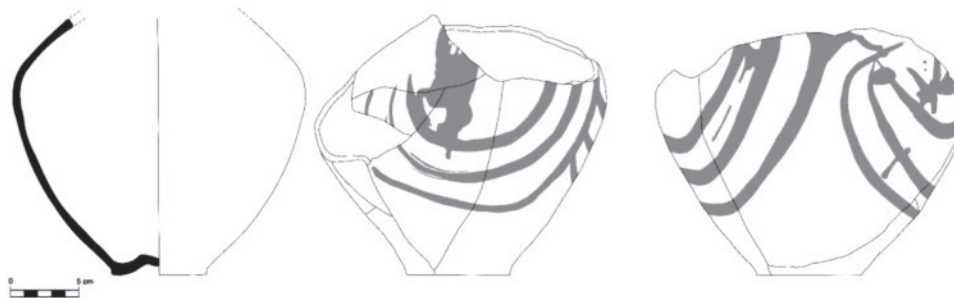
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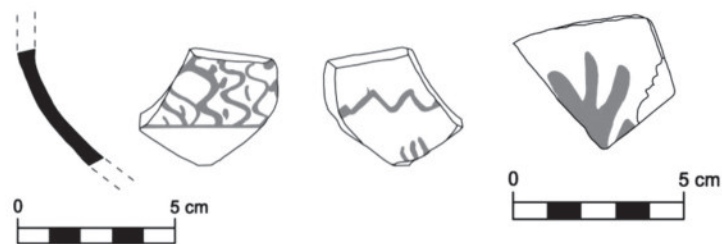
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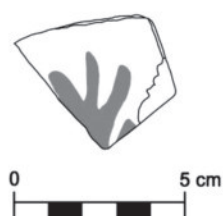
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15



16



17

Walker (2012), p. 512, no. 13-16; fig. 4.1; Gawlikowski and Musa (1986), pl. XII, second top on right column; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215, no. 3-4; fig. 23.

Umayyad (7th – 8th cent. AD).

14.

J14-Kh-3-439

Bowl rim, fragmented.

Fig. 14.

Diam.: 10.6; H.: 4.25; L.: 4.8; T. (min.): 0.3; (max.): 0.7.

Munsell: core (inner): 10YR 7/4; (outer): 7.5YR 7/6; int.: 7.5YR 7/4; ext.: 7.5YR 7/6; deco.: 10R 4/4; wash: white 2.5Y₁₈/.

Crispy fired, medium fine levigated clay, including some air pockets, many lime (a few erupted) and many brown spots. The thin, matt and worn red paint is put onto a matt and worn white wash which is covering the surface.

References: deco.: Walker (2012), p. 517; fig. 4.4, no. 20; p. 510-511; fig. 4.1, no. 27; fig. 4.2, no. 1; Rasson and Seigne (1989), p. 127, no. 7; fig. 5, no. 5; Najjar (1989), p. 312, fig. 5, 4; 'Amr (1988), p. 247-254; fig. 1, no. 7, 11; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215 no. 3-4; fig. 23.

Shape: Walker (2012), p. 512; fig. 4.1, no. 13-16; Gawlikowski and Musa (1986), pl.: XII, top on right column; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; p. 215, no. 3-4; fig. 23.

Umayyad (7th – 8th cent. AD).

Painted Buff Ware

Base

15.

J14-Kh-3-243

Jar, base, fragmented.

Fig. 15.

Diam. (max.): 21.4; (base): 6.8; H.: 18.8; T. (min.): 0.413; (max.): 0.576.

Munsell: core: 7.5YR 8/2; int.: 7.5YR 7/3; ext.: 7.5YR 7/4; deco.: 10R 4/1 – 5YR 6/4.

Jar with disc-base, crispy fired but rather finely levigated clay, including some air pockets; deco.: Painted brown, semi-circles intertwined and other lines crossing the semi-circles or running parallel to them. A star-like form

appears in one of the semi-circles.

References: (slight resemblance in form and roughly the deco.) Gawlikowski and Musa (1986), p. 149; fig. 8, 2; (the earliest piece published with indistinct spots in any places on body) Walker (2012), p. 532; fig. 4.10, no. 5. Umayyad (7th – 8th cent. AD).

Body

16.

J14-Iac-11-8

Goblet body, fragmented.

Fig. 16.

H.: 2.8; L.: 4.6; W. (max.): 0.52; (min.): 0.47.

Munsell: core: 5YR 5/8; ext.: 7.5YR 8/4; deco.: 5YR 4/3.

Goblet, hard fired and finely levigated clay. Small stem broken off, break still visible. Wheel-made. Red-brown paint on whitish background on int. and ext.

References: deco: Dornemann (1990), p. 155; pl. III, 1, no. 10.

Umayyad (7th – 8th cent. AD).

17.

J14-Kf-3-357

Bowl body, fragmented.

Fig. 17.

L.: 4.1; W.: 4.1; T.: 0.6.

Munsell: core: 2.5YR 5/8; int.: 10YR 8/2; ext.: 10YR 7/2; deco.: 7.5YR 5/8; wash: 10YR 8/2.

Bowl, hard fired and finely levigated clay; deco. ext.: 4 light red painted lines, connected in a corner of the sherd on whitish wash.

References: deco.: Dornemann (1990), p. 155, pl. III, 1, no. 17; Walmsley, Macumber and Edwards (1993), p. 213, Ware II; fig. 23; Walker (2012), p. 532; fig. 4.10, no. 8; Joguín (2001), p. 644; fig. 7.

(Dornemann - Walker) "Umayyad, 7th – 8th cent. AD"; (Walmsley, Macumber and Edwards) "Abbasid".

Umayyad (7th – 8th cent. AD).

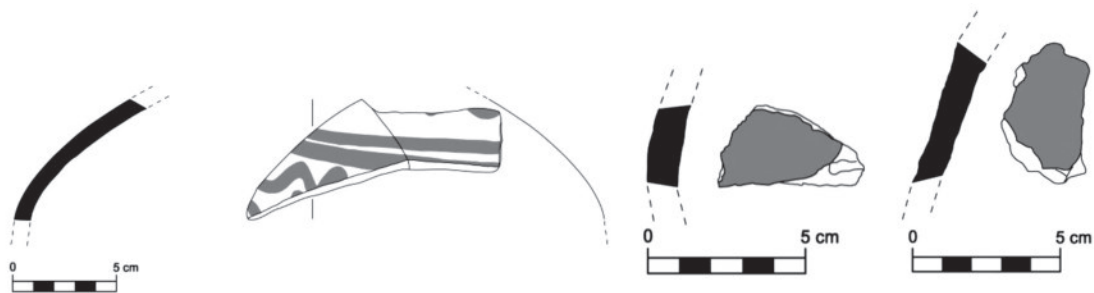
Red Painted Pale Ware

18.

J14-Kh-3-548 + J14-Kh-3-544

Jar, body.

Fig. 18.



18

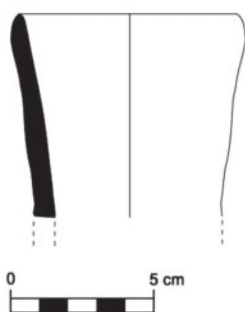
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20



21

22



23



Diam.: 2.8; H.: 5.4; L.:12.2; T.: 0.8.

Munsell: core: (inner): 5YR 7/1; (outer): 5YR 7/6; int.: 7.5YR 7/4; ext.: 10YR 8/2; deco.: 2.5YR 5/6.

Pear-shaped jar. Hard fired and rather finely levigated clay, including a few air pockets. Thin whitish slip; deco.: two red horizontal lines, two wavy lines below and remains of another red paint above.

References: deco.: Walker (2012), p.517; fig. 4.5, no. 1; Smith (1973), pl: 91, C.

Shape: Walker (2012), p. 517; fig. 4.4, no. 22; Schaefer and Falkner (1986), p. 314; fig. 13, 7. Umayyad (7th – 8th cent. AD).

Glazed Ware

19.

J14-Kh-3-441

Body, fragmented.

Fig. 19.

L.: 4.51; W.: 2.55; T.: 1.01.

Munsell: core: 5YR 8/2-5Y 8/3; glaze (int.): White 2.5Y_{18.5}; (ext.): GLEY1 5/5G₂.

Indistinct form, medium hard fired and rather coarse clay, including some air pockets. Turquoise glaze on int. and ext.

References: Walker (2012); p. 551; fig. 4.14, no. 9; Milwright (2008), p.317, no. 13.

Late Ayyubid – Mamluk (13th – 14th cent. AD).

20.

J14-Kh-3-442

Body, fragmented.

Fig. 20.

L.: 5.31; W.: 2.97; T.: 0.94.

Munsell: core: (inner): 5Y 8/3; (outer): 2.5Y 8/3; glaze (int.): GLEY1 4/N; (out.): GLEY1 5/5G₂.

Indistinct form, medium hard fired and rather coarse clay including many air pockets, a few lime and black spots. Turquoise glaze on int. and ext.

References: Walker (2012), p. 551; fig. 4.14, no. 9; Milwright (2008), p. 317, no. 13.

Late Ayyubid – Mamluk (13th – 14th cent. AD).

Handmade Geometric Painted Ware (HGPW) (CBH)

Rims

21.

J14-Icd-25-2

Plate rim, fragmented.

Fig. 21.

H.: 1.9; L.: 5.2; T.: 0.9.

Munsell: core: (inner): 10YR 5/1; (outer): 10YR 7/3; int.: 10YR 7/2; ext.: 10YR 8/2.

Plate, rounded rim, flattened base, concave sloping body; deco.: painted: dark line covering rim; int. deco.: nine horizontal lines, circulating body; ext. deco.: two horizontal lines framing a triangular pattern.

References: deco.: Franken *et al.* (1975), p. 187; fig. 26; p. 182; fig. 7.

Late Ayyubid – Mamluk (13th – 15th cent. AD).

22.

J14-Icd-29-7

Lid, fragmented.

Fig. 22.

Diam.: 12.5; H.: 4.2; L.: 12.5; T.: 1.2-1.5.

Munsell: core: 5YR 6/0; int.: 7.5YR 7/4; ext.: 2.5Y 7/3; deco.: 10R 3/2, 5YR 4/3.

Lid, convex sloping neck/body, rounded lid rim. With handle fragment attached almost in the depressions centre; deco.: Painted: ext.: thin line, triangular pattern; deco. int.: geometric pattern, five triangles part of star form, around square in centre, dark dots in some triangles; rim: broad dark line covering rim.

References: deco.: Franken *et al.* (1975), p. 182, fig. 7; p. 194; fig. 26; Shape: Franken *et al.* (1975), p. 184; fig. 16; p. 195; fig. 15; Lichtenberger, Raja and Sørensen (2013, forthcoming), fig. 35.

Late Ayyubid – Mamluk (13th – 15th cent. AD).

23.

J14-Kefg-1-60 + J14-Kg- 3N-366

Jug rim, fragmented.

Fig. 23.

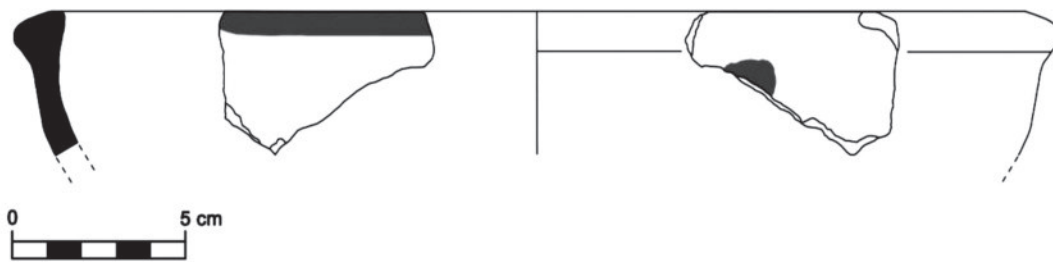
J14-Kefg-1-60: Diam.: 8; H.: 7; L.: 7.3; T.: 0.6.

J14-Kg- 3N-366: Diam.: 8; H.: 5.4; L.: 4.6; T.: 0.5.

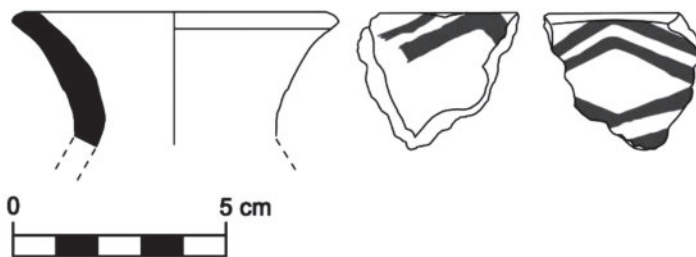
Munsell: core: 2.5Y 8/3; int.: 2.5Y 8/3; ext.: 2.5Y 8/3; deco.: 2.5YR 3/3.

Jug, slightly out sloping neck/body. Rounded, straightened rim; deco.: painted: ext.: three sections of deco. at neck; geometric-, triangular- pattern and pointed lines circulating neck, triangular pattern on neck; deco. int.: one straight horizontal line; rim: dark line covering rim.

References: deco.: Franken *et al.* (1975), p. 186; fig. 39; Lichtenberger, Raja and Sørensen



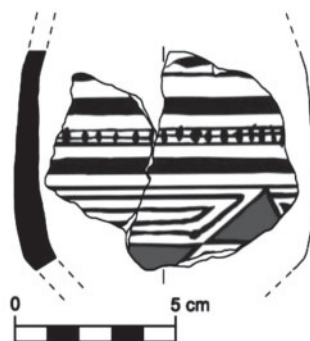
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26



27

(2013, 2017), fig. 34; Shape: Franken *et al.* (1975), p. 189; fig. 1; p. 191; fig. 19; Thuesen (1988), p. 220; fig. 3.

Late Ayyubid – Mamluk (13th – 15th cent. AD).

24.

J14-Kg-31-2

Bowl rim, fragmented.

Fig. 24.

Diam.: 30; H.: 4.1; L.: 6.

Munsell: core. 10YR 6/4; int.: 10YR 8/2; deco. slip: 2.5YR-2.5YR 6/6.

Bowl, convex sloping neck/body. Rounded rim.

Deco.: Painted: ext.: thick horizontal line on upper rim; int. deco.: circular.

References: deco.: Franken *et al.* (1975), p. 184; fig. 9.

Shape: Franken *et al.* (1975), p. 184; fig. 20.

Late Ayyubid – Mamluk (13th – 15th cent. AD).

25.

J14-Kf-29-2

Jug rim, fragmented.

Fig. 25.

Diam.: 7; H.: 3.21; L.: 3.58; W.: 3.42; T.: 0.71.

Munsell: core: (inner): 10YR 7/3; (outer): 2.5YR 6/6; int.: 5YR 6/6; deco.: 10R 4/4; slip: 5YR 6/6.

Jug, inwards sloping rounded rim, with convex neck/body; deco.: painted: two parallel running lines continuously forming up- and downwards pointing obtuse angles on both ext. and int. surface.

References: deco.: Franken *et al.* (1975), p. 178; fig. 16; Shape: McQuitty *et al.* (1997-98), p. 211; fig. 8.

Late Ayyubid – Mamluk (13th – 15th cent. AD).

Base

26.

J14-Ic-29-1x

Jug base.

Fig. 26.

Diam.: 15; H.: 12.5; L.: 14.2; T.: 0.4.

Munsell: ext.: 2.5Y 8/3; deco.: 10R 4/3. Lime incrustated on other surfaces.

Jug, ring base concave at centre, with angular body. Oval handle fragment at one side of upper body/shoulder. Dark brown slip on white: deco. ext.: two sections, upper section in panels,

divided by lines straight and wavy, containing diagonally geometric bands, with zig-zag and spiral pattern. Lower section with rectangular spiral pattern. Base: dark line covering base.

References: deco.: Franken *et al.* (1975), p. 180; fig. 7; shape: Avissar (1996), p. 170; fig. 1-2.

Late Ayyubid – Mamluk (13th – 15th cent. AD)

Body

27.

J14-Ib-13-8 + J14-Iac-11-4

Body, fragmented.

Fig. 27.

Diam. Max: 8.4; H.: 7.7; T.: 0.7

Munsell: core: 10YR 2/8; int.: 10YR 2/8.5; deco.: 2.5Y 2/9 + 7.5R 3/2.

Closed shape, presumably from neck, horizontal convex body fragment; deco.: painted: ext.: two horizontal lines. One horizontal band with small vertical lines, with three horizontal lines running over, under and in centre. A broad band. Triangular pattern; int.: white slip.

References: deco.: Franken *et al.* (1975), p. 183; fig. 5; shape: Franken *et al.* (1975), p. 197; fig. 13; McQuitty *et al.* (1997-98), p. 220; fig. 32.

Late Ayyubid – Mamluk (13th – 15th cent. AD)

Object With Cut Decoration (Lantern ?)
(PE)

28.

J14-Ke-3-173

Lantern or bowl rim (?), fragmented.

Fig. 28

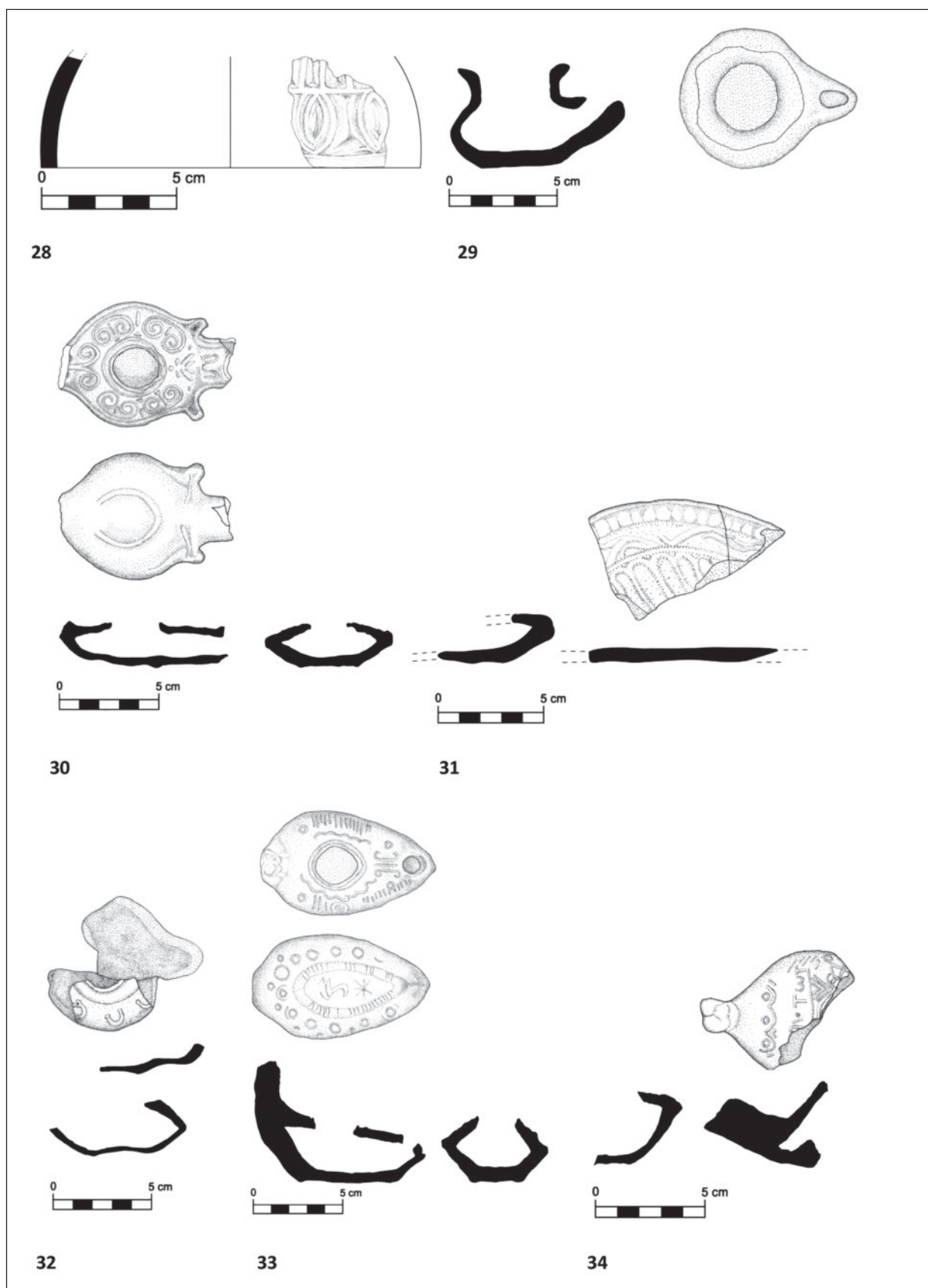
Diam. (base): 14; H.: 4.1; L.: 3.4; T.: 0.5.

Munsell not available.

Lantern or bowl fragment with incised decoration; hard fired, rather finely levigated clay, including a few erupted and non-erupted lime particles.

The incised deco. visible: two bands of different repetitive motives. The upper one shows a smaller ovoid with pointy ends (“eye form”) in a bigger one. The band below shows a repetitive sequence of a slim, rectangular “funnel”-impression, followed by a slightly bigger one. The decorated bands are separated by a thin line in positive.

References: same ware but differently decorated: Bonifay (2004), p. 301, 2.3.9; fig. 168; Lichtenberger, Raja and Sørensen (2013),



no. 56, Uscatescu (1996), p. 266, no. 755; fig. 108.

Late Byzantine – Umayyad.

Lamps (NSL)

Rims

29.

J14-Kef-3-239

Rim, fragmented.

Fig. 29.

H.: 4.7; L.: 6.5; T.: 0.6.

Munsell: core: 10YR 1/6; surface (int.): 5YR 4/1; (ext.): 7.5 YR 4/1.

Wheel made with outwards flattened round rim; round filling hole; oval wick hole.

References: Adler (2004), fig. 137.

Roman (1st – 3rd cent. AD).

30.

J14-Le-2-7

Rim, almost intact.

Fig. 30.

H.: 2.2; L.: 8.7.

Munsell: core: 10YR 5/2; surface (int.): 10YR 6/2; (ext.): 10YR 6/2-6/3.

Mould made with circular filling hole and base ring; wick hole not preserved; deco.: volutes around edge of body; two ears attached near wick hole with flower-like deco. in between.

References: Da Costa (2001), fig. 1, no. 5.

Roman (2nd – 3rd cent. AD).

31.

J14-Jd-32-208

Rim and fill hole, fragmented.

Fig. 31.

Diam.: H.: 2.2; L.: 9; T.: 0.9.

Munsell: Not available.

Mould-made with decorative oval pattern around edge of body, on shoulder flower-like pattern; diagonal grooves towards filling hole.

References: Mlynarczyk (2013), fig. Gr 4 Q 22.

Late Roman (3rd – 4th cent. AD).

32.

J14-Jd-32-166

Rim, fragmented.

Fig. 32.

Diam. (base): 3.8; H.: 2.6; L.: 8; T.: 0.37.

Munsell not available.

Mould made with circular body, base ring, and rounded nozzle; ledge running around shoulder of body; deco.: horseshoe pattern around edge of body.

References: Kehrberg (2005), fig. 19, 22; Kennedy (1963), type 15; Da Costa (2010), fig. 3b; Zayadine (1986); pl. V, no. 19.

Late Roman – Byzantine (4th – 5th cent. AD).

33.

J14-Kc-3-202

Jerash lamp, intact.

Fig. 33.

H.: 6.6; L.: 9.4; T.: 0.6.

Munsell: core: Gley 1 2.5/10/4; surface (int.): Gley 1 4/N; (ext.): Gley 1 4/N.

Mould made with a wavy ledge on upper surface; continuous diagonal lines running around edge of body, round fill hole. Above wick hole a vertical line is flanked with volutes and two circles; two ledges around fill hole; straight zoomorphic handle and oval base ring; diagonal lines running on ring base; inside base ring, deco. of bird and star.

References: Al-Khouly (2001), fig. 4, no. 196; Khairy and ‘Amr (1986), fig. 12, 15; Day (1942), p. 65-79; pl. 12.

Late Byzantine – Umayyad.

34.

J14-Kh-3-491

Handle, fragmented.

Fig. 34.

H.: 5.5; L.: 5.6; T.: 0.4.

Munsell: core: Gley 1 3/N; surface (int.): Gley 1 4/N; (ext.): Gley 1 3/N.

Mould made; zoomorphic handle; diagonal lines running along edge of body; towards fill hole Greek letters: “T ω T” on upper surface between filling hole and handle; below letters triangular deco; below handle wavy pattern and three circles.

References: Khairy and ‘Amr (1986), fig. 15; Day (1942), pl. XIII; fig. 2.

Umayyad.

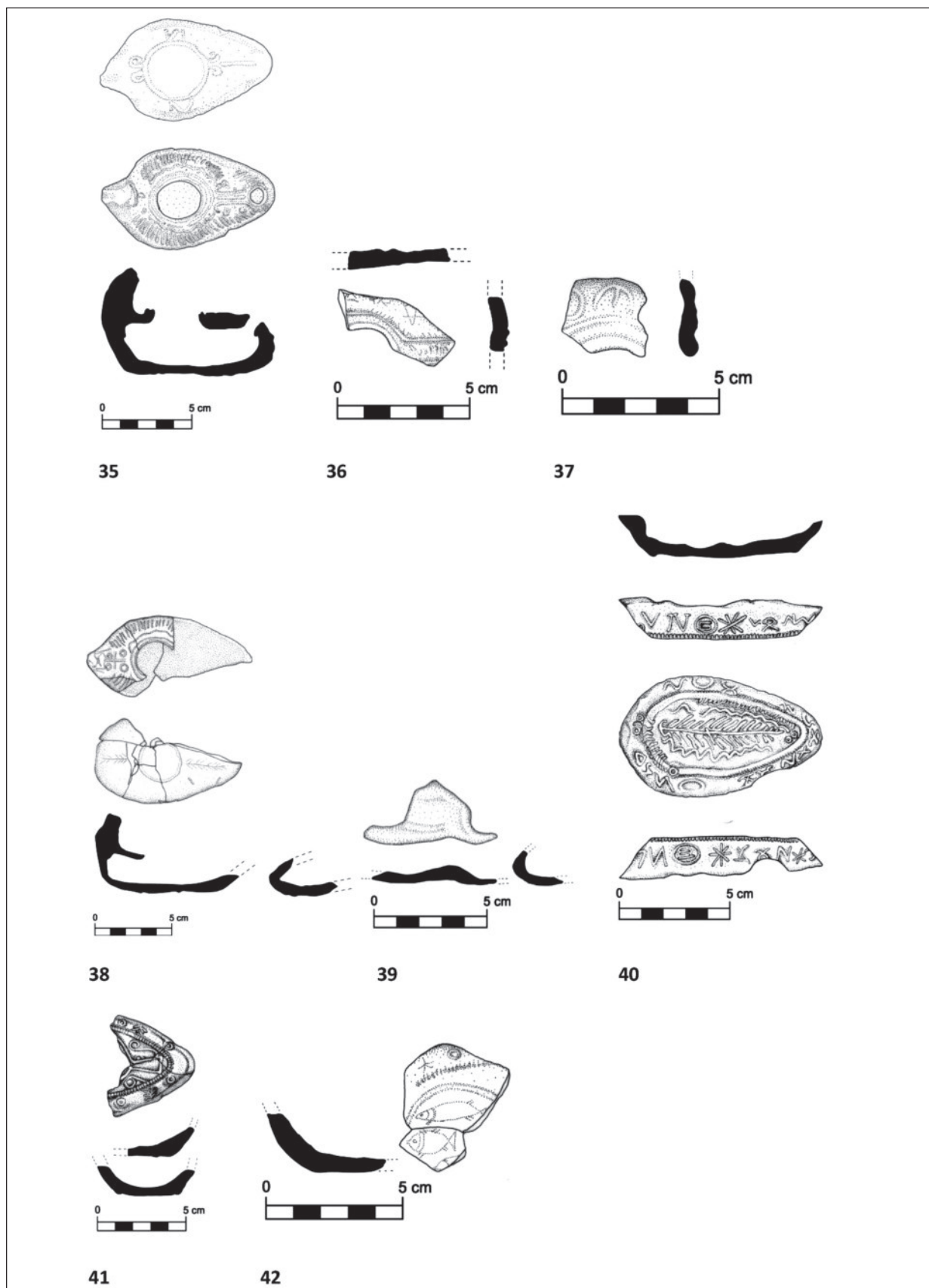
35.

J14-Kg-3-372

Hybrid Jerash lamp, intact.

Fig. 35.

H.: 5.87; L.: 9.61; T.: 0.7.



Munsell: core: 5YR 6/6; surface (int.): 5YR 5/3; (ext.): 2.5YR 5/6-5YR 5/3.

Mould made and on upper surface diagonal lines are running around edge of body; one ledge and one wavy line encircling the fill hole; small handle with squeezed top; base ring with volutes on each side of base towards filling hole and handle; letter "N" on each side of upper base. The lamp combines an upper part of a Jerash Lamp (without the 'cross') with an Umayyad/Abbasid lamp base.

References: Kehrberg (2005), fig. 64; Da Costa (2001), p. 255, fig. 2; Zayadine (1986), pl. VI, no. 11.

Umayyad (8th cent. AD).

36.

J14-Kc-3-152

Rim, fragmented.

Fig. 36.

H.: 1; L.: 4.6; T.: 0.55.

Munsell: core: 2.5 YR 6/8; surface (int.): 2.5 YR 6/8; (ext.): 5 YR 6/6.

Mould made, channel nozzle lamp; deco.: stars on upper side; diagonal lines on top of channel nozzle; Ledge running around fill hole.

References: Al-Khouly (2001), fig. 1, no. 196; Khairy and 'Amr (1986), fig. 9.

Umayyad (7th – 8th cent. AD).

37.

J14-Lh-9-22

Rim, fragmented.

Fig. 37.

H.: 1.7; L.: 6.2; T.: 0.4.

Munsell: core: 7.5YR 7/4; surface (int.): 7.5YR 6/4; (ext.): 7.5YR 7/4-7/6.

Mould made; fragment of upper part; deco: two ledges around fill hole; "ω"-pattern running around edge of body.

References: Day (1942), pl. 6, fig. 1; pl. XIV, fig 1; Kennedy (1963), pl. XXVIII, fig. 761; Khairy and 'Amr (1986), pl. XLI, fig. 12.

Umayyad (7th – 8th cent. AD).

38.

J14-Ke-3-203

Jerash lamp rim, fragmented.

Fig. 38.

H.: 5.2; L.: 9.2; T.: 0.7.

Munsell: core: 5YR 3/3; surface (int.): 5YR

6/4; (ext.): 5YR 7/3.

Mould made; handle: small with squeezed top; deco.: diagonal lines running around edge of body; one ledge and one wavy line encircling the fill hole; under handle "cross" and four circles; base ring; on each side of base ring two leaves.

References: Kehrberg (2005), fig. 64; Da Costa (2001), p. 255; fig. 2; Lichtenberger, Raja and Sørensen (2013), no. 53; Lichtenberger, Raja and Sørensen (2017), no. 48 and 49.

Late Umayyad (8th cent. AD).

39.

J14-Lb21-7

Rim, fragmented.

Fig. 39.

H.: 1.5; L.: 7.5; T. (max.): 0.7, (min.): 0.2.

Munsell: core: 7.5YR 8/4; surface (int.): 10YR 8/2; (ext.): 10 YR 7/3.

Mould made; round wick hole; smooth surface; traces of fire at wick hole; no deco.

References: Adler (2004), fig. 85.

Not datable.

Bases

40.

J14-Kac-3-81

Complete base.

Fig. 40.

H.: 1.8; L.: 9.2; T. (max.): 0.95; (min.): 0.15; W.: 5.27.

Munsell: core: 5YR 5/4; surface (int.): 10R 3/1; (ext.): 2.5YR 5/6.

Mould made, drop shaped base; inside the drop shaped stand ring leaf deco; diagonal lines running around stand ring; stars and Greek letters [N X] on upper side of base. Int. traces of use and fingerprints.

References: Khairy and 'Amr (1986), fig. 10.

Umayyad (7th – 8th century AD).

41.

J14-Kc-3-20+26+66

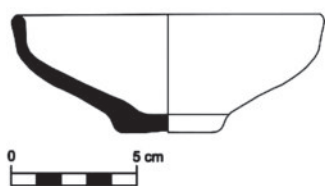
Base, fragmented.

Fig. 41.

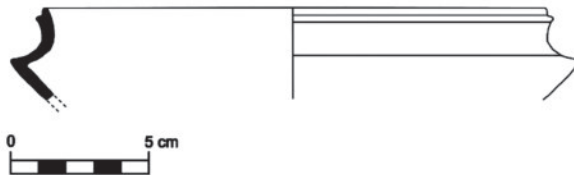
H.: 1.5; L.: 5; W.: 5.7.

Munsell: core: 2.5YR 6/8; surface (int.): 5YR 7/8; (ext.): 5 YR 6/6-5YR 6/3.

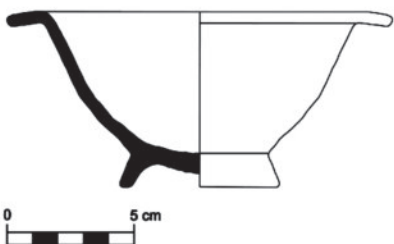
Mould made; deco.: vase like depiction in base



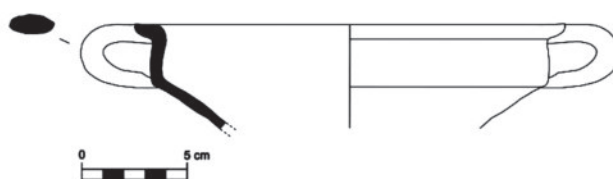
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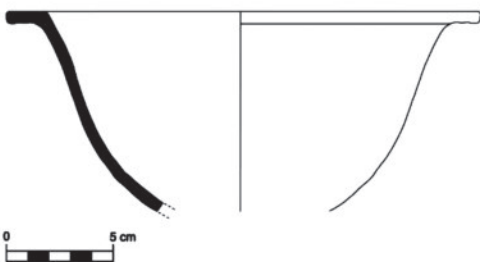
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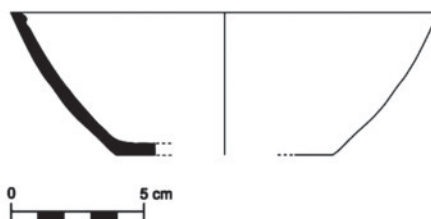
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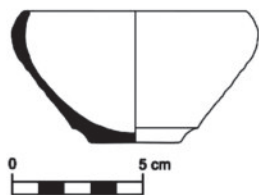
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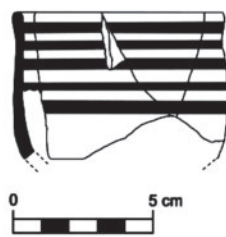
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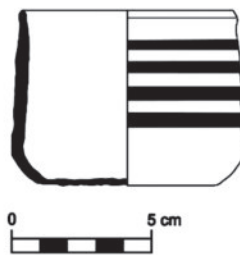
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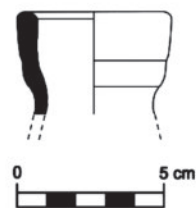
49



50



51



52

ring; around edge of base: stars, leaves and circles.

References: Al-Khouly (2001), fig. 4, no. 196; Khairy and 'Amr (1986), fig. 12, 15.

Umayyad (7th – 8th cent. AD).

42.

J14-Kg-44s-12

Base, fragmented.

Fig. 42.

H.: 2.2; L.: 4.5; T.: 0.7.

Munsell: core: 2.5YR 6/6-6/8; surface (int.): 2.5YR 7/6-6/6; (ext.): 5YR 6/6.

Mould made; deco.: at base centre two complete fish and parts of a third fish; one star and one circle on upper base part.

References: Khairy and 'Amr (1986), pl. XLI, fig. 15; Day (1942), pl. XIV, fig. 1.

Umayyad (7th – 8th cent. AD)

Household Wares (SBK)

Table Wares

Bowls

Rims

43.

J14-Jd-32-204

Bowl, almost intact.

Fig. 43.

Diam. (rim): 12.5; (base) 4; H.: 4.7; T.: 0.5.

Munsell: ext.: 2.5YR 5/6; int.: 2.5YR 5/8; slip: 2.5YR 5/6.

Bowl with rounded thickened rim, straight neck, steep, rounded body, disk base. Hard fired. Levigation: medium with air pockets; inclusions: many lime, some erupted, few quartz, some black spots. Slip: thick and covering, lustrous but worn.

References: shape: Parker (2014), p. 213; fig. 15, no. 2; Kenkel (2012), taf. 14, group 6, no. 1.4; Uscatescu (1996), p. 282; fig. 12, group V, no. 1.; slip: Gervasini (2005), p. 283; Tav. 1a, no. 3, 7; Mazar (2006), p. 367; pl. 17, no. 7; Johnson (2008), p. 21, no. 62.

Early Roman – Byzantine (1st – 5th cent. AD).

44.

J14-Jcd-32-74

Bowl rim, fragmented.

Fig. 44.

Diam.: 18; H.: 3.3; L.: 7.2; T.: 0.4.

Munsell: ext.: 2.5YR 5/6-6/4; int.: 2.5YR 6/6; core: (inner): 10YR 4/3; (outer): 2.5YR 6/6.

Bowl with outwards flaring, rounded rim. Incised groove in rim (double rim). Distinct convex shoulder, steep body with shallow ribbing, secondarily fired ext. at rim. Hard fired. Levigation: medium; inclusions: some lime and stone grits, much quartz.

References: Uscatescu (1986), p. 254, no. 322; fig. 37; p. 254, no. 323, 326; fig. 68; London (2012), p. 664; fig. 5.66, no. 126; Mazar (2006), p. 479; pl. 73, no. 3.

Roman – Byzantine.

45.

J14-Jd-32-196

Bowl, intact profile.

Fig. 45.

Diam.: 15.3; H.: 6.9; T. (min.): 0.4, (max.): 0.5.

Munsell: ext.: 2.5YR 5/8; int.: 2.5YR 7/6; core: 2.5 YR 6/8; deco.: 2.5YR 5/6.

Bowl with outwards-flattened rim, rounded body and ring base; slip covering ext. and rim. Hard fired. Levigation: Rather finely; inclusions: some lime, few quartz, many black; deco.: slip: thick and lustrous but worn.

Not datable.

46.

J14-Jd-35-5

Bowl/casserole rim and handle, fragmented.

Fig. 46

Diam.: 18; H.: 5.1; L.: 6.1; T.: 0.6.

Munsell: ext.: 5YR 6/4; int. 5YR 5/3; core: (inner): 5YR 4/3; (outer): 7YR 5/4.

Flattened rim, rounded out-turned lip. Straight neck and steep body. Vertical strap handle attached at rim and shoulder. Hard fired. Levigation: medium with air pockets; inclusions: many lime, many erupted, some black and some red-brown spots.

References: Uscatescu (1996), p. 244, no. 22-24; fig. 38; fig. 16, group XVI, no 5; Lichtenberger, Raja and Sørensen (2013, 2017), fig. 54.

Late Roman (3rd – 4th cent. AD).

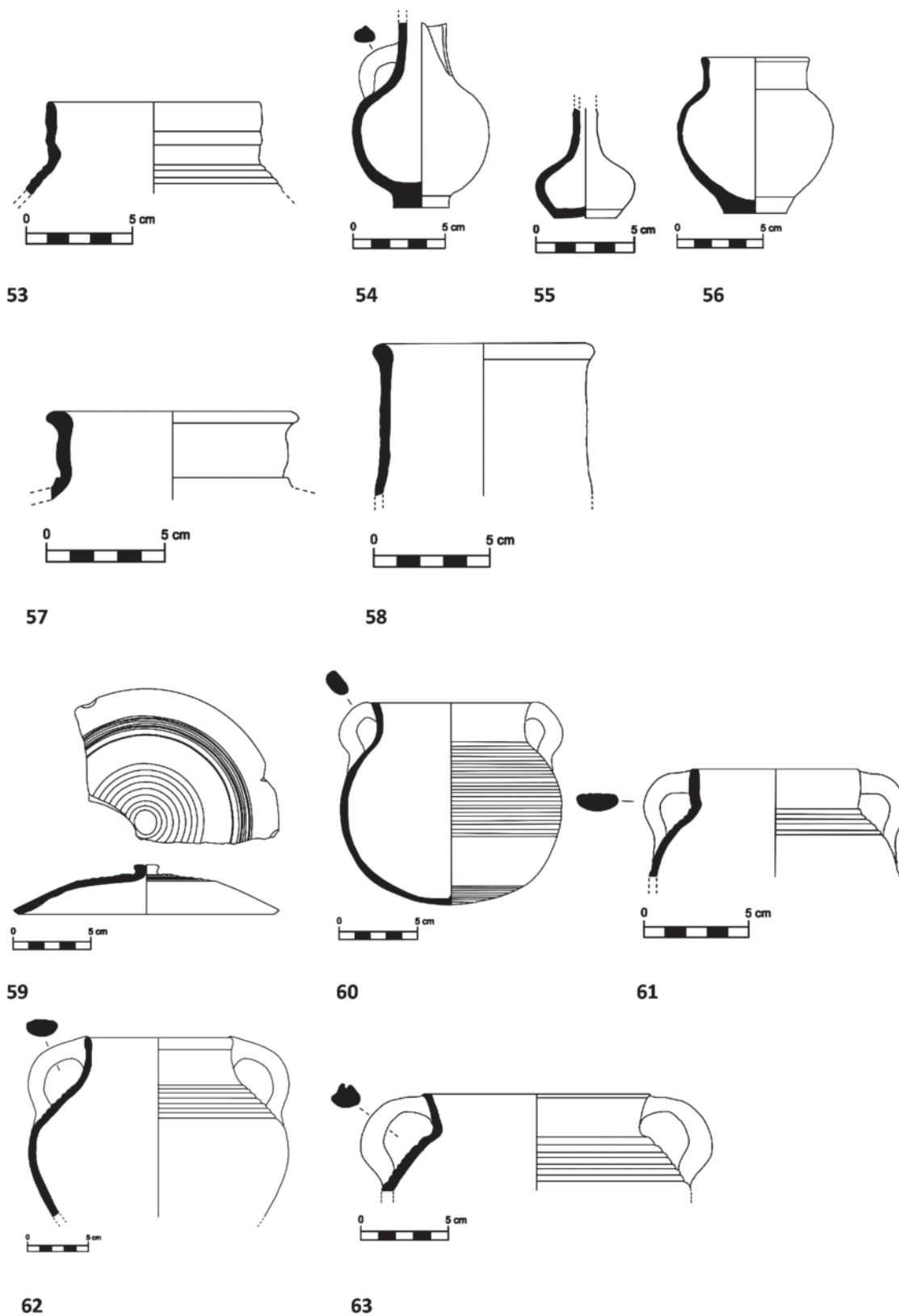
Orange Ware

47.

J14-Jd-32-95

Bowl, almost complete profile.

Fig. 47.



Diam.: 22; H.: 9.4; L.: 16; T.: 0.4.
 Munsell: ext.: 2.5YR 6/8; int.: 2.5YR 6/8; core: (inner): 2.5YR 5/8; slip: 2.5YR 4/6.
 Bowl. Outwards flaring, flattened rim, rounded lip. Steep dome shaped body. Hard fired. Levigation: medium; inclusions: many lime, many eruptions; slip: thin, matt and worn.
References: Cowie (2007), p. 173; fig. 15.12, no. 2; Johnson (2008), p. 50, no. 160.
 Roman.

Reddish/Red-Brown Ware

48.

J14-Kb-3-35

Bowl, intact profile.

Fig. 48.

Diam. base: 8; H.: 5.3; L.: 5.4; T.: 0.4.

Munsell: ext.: 2.5YR 4/1; int.: 2.5YR 5/6; core: 2.5YR 6/8.

Bowl, cut rim; straightened body and neck, ribbed body, disk base. Hard fired. Levigation: fine; inclusions: occasional lime, a few have erupted.

Not dateable.

Cups

Rims

49.

J14-Kg-3-291

Cup, almost intact.

Fig. 49.

Diam.: 7.6; H.: 5.2; L.: 7.6; T.: 0.4.

Munsell: ext.: 2.5YR 5/4; int.: 2.5YR 5/3; core: 7.5 YR 4/2; deco.: white page 10YR 2/6.

Cup with rounded rim, concave ledge under lip. Straightened neck and body, base not preserved. Five whitish horizontal lines at ext. body. Hard fired. Levigation: medium. Inclusions: many lime, some black and many red-brown spots.

References: Walker (2012), p. 510; fig. 4.1, no. 1-2; Uscatescu (1996), p. 254, no. 330; fig. 15, group XIII, no. 11a; fig. 68.

Late Byzantine – Early Umayyad.

50.

J14-Kh-3-25x

Cup, intact.

Fig. 50.

Diam. (rim): 8.26; (max.): 9.13; (base): 3.23; H.: 5.08; T. (min.): 0.40; (max.): 0.84.

Munsell: ext.: 5YR 6/4; int.: 5YR 5/3; core: (inner): 5YR 4/3; (outer): 7YR 5/4.

Rounded inwards turned rim, thickened convex shoulder, steep body. Ledge at lower body. Disk base. Hard fired. Levigation: medium with air pockets; inclusions: many lime, occasionally erupted, some black spots.

References: Uscatescu (1996), p. 254, no. 332-335; fig. 68; fig. 15, group XIII, no. 11c; Kenkel (2012), Taf. 14, group 6, no. 1.4.

Late Byzantine – Early Umayyad.

51.

J14-Kg-3s-456

Cup, intact.

Fig. 51.

Diam. (rim): 7.7; (max.): 8.68; (base): 7; H.: 6.23; T. (min.): 0.21; (max.): 0.51.

Munsell: Ext.: 2.5YR 5/6; int.: 2.5YR 5/8; core: (inner): GLEY 1 4/N; (outer): 2.5YR 6/8. deco.: White page N9/.

Rounded rim, straightened body and neck, slightly sloping inwards. Ribbed ext. surface. Disc base. Deco.: five whitish horizontal lines ext., crisp fired. Levigation: Medium with some air pockets; inclusions: abundant lime, many erupted, some quartz.

Not dateable.

Jugs

Rims

Yellowish Sandy Ware

52.

J14-Kc-3-154

Jug rim, fragmented.

Fig. 52.

Diam.: 4.8; H.: 3.44; L.: 3.93; T. (min.): 0.36; (max.): 0.57.

Munsell: ext.: White 2.5Y -/2 8.5/; int.: White 2.5Y -/2 8.5/; core: 5Y 8/4.

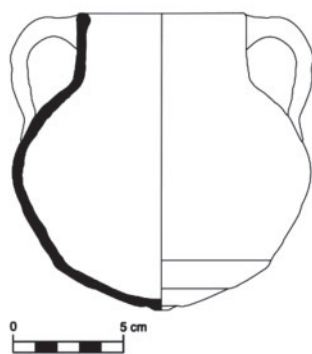
Jug with rounded rim, straightened neck. Soft fired. Levigation: medium, some air pockets; inclusions: some tiny stone grits, and black spots.

Not dateable.

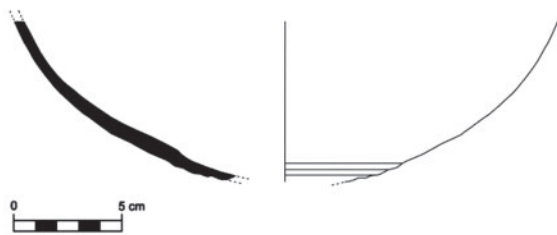
53.

J14-Kc-3-63

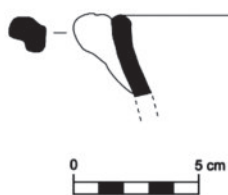
Jug rim, fragmented.



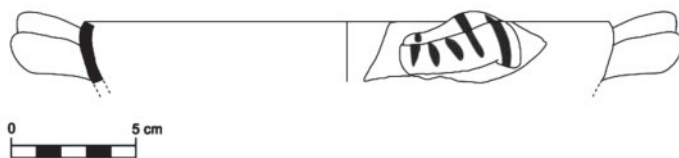
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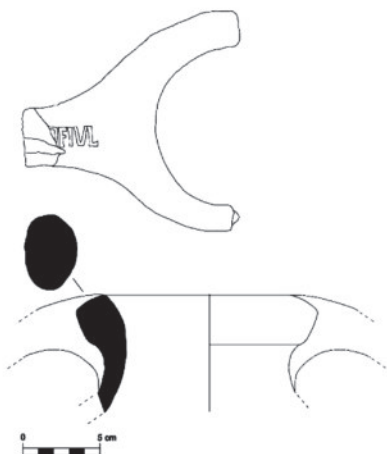
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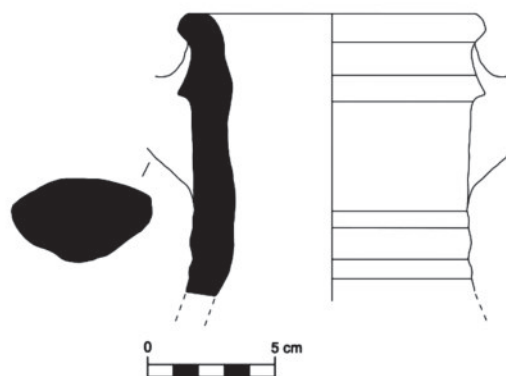
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67



68



69

Fig. 53.

Diam.: 10; H.: 4.3; L.: 6.5; T. (rim): 0.47; (body): 0.45.

Munsell: ext.: 2.5YR 8/2; int.: 5Y 8/2; core: 2.5YR 8/2.

Jug with rounded rim and straightened neck. Two broad and shallow ribs circulating the neck. Slimmer and even shallower ribs at shoulder. Soft fired. Levigation: medium with air pockets; inclusions: a few lime, many small lime eruptions, a few red/brown.

References: Mazar (2006), p. 367; pl. 17, no. 5. Not datable.

Juglets

Bases

54.

J14-Jd-32-167

Juglet, almost intact.

Fig. 54.

Diam. (base): 3; (body): 7.1; H.: 10; T.: 0.3; W.: 7.1.

Munsell: Ext.: GLEY 1 3/N; Int.: GLEY 1 3/4. Tall, straightened neck, globular body, disk base. Handle attached at mid neck and on shoulder. Hard fired. Levigation: Rather finely; inclusions: Some lime, some erupted.

References: Kenkel (2012), taf. 20, group 29, no. 8.9, 8.10; Parker (1987), p. 593; fig. 111, no. 169; Stern (1995), p. 65; fig. 2.11, no. 5.

Early Roman – Early Byzantine.

55.

J14-Kg-39-1

Juglet, almost intact.

Fig. 55.

Diam. (base): 3.3; (max.): 5.2; H.: 5.5; L.: 5.2; T.: 0.4.

Munsell: Ext.: 7.5YR 4/3; core: 7.5YR 5/4.

Straightened, elongated neck; compressed, globular body; disk base. No handle attachment visible. Secondarily fired ext. Hard fired. Levigation: Rather finely with air pockets; inclusions: some lime, many erupted, some black and red-brown spots.

Not datable.

Jars

Rims

56.

J14-Jd-32-187

Handleless jar, intact.

Fig. 56.

Diam. (rim): 6.2; (base): 3.7; H.: 9.02; T.: 0.389; W.: 9.1.

Munsell: ext.: 2.5YR 5/8; int.: 10R 5/8.

Small jar with rounded rim, straightened neck, globular body, disk base. Shallow, sharp ribbed neck and body, matt ext. surface, crisp fired. Levigation: medium with air pockets; inclusions: a few lime, a few erupted, some black and red-brown spots.

References: Uscatescu (1986), p. 256, no. 425-427; fig. 17, 3A-3B; fig. 77; pl. IX, a-b; Gerber (2012), p. 288; fig. 3.28, no. 22, 31, 32; p. 250; fig. 3.19, no. 20; Frangie and Joly (2014), p. 97, fig. 14.

Late Roman – Byzantine.

57.

J14-Lb-72-3

Rim, fragmented.

Fig. 57.

Diam.: 10.6; H.: 3.2; L.: 6.9; T. (min.): 0.4; (max.): 0.7.

Munsell: ext.: 2.5YR 6/4; int.: 2.5YR 5/4; core: 2.5YR 5/4.

Jar or amphora with outwards sloping, rounded rim. Bulging neck. Convex ledge on shoulder. Hard fired. Levigation: medium; inclusions: abundant lime, occasionally erupted, some pebbles, many black spots.

References: Kenkel (2012), taf. 37, fig. 7, no. 4.7; taf. 41, group 7, no. 22.1d; Taf. 42, group 7, no. 23.5a; Zissu (2002), p. 21; fig. 13, 3-18.

Late Roman – Byzantine.

Green Ware

58.

J14-Jc-32-1

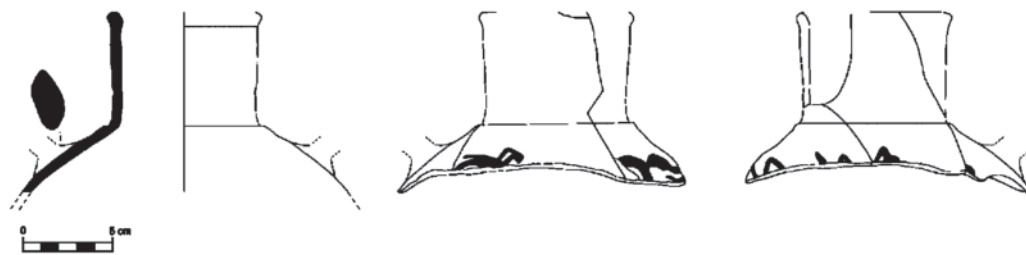
Jar/Amphora rim.

Fig. 58.

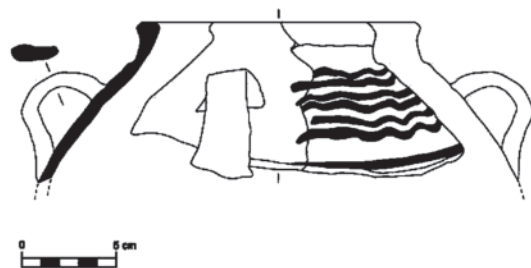
Diam.: 9; H.: 6.54; L.: 5.85; T. (min.): 0.28; (max.): 0.70.

Munsell: ext.: 5YR 7/3; int.: 7.5YR 7/4; core: (inner): 10YR 7/3; (outer): 5Y 7/3; slip: 5YR 7/6.

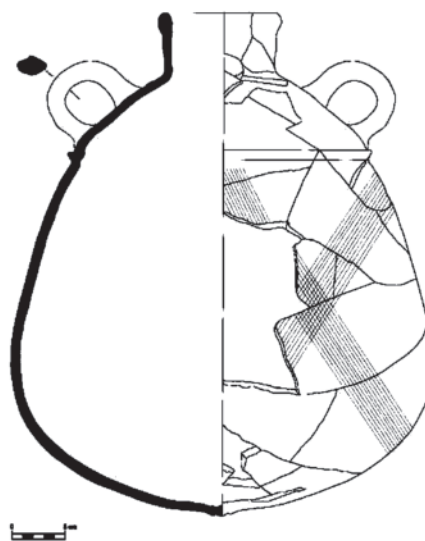
Bowl with outwards turned, thickened, rounded rim. Straight neck and body, hard fired. Levigation: medium with some air pockets. Inclusions: some lime, many pebbles, abundant



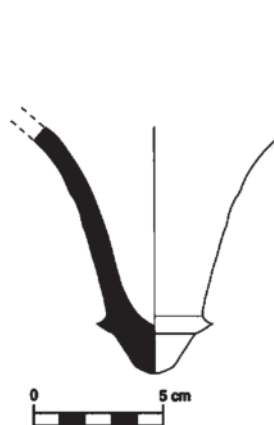
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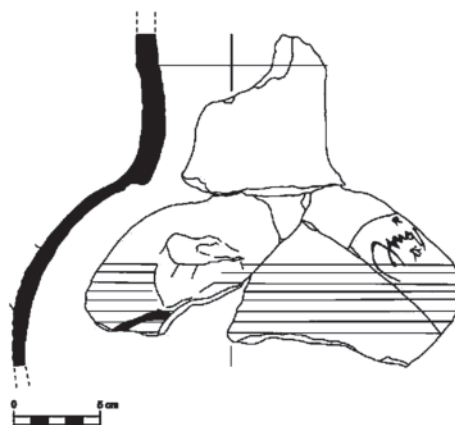
71



72



73



74

black spots.
Not datable.

Lids

Rims

59.

J14-Jd-32-190

Lid profile, fragmented.

Fig. 59.

Diam.: 17; H.: 3.2; L.: 14.8; T. (min.): 0.4, (max.): 0.9.

Munsell: ext.: 5YR 7/4; int.: 10R 6/8; core: (inner): 2.5YR 5/4; (outer): 2.5YR 5/4.

Lid with flattened dome shaped body, flattened/cutrim. Ribbed ext. surface. Round, cylindrically shaped knob in centre. Combed deco. on rim. Mottled surface, hard fired. Levigation: medium with air pockets; inclusions: many lime, few pebbles, some quartz, many black spots.

References: Parker (2010), p. 209; fig. 7, no.2; Gerber (2012), p.385; fig. 3.61, no. 4; p. 327; fig. 3.41, no. 3; p. 288; fig. 3.28, no. 1; McNicoll *et al.* (1992), pl. 108, no. 6.

Late Roman – Early Byzantine.

Cook Wares

Cook Pots

Rims

60.

J14-Jd-32-97

Cook pot, almost complete.

Fig. 60.

Diam.: 10; H.: 12.9; T.: 0.4.

Munsell: core: (inner): 5Y 4/4; (outer): 5Y 5/1; ext.: 5Y 4/1; int.: 5Y 6/1-4/1.

Cook pot with cut rim, incised groove on rim. S-curved neck. Globular body, ribbed at shoulder, upper body and base, leaving an un-ribbed frieze on lower body. Two oval handles attached vertically at rim and shoulder. Rounded base. Hard fired. Levigation: medium.

References: Reynolds (2014), p. 58; fig. 5, a.2; Gordon (2007), p. 167; fig. 15.8, no. 11.

Mid-1st cent. AD (Roman).

61.

J14-Jcd-32-72

Cook pot rim and handle, fragmented.

Fig. 61.

Diam.: 8; H.: 5.1; L.: 5.9; T. (min.): 0.3; (max.): 0.4.

Munsell: ext.: 10R 4/1 + 3/1; int.: 5YR 5/3; core: 5YR 5/7.

Rounded rim with inside groove at lip. Short bulging neck, ribbed globular body. Broad, compressed handle, attached at neck and shoulder. Mottled ext. surface. Hard fired. Levigation: medium with air pockets; inclusions: many lime, many erupted, some black.

References: Uscatescu (1986), p. 265, no. 716; fig. 104; pl. XIII; fig. b.

Late Roman – Byzantine.

62.

J14-Kc-3-53

Cook pot rim and handle, fragmented.

Fig. 62.

Diam. (rim): 12; (max.): 21.4; H.: 14.7; T. (rim): 0.5; (handle): 1.5; (body): 0.54.

Munsell: core: 2.5 Y 4/1; ext.: GLEY 1 4/N; int.: GLEY 1 3/N.

Cook pot with rounded, thickened rim, straight neck. Bag-shaped body, base not preserved. Traces of use over fire from shoulder to mid body. Shallow and broader ribs on lower part of body. Sec. fired, worn flaking ext. surface. Shallow carinations at handle, attached at shoulder and over folded rim. Hard fired. Levigation: rather coarse with air pockets; inclusions: a few lime, a few erupted, many pebbles, a few quartz, many black and red-brown spots.

References: Gerber (2012), p. 21; fig. 3.85, no. 21; p. 405; fig. 3.67, no. 6; Uscatescu (1996), p. 265, no. 715; fig. 103.

Byzantine – Umayyad.

Reddish/Red-Brown Ware

63.

J14-Jc-35-41

Rim, handle fragment.

Fig. 63.

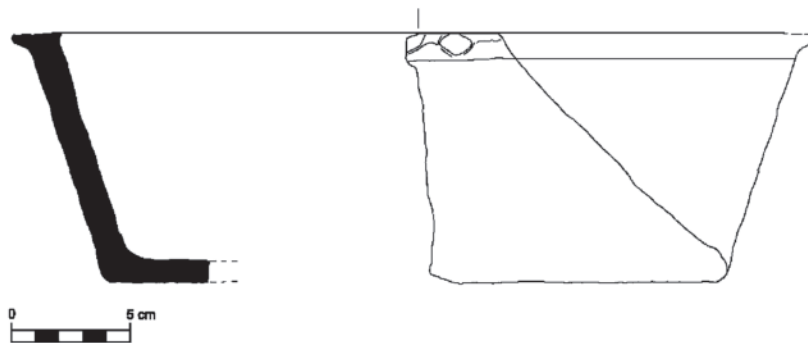
Diam.: 13; H.: 5.5; L.: 15.27; T. (min.): 0.26; (max.): 0.47; W.: 10.68.

Munsell: core: (inner): 7.5YR 6/3; (outer): 2.5YR 6/8; slip: 2.5YR 4/3; ext.: 2.5YR 6/6; int.: 2.5YR 6/4.

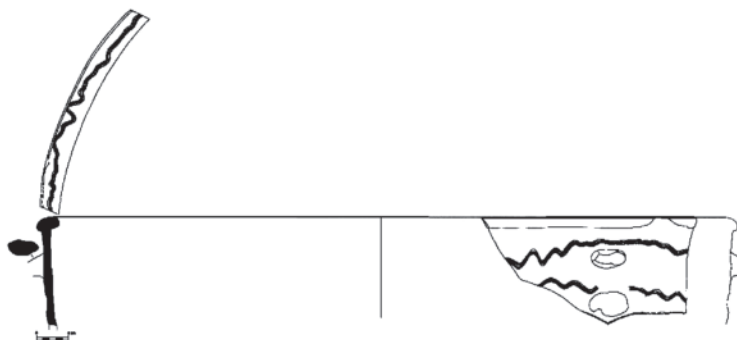
Cook pot with cut rim, straight outwards sloping neck, ribbed sloping shoulder, indicating a



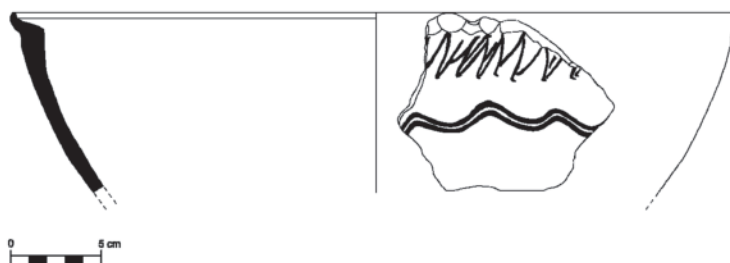
75



76



77



78

globular body shape. Pinched handle, attached at neck and top shoulder. Hard fired. Levigation: medium, some air pockets; inclusions: many lime, some erupted, some black and a few red-brown spots.

References: shape: Parker (1987), p. 575; fig. 102, no. 99-103; p. 571; fig. 100, no. 82, 83; Gerber (2012); p. 298; fig. 3.31, no. 11; Zissu (2002), p. 19; fig. 12; Mazar (2007), p. 161; fig. 15.3, no. 24.

Early Roman – Early Byzantine.

Grey Ware

64.

J14-Kh-3-444

Cook pot, almost intact.

Fig. 64.

Diam.: 7.6; H.: 13.4; T. (min.): 0.22; (max.): 0.64.

Munsell: core: (inner): 7.5YR 5/2; (outer): 7.5YR 6/1; surface (ext.): 2.5Y 2.5/1; (int.): 2.5Y 5/1.

Rounded, thickened rim, out-curving neck. Vague shoulder, ribbing on neck and body. Rounded base. Flattened vertical handle, attached at upper neck and mid body. Hard fired. Levigation: medium with some air pockets; inclusions: few lime and pebbles, many black spots.

References: Uscatescu (1996), p. 258, no.499; fig. 82; fig. 20, no. 3g-11.

Late Byzantine – Umayyad.

Bases

Dark Brown Ware

65.

J14-Kc-3-160

Cook pot base, fragmented.

Fig. 65.

Diam.: (max.) 24; H.: 7.3; T.: 0.59.

Munsell: core: (inner): 10R 6/8; (outer): 5YR 5/4; surface (ext.): 5YR 5/3; (int.): 5YR 6/3.

Cook pot, lower body, base not preserved. Ribs circulating base, not lower body. Ext. surface very flaky and worn. Medium fired. Levigation: medium with air pockets; inclusions: some lime, pebbles, quartz, black and red-brown spots.

References: Kenkel (2012), Taf. 43, group 7,

no. 23.9a.; taf. 63, kt. 25.

Roman – Byzantine.

Casseroles

Rims

66.

J14-Iabcd-13-40

Casserole rim, handle, fragmented.

Fig. 66.

Diam.: 30; H.: 3.31; L.: 6.1; T. (min.): 0.58; (max.): 0.79.

Munsell: ext.: 5YR6/8; int.: 5YR 6/6; core: 2.5YR 5/8.

Casserole with rounded, thickened rim; inward sloping body. Handle: rounded, attached as vertical loop against wall; seems mostly decorative and of little practical use. Crisp fired. Levigation: rather coarse with air pockets; inclusions: few lime, many pebbles and black spots and some red-brown.

References: Lichtenberger, Raja and Sørensen (2017), fig. 105; Ferguson (2010), p. 183; fig. 6, no. 17.

Early Roman (15 BC – AD 100).

67.

J14-Kef-3s-325

Casserole rim, handle, fragmented.

Fig. 67.

Diam.: 21; H.: 2.8; L.: 7.6; T.: 0.4.

Munsell: ext.: 2.5YR 5/6; int.: 2.5YR 6/8; core: 2.5YR 6/8; deco.: 2.5YR.

Casserole with cut rim, double folded handle, inward sloping rim and body; deco.: white painted lines on handle. Inclusions: many lime and many erupted lime particles.

References: Uscatescu (1996), p. 255, no. 383-385; fig. 73; p. 255, no. 389-390; fig. 74.

Late Byzantine.

Storage Vessels (NBH)

Amphorae

Rims

68.

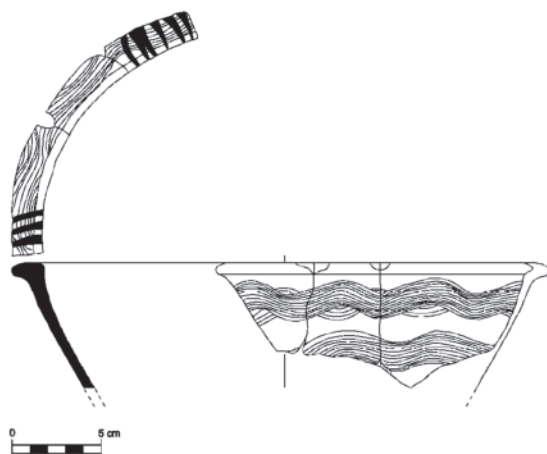
J14-Jd-32-173

Rim, fragmented.

Fig. 68.

Diam. (rim): 10; H.: 7.6; L.: 7.8; T.: 0.9.

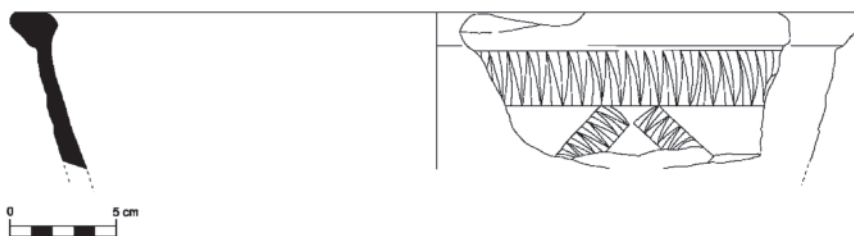
Munsell: core: 5YR 6/4; int.: 10YR 7/4; ext.:



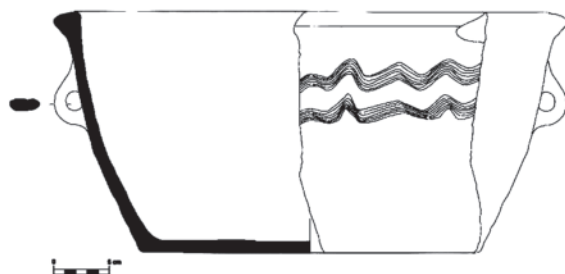
79



80



81



82

10YR 7/4.

Fragment of handle, attached over rim, with stamp on top: /FIVL.

References: shape: Smith (1973), pl. 44, fig. 1255.

Late Roman.

69.

J14-Kg-3s-503

Rim, fragmented.

Fig. 69.

Diam. (rim): 12; H.: 11; L.: 9.7; T. (min.): 1.2; (max.): 1.7.

Munsell: core: 5YR 5/8; int.: 5YR 7/4; ext.: 5YR 6/6.

Out-turned, thickened rim with smooth neck and circular ledge. Handle attached at ledge, presumed oval shape.

Byzantine (?).

70.

J14-Kg-3-232

Rim, fragmented.

Fig. 70.

Diam. (rim): 8.5; H.: 10.1; L.: 16.2; T.: 0.6.

Munsell: core: 2.5YR 5/8; int.: 2.5YR 6/6; ext.: 2.5YR 4/4; deco.: 2.5Y 8/2; wash: 2.5YR 4/4.

Flattened rim with handle fragment attached. White painted deco. in a wavy pattern running horizontally on body.

References: Shape: Smith (1973), pl. 44, fig. 1319; McNicoll *et al.* (1992), pl. 40, fig. 288.

Byzantine – Umayyad.

71.

J14-Kh-3-445

Rim, fragmented.

Fig. 71.

Diam. (rim): 15; H.: 8.33; T. (min.): 0.29; (max.): 1.21.

Munsell: core: 5YR 6/8; int.: 2.5YR 6/6; ext.: 2.5YR 6/8; deco.: White 7.5 _/1 8.5/.

Thickened rim with flattened vertical handle attached on shoulder. White wavy pattern deco. across shoulder and belly.

Byzantine – Umayyad.

72.

J14-Kh-32-1-3 + Kh-32-1-2

Rim, intact profile.

Fig. 72.

Diam. (rim): 10.8; H.: 47; T.: 0.6-1.

Munsell: core: (inner): 2.5YR 3/1; (outer): 2.5YR 5/8; int.: 2.5YR 5/8; ext.: 10R 5/8.

Baggy shaped amphora with intact profile. Outwards thickened rim and oval tilted handle. Baggy ribbed body and pointed base. Ledge around shoulder. White strip deco.

References: Smith (1973), pl. 85; fig. 281; Clark (1986), pl. XIII.26.

Byzantine – Umayyad.

Bases

73.

J14-Jd-32-172

Base, fragmented.

Fig. 73.

Diam. (max.): 7.2; H.: 9.1; L.: 8.1; T.: 0.7.

Munsell: core: 5YR 7/4; int.: 5YR 7/4; ext.: 10YR 7/4.

Circular ledge towards the bottom; Possible LRA shape.

Late Roman.

Body

74.

J14-Jb-11-8+Jb-8-28

Body, fragmented.

Fig. 74.

Diam. (max): 25.4; (neck): 5.4; H.: 19.3; L.: 22; T. (min.): 0.8; T. (max.): 1.4.

Munsell: core: 5YR 6/6; int.: 5YR 6/6; ext.: 10YR 8/2 - 10YR 7/3; deco.: 2.5YR 5/6.

Ripples on belly and down. Handle attached on upper belly. Dipinto just below the handle in circular shape. Red dipinto above first ripple.

References: shape: Smith (1973), pl. 85. For dipinti, see: (5th – 6th cent. AD) Segal *et al.* (2013), p. 275-276; fig. 341; (8th cent. AD) Walmsley *et al.* (2008), p. 131, fig. 25.19.

Umayyad (7th – 8th cent. AD).

Basins

Handmade

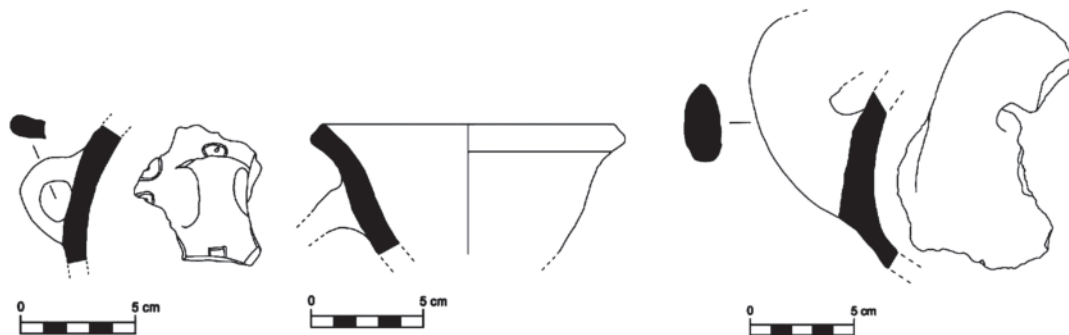
Rims

75.

J14-Jc-32-3

Rim, fragmented.

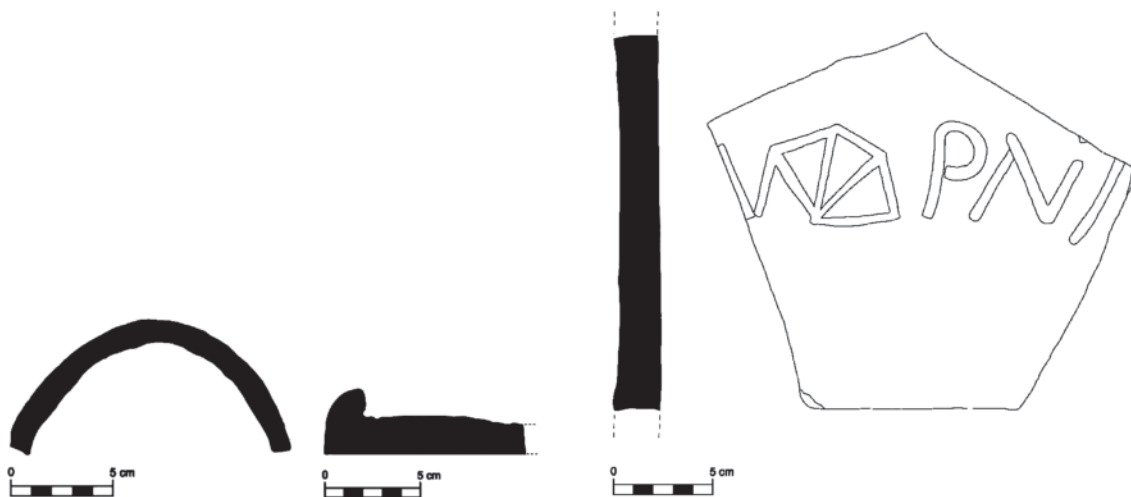
Fig. 75.



83

84

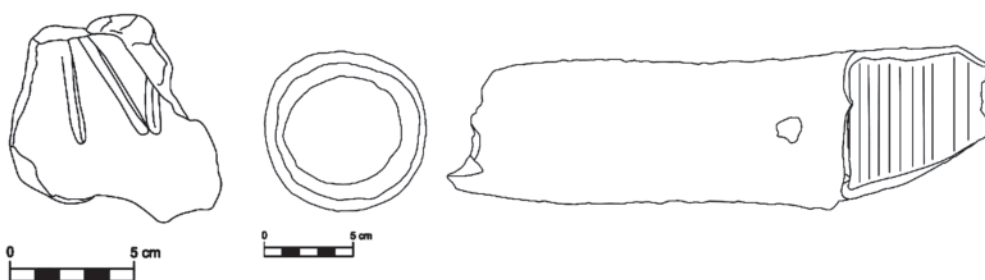
85



86

87

88



89

90

Diam: 41; H.: 6.58; L.: 12.47; T. (min): 0.529; (max): 1.518.

Munsell: inner core: 5YR 4/1, outer core: 2.5YR 4/8; int: 2.5YR 5/4; ext: 10YR 5/1.

Flattened rim with finger pressed deco. below rim.

References: deco.: Smith (1973), pl. 44; fig. 1248; Lichtenberger, Raja and Sørensen (2017), fig. 104; shape: Lichtenberger, Raja and Sørensen (forthcoming a), fig. 101.

Byzantine – Umayyad (Late 5th – mid-7th cent. AD).

Grey Ware

76.

J14-Jb-10-12

Rim, intact profile.

Fig. 76.

Diam: 34; H.: 10.59; T.: 1.17.

Munsell: core: 10YR 4/1; int:

10YR 6/1; ext: 10YR 5/1.

Basin, flattened base. Flattened out-turned rim with finger made impressed decoration.

References: deco.: Lichtenberger, Raja and Sørensen (2017), fig. 114.

Byzantine – early Umayyad.

77.

J14-Kg-3-253

Rim, fragmented.

Fig. 77.

Diam: 106; H.: 16.4; L.: 31.2; T. (min.): 0.7; (max.): 3.2.

Munsell: core: 2.5Y 5/1; int: 2.5Y 6/1; ext: 2.5Y 6/1.

Basin with wheel-made, flattened rim and handmade body. Handle fragment. Wavy combed line deco. on ext. and on rim.

References: deco.: Smith (1973), pl. 44; fig. 1301, 1243. Shape: McNicoll *et al.* (1992), pl. 114; fig.

8.

Byzantine – Umayyad.

78.

J14-Kac-3-84

Basin rim, fragmented.

Fig. 78.

Diam. (rim): 40; H.: 9.4; L.: 11.9; T. (min.): 0.11; (max.): 0.77.

Munsell: core: GLEY 4/N; int.: GLEY 4/N; ext: GLEY 4/N.

Basin with flattened rim; combed and “pie crust” deco. Diagonal triangular incisions, made by a tool below rim. Two wavy lines on lower part (combed deco).

References: Clark and Falkner 1986, fig. 21.5; deco.: Smith (1973), fig. 1192; McNicoll *et al.* (1992), pl. 115; fig. 1.

Umayyad.

79.

J14-Kh-44-27

Basin rim, fragmented.

Fig. 79.

Diam: 30; H.: 7; L.: 17.5; T.: 0.5.

Munsell: core: (inner) 5Y 3/1; (outer): 2.5Y 7/1; int.: 5Y 3/1; ext.: 7.5YR 4/1; deco.: White Page 7.5YR _/2/8.5/.

Combed deco. ext. and on the rim. White painted lines crossing the combed grooves on the rim.

References: deco.: Smith (1973), fig. 1192; shape: McNicoll *et al.* (1992), pl. 114; fig. 8.

Umayyad.

80.

J14-Ka-3-95

Basin rim, fragmented.

Fig. 80.

Diam: 48; H.: 3.6; L.: 8.6; T.: 0.8.

Munsell: core: GLEY1 3/N; int: GLEY1 3/N; ext: GLEY1 3/N; slip: GLEY1 3/N.

Basin with flattened rim. Triangular diagonal tool made pattern under rim on ext., int. slipped.

References: deco.: McNicoll *et al.* (1992), pl. 115; fig. 1; Lichtenberger, Raja and Sørensen (2017), fig. 113; shape: Lichtenberger, Raja and Sørensen (2017), fig. 113.

Byzantine – Umayyad (Late 5th – late 8th cent. AD).

81.

J14-Kg-3s-502

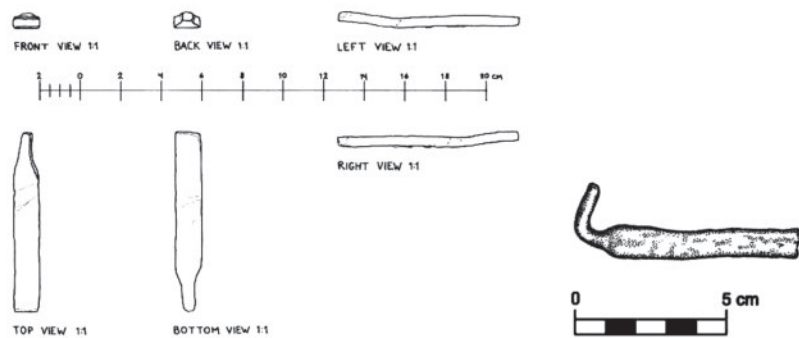
Basin rim, fragmented.

Fig. 81.

Diam: 40 H.: 7.3; L.: 15.2; T. (min): 1 T. (max): 2.2.

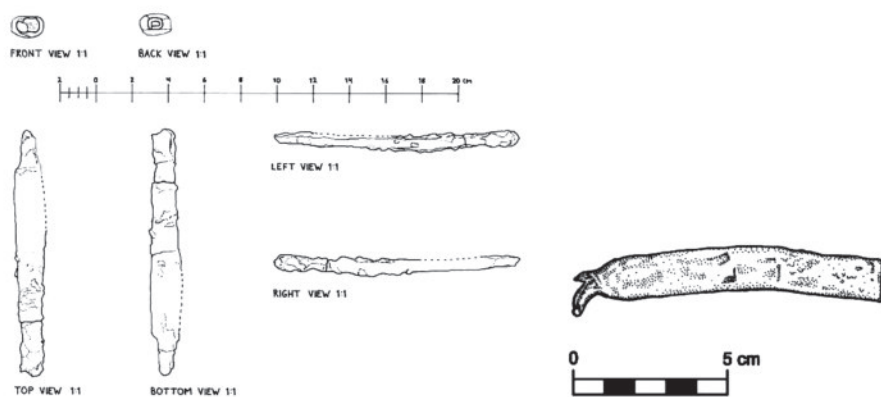
Munsell: core: GLEY 4/N; int.: GLEY1 5/N; ext.: GLEY1 3/N.

Outturned flattened rim with finger marks



91

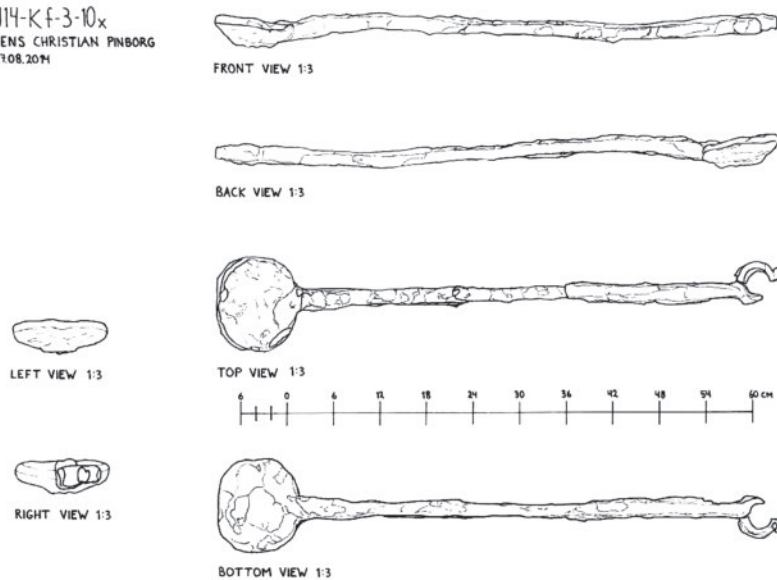
92



93

94

J14-K-F-3-10x
JENS CHRISTIAN PINBORG
27.08.2014



95

visible on interior. Triangular diagonal tool made pattern as decoration running under the rim on exterior.

References: deco. and shape: Lichtenberger, Raja and Sørensen (forthcoming b), fig. 113.

Byzantine – Umayyad (Late 5th – late 8th cent. AD).

82.

J14-Kg-40-7

Basin, intact profile.

Fig. 82.

Diam (rim): 46; (base): 30; H.: 21.6; T. (min.): 0.80; T. (max.): 1.64.

Munsell: core (inner): GLEY1 6/1; (outer): 2.5Y 6/2; int.: 7.5 YR 5/1; ext.: GLEY1 4/N.

Thickened rim. Combed decoration on exterior body. Flattened vertical handle.

References: deco.: Smith (1973), fig. 1192; shape: McNicoll *et al.* (1992), pl. 114; fig. 8.

Byzantine – Umayyad.

Handles

Grey Ware

83.

J14-Ka-18-5

Handle, fragmented.

Fig. 83.

H.: 6.10; L.: 6.39; W.: 5.51; T. (min.): 0.682; (max.): 0.729.

Munsell: core: GLEY1 4/N; int.: 10YR 5/1; ext.: GLEY 4/N.

Handmade circular flattened handle piece. Circle-dot/simple eye incised deco.

References: Smith (1973), pl. 29; fig. 313.

Byzantine – Umayyad.

Unpainted Handmade Coarse Ware (CBH)

Rims

84.

J14-Ib-13-5

Rim, jug, fragmented.

Fig. 84.

Diam.: 14; H.: 5.8; T.: 0.95-1.

Munsell: core: 7.5YR 7/4; int.: 10R 5/6; ext.: 2.5YR 5/6.

Jug, outward tilted square rim, handle attachment on neck. Suggesting handle sloping downwards. Crudely made.

References: shape: McPhillips and Walmsley (2007), p. 150; fig. 1; Franken *et al.* (1975), p. 192; fig. 31.

Late Ayyubid – Mamluk.

Handles

85.

J14-Ib-6-5

Elephant ear handle, fragmented, unpainted.

Fig. 85.

Diam.: not measurable; H.: 12.8; L.: 6.61; T.: 1.44; Handle W.: 5.07; T.: 1.33.

Munsell not available.

Horizontal, oval handle, elephant ear-type. Secondarily fired. Unpainted. Crudely made.

References: Shape: Walmsley-Grey (2001), p. 156; fig. 10, no. 10; Lichtenberger, Raja, Sørensen catalogue, 2013), fig. 133.

Late Ayyubid – Mamluk.

Tiles (PE)

Rims

86.

J14-Igh-37-3

Imbrex, fragmented.

Fig. 86.

H.: 9.3; L.: 12.7; T.: 1.

Munsell: core: (inner) 2.5YR 5/8; core (outer): 2.5YR 6/1; int.: 10YR 8/3; ext.: 10YR 8/3.

Hard fired and rather coarse clay, including air pockets, some lime, pebbles and many black spots. Some plaster still sticking on top.

References: Clark (1986-1), p. 317; pl. XV.

Late Roman – Byzantine.

87.

J14-Kc-3-136

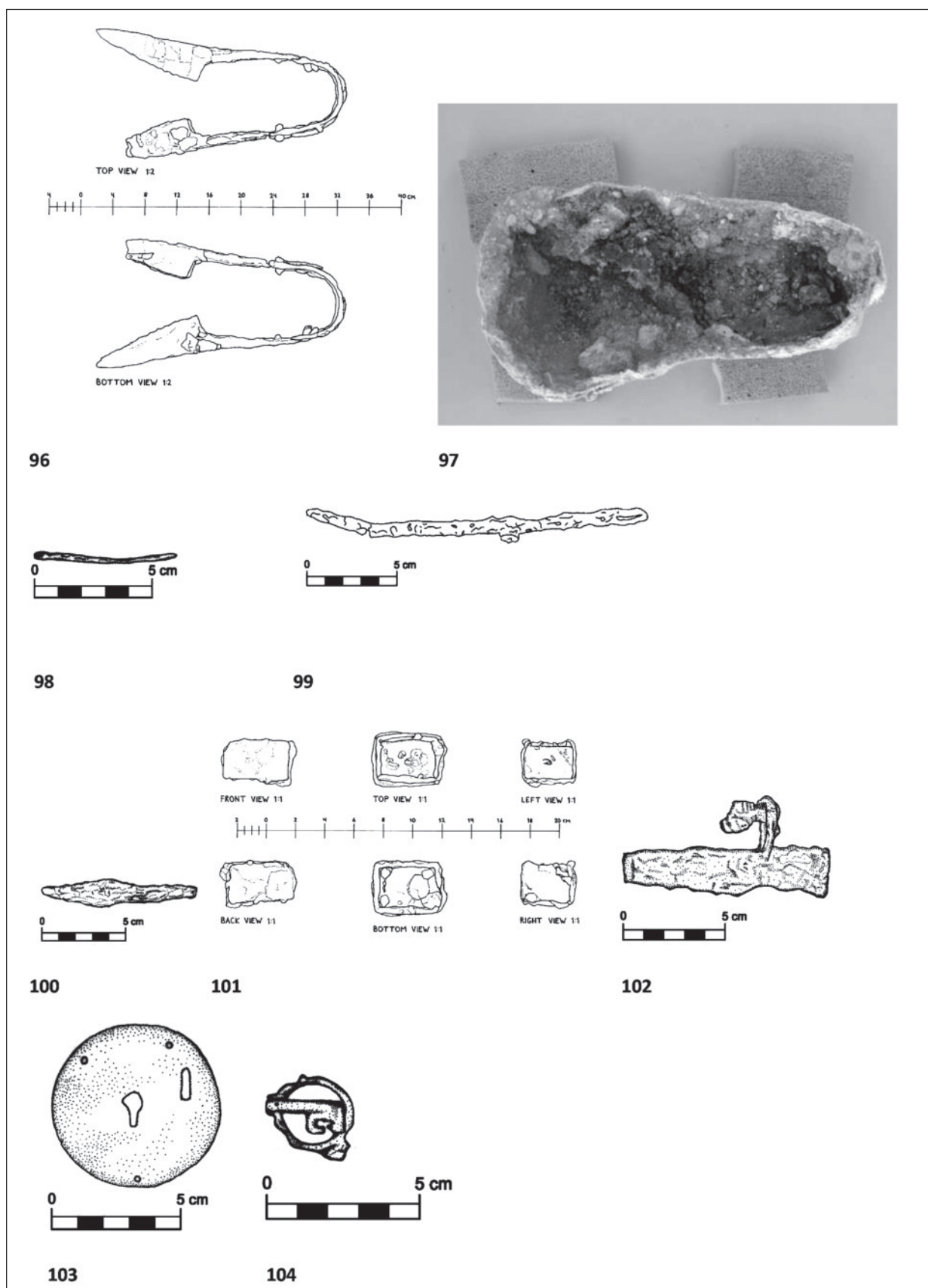
Tegula, fragmented.

Fig. 87.

L.: 10.6; W.: 8.5; T.: 3.3.

Munsell: core: 2.5YR 6/4; int.: 2.5YR 7.6 – 7.5YR 6/4; ext.: 5YR 7/6.

Hard fired and rather coarse clay, including some red-brown spots, chaff and chamotte, as well as a few lime and pebbles. The drawn and rounded tegula rim is bent, running partly along the tile's long side, to be smoothed back down onto the flat top of its base again. Two finger drawn lines running along the rim as deco.



References: Melkawi, Whitcomb and ‘Amr (1994), p. 461; fig. 11, no. 1; Leonard Jr. (1987), p. 606; pl. LX, no.1, Konrad (2001), p. 119F; taf. 80, no. 7; Vriezen and Mulder (1997); p. 326f.; fig. 18, no. 17.

Late Roman – early Byzantine.

Body

88.

J14-Jd-32-174

Tile, fragmented.

Fig. 88.

H.: 18.8; L.: 21.5; T.: 1.8.

Munsell not available. Brownish/ Reddish colour.

Broken on all sides. Probably a tegula fragment, hard fired, coarse tile, including air pockets, many lime (a few erupted) and red-brown spots, as well as an abundant number of black spots. Surface mostly covered in lime.

Finger-drawn inscription still partly readable: / PN (T; I)/.

Not datable.

89.

J14-Kef-3s-331

Laterculus (suspensorium), fragmented.

Fig. 89.

H.: 5.5; L.: 7.6; W.: 7.1.

Munsell not available. Brownish/reddish colour. Suspensorium, broken on all sides, but on top still a single finger-drawn “N” clearly visible.

References: Barnes *et al.* (2006), fig. 17, no. 1-2; Lichtenberger, Raja and Sørensen (2017), p. 119; fig. 119 (both referred pieces show the letter “K”).

Byzantine.

Water Pipes (PE)

Body

90.

J14-Ka-3-17

Water pipe, fragmented.

Fig. 90.

Diam. (min.): 6.9; (max.): 8.9; L.: 30.5; W. (min.): 7; (max.): 8.8; T. (min.): 0.3; (max.): 0.7.

Munsell: int: 2.5YR 6/8; ext.: 2.5YR 6/6.

Hard fired and medium to finely levigated

clay including many air pockets, lime (a few erupted), some pebbles, quartz and black spots. Grey mortar spots sticking on its ext. surface, including white lime lumps and charcoal spots. The ext. surface is softly ribbed while the int. surface has spiralled lines, much more extreme in profile.

References: ‘Amr *et al.* (1998), p. 525; fig. 14; p. 524; fig. 13 (undated. Associated pottery is ‘Nabataean’); ‘Amr and al Momani (2001), p. 271; fig. 24 (for a local and rough scheme of pipe development in general in southern Jordan); Kerner, Krebs and Michaelis (1997), p. 267f.; fig. 3a, 3b (dated Late Roman); Segal *et al.* (2009), p. 9; fig. 74, 76 (possible dating not explicitly given. See the pottery on p. 102f. = mostly Late Roman, Byzantine and some Umayyad. No repairs in wall recorded = Pipe must be part first phase); Segal *et al.* (2010), p. 223; fig. 304 (very likely to be late Byz./early Umayyad, but the diam. is bigger: 12); Silberstein (2000), p. 462, fig. 21 (dated between 30 BC and 1st - 2nd cent. CE); Daviau (2010), p. 125; fig. 6.3, no. 1, 4; p. 284f.; fig. 8.19, no. 1 (diam. is much wider but in terms of body shape is still the closest to ours. The referred example was used as drainage and is probably Late Byzantine/Early Islamic). Pre-Umayyad.

Metal Objects (CE)

Architectural Fittings

91.

J14-Kh-34-5

Revetment pin.

Fig. 91.

AE.

L.: 8.9; W.: 1.2; T.: 0.45.

Oblong rectangular bar, ingot-shaped; with a curved peg at one end.

References: Patrich (2008), p. 441, 456; no. 101-107; Waldbaum (1983), p. 66-67; pl. 19, no. 266-277.

Hellenistic/Roman or later.

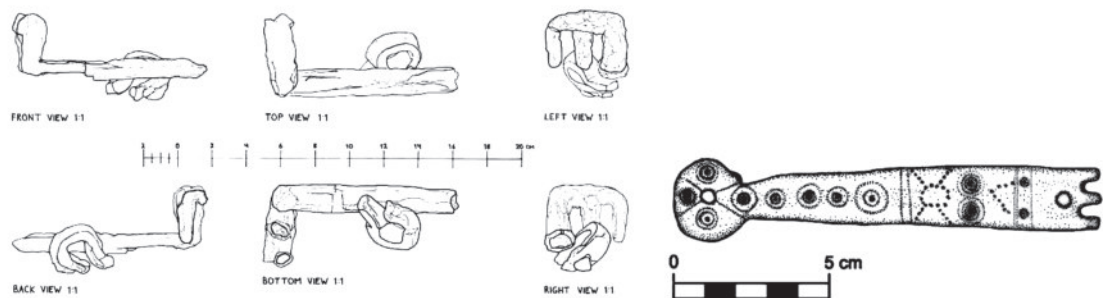
92.

J14-Kh-34-25

Revetment pin.

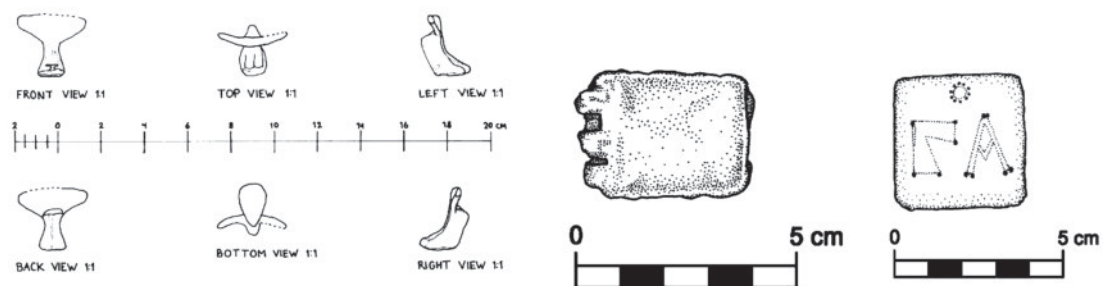
Fig. 92.

AE.



105

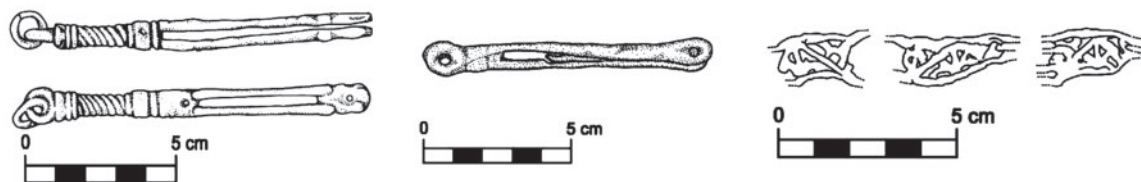
106



107

108

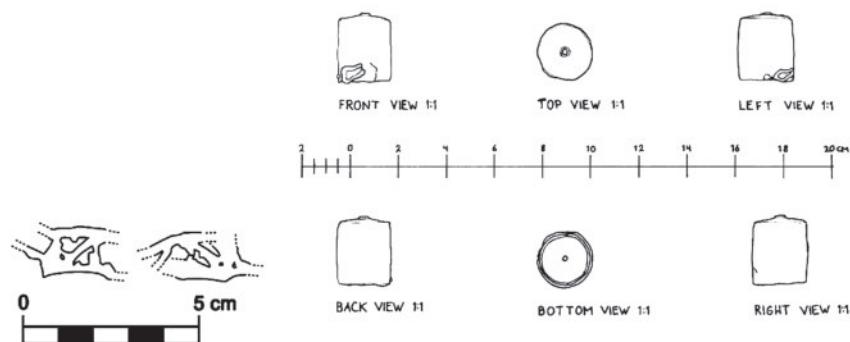
109



110

111

112



113

114

L.: 7.1; W.: 1.

Oblong rectangular bar with a curved peg at one end.

References: Patrich (2008), p. 441, 456, no. 101-107.

Hellenistic/Roman or later.

93.

J14-Kh-34-13

Revetment pin (?).

Fig. 93.

FE, badly corroded.

L.: 7; W.: 1.7; T.: 0.8.

References: Patrich (2008), p. 441, 456, no. 101-107; Waldbaum (1983), p. 66-67; pl. 19, no. 266-277.

Hellenistic/Roman or later.

94.

J14-Kh-34-23

Fragment of unknown function/revetment pin (?).

Fig. 94.

AE.

L.: 9.9; W.: 2.2; T.: 1.4.

Long bar with one rectangular end and one rounded end with a small peg.

Hellenistic/Roman or later.

Household Appliances and Tools

95.

J14-Kf-3-10x

Ladle/scoop.

Fig. 95.

FE, badly corroded.

L.: 72.6; W.: 12.3; W. eye: 5.7.

Long handle with almost rectangular section; plain, oval bowl; at the opposite end a broken, circular eye.

References: Waldbaum (1983), p. 60; pl. 16, no. 220-221; Baitinger and Völling (2007), p. 92; pl. 31, no. 376.

Hellenistic/Roman or later.

96.

J14-Ke-3-17x+Kef-3s-343

Fragmented scissors.

Fig. 96.

FE, badly corroded.

L.: 31; W.: 16.

Triangular blades; the handle is made of a curved band. The top of one blade is missing.

References: Patrich (2008), p. 448, 458; no. 229; from Late Roman context: Künzl and Weber (1991), p. 89-90; fig. 5.

Hellenistic/Roman or later.

97.

J14-Kg-3-13x

Fragments of a wool comb or heckling comb with dozens of teeth.

Fig. 97.

FE, badly corroded.

L. (max.): teeth 12.1.

Long iron band with needle-shaped teeth, arranged in at least two rows.

References: Gaitzsch (2005), p. 42; pl. 58, 75, no. 1-2.

Hellenistic/Roman or later.

98.

J14-Kh-3-515

Needle.

Fig. 98.

AE.

Diam.: 0.2; L.: 6.

Short needle with an oblong eye.

References: Patrich (2008), p. 448, 458, no. 221-224; 467, no. 221; Waldbaum (1983), p. 61; pl. 17, no. 230-234.

Hellenistic/Roman or later.

99.

J14-Kh-34-9

Needle.

Fig. 99.

FE, badly corroded.

L.: 19.3; W.: 0.85.

Long shaft with another small iron fragment adherent; an oblong eye is pierced through the flattened end.

References: Platt and Ray (2009), p. 177-178, 181; fig. 11.10, no. 1-3; Waldbaum (1983), p. 61-62; pl. 17, no. 231.

Hellenistic/Roman or later.

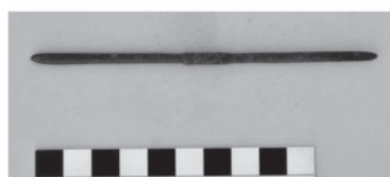
100.

J14-Kh-34-8

Small knife (?).

Fig. 100.

FE, badly corroded.



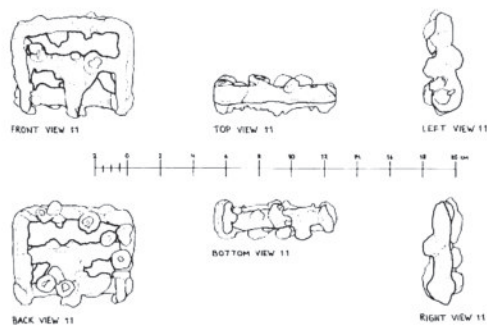
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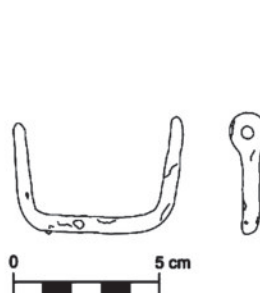
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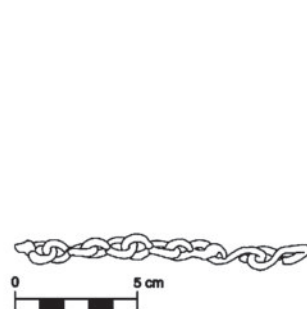
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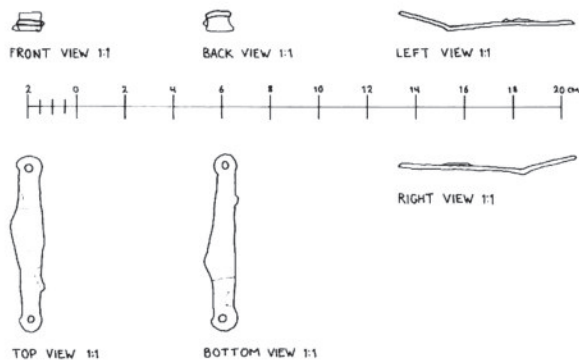
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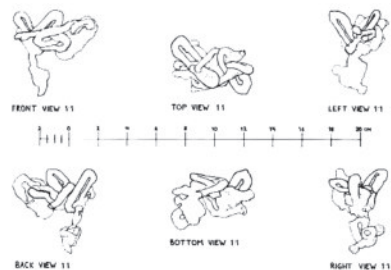


120

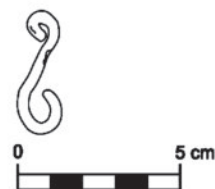


121

122



123



124



125

L.: 9.2; W.: 1.9; T.: 1.1.

Oblong, slightly conical handle; short triangular blade.

References: Waldbaum (1983), pl. 15, no. 199.
Hellenistic/Roman or later.

Locks and Keys

101.

J14-Kh-34-15

Small, casket-shaped object, probably a lock.

Fig. 101.

FE, badly corroded.

H.: 3.6; L.: 4.9; W.: 2.5.

Rectangular casket, open on one side; a big hole on the front; each corner has a small hole through which a rivet is passed.

References: Waldbaum (1983), pl. 23.
Hellenistic/Roman or later.

102.

J14-Kh-34-16

Fragment of the closing device (?).

Fig. 102.

FE, badly corroded.

L.: 10.2; H.: 4.9; T.: 0.8.

Rectangular band with an oblong eye, which is attached on the upper ridge of the band.

Hellenistic/Roman or later.

103.

J14-Kg-3-14x

Keyhole plate.

Fig. 103.

AE.

Diam.: 6.5.

Circular plate with a central keyhole and a small rectangular hole on the upper right.

References: Waldbaum (1983), p. 72-73; pl. 24, no. 385; Baitinger and Völling (2005), p. 138-142; pl. 56, no. 634; Jantzen (2004), pl. 32, no. 1184.

Byzantine/Late Byzantine.

104.

J14-Kh-3-21x

Ring with movable key.

Fig. 104.

AE.

L.: 2.9; Diam.: ring 2.5; L.: key 2.6.

Ring with two dolphin head-shaped ends; small

key with an eye at one end, which is linked to a short axis between the dolphin heads.

References: Patrich (2008) p. 422, 428; no. 16; Waldbaum (1983), p. 76; pl. 25, no. 403-407; Jantzen (2004), pl. 33, no. 1189.

Late Byzantine.

105.

J14-Kh-3-27xa

Slide key.

Fig. 105.

FE, badly corroded.

L.: 11.5; W.: 4.6.

Key with long shaft and orthogonal bit with three teeth; the annular end of the handle is broken and fixed to the shaft.

References: Gaitzsch (2005), pl. 43, S12; Baitinger and Völling (2007), p. 132-134; pl. 54; Seigne *et al.* (1986), 98 pl. 14.1.

Hellenistic/Roman or later.

Casket Fittings

106.

J14-Kh-34-22

Hinge/hinge-plate.

Fig. 106.

AE.

L.: 12.8; W.: 2.5.

Flat bar with a knuckle at one end and a rounded, perforated extension at the other. Face decorated with chased geometrical ornament (concentric circles and small dots).

References: Waldbaum (1983), p. 76-78; pl. 26, no. 417-418; Jantzen (2004), pl. 31, no. 1159-1163.

Byzantine/Late Byzantine.

107.

J14-Kh-34-12

Small attachment, probably a stand/foot of a casket.

Fig. 107.

AE.

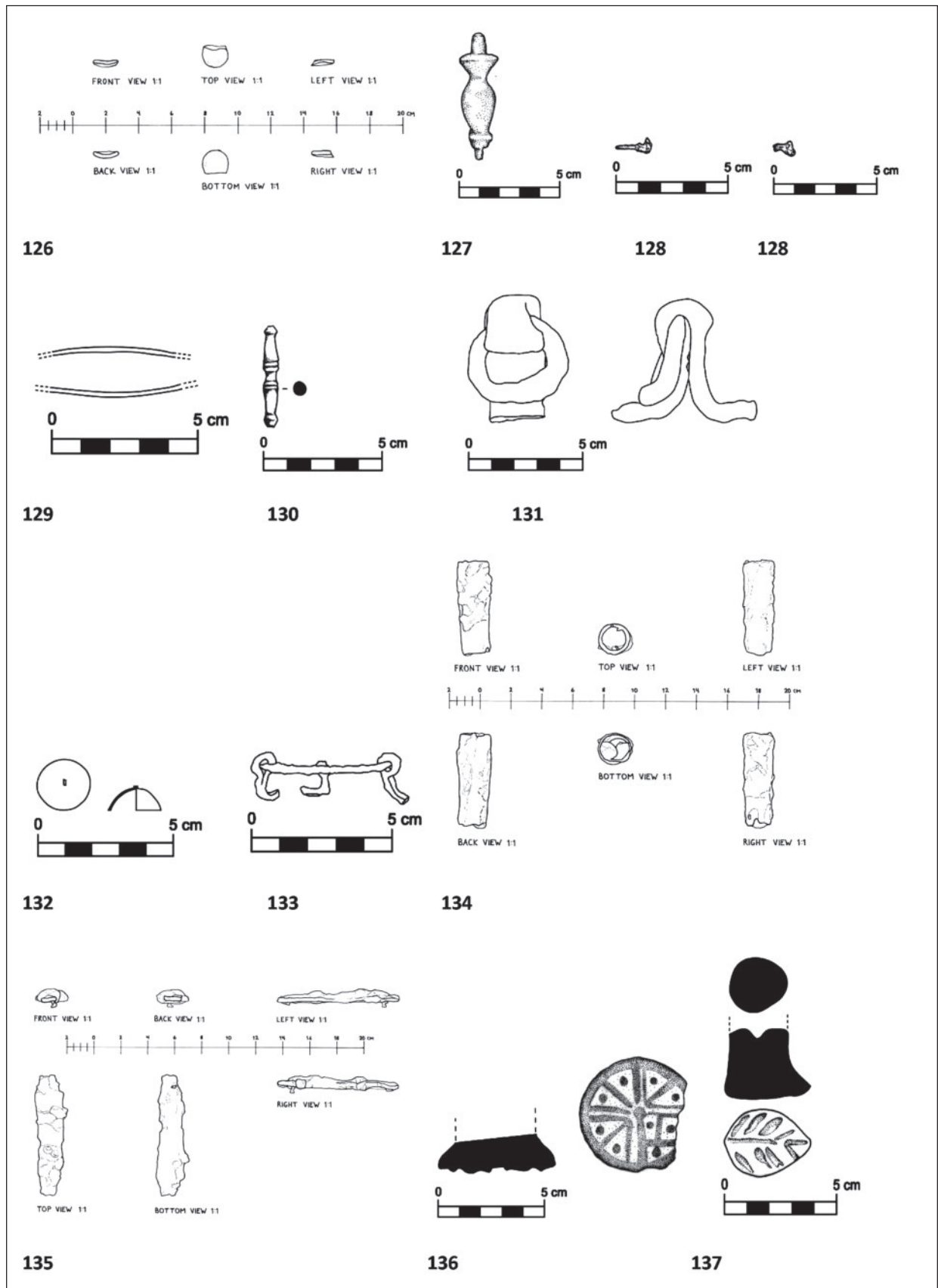
H.: 3.1; W.: 3.3; T.: 1.6.

Massive "foot" with triangular extension.

References: Davidson (1952), pl. 52, no. 560; pl. 62, no. 837.

Roman – Late Byzantine.

108.



J14-Kh-34-18

Hinge.

Fig. 108.

FE, badly corroded.

L.: 3.8; W.: 2.8; T.: 1.2.

Rectangular plate with three eyes of the knuckle.

Hellenistic/Roman or later.

Weighing Equipment

109.

J14-Kh-34-1

Weight.

Fig. 109.

AE.

L.: 4; W.: 3.9; T.: 0.25.

Flat rectangular plate; face incised with two letters, Gamma and Alpha (=standard one ounce weight), and a small, dotted circle.

References: Cat. München (2004), p. 362-363; Bendall (1996), p. 29-38.

Late Byzantine.

110.

J14-Kh-24-4

Suspension for a balance.

Fig. 110.

AE.

L.: 6.8; W.: 0.6.

Solid upper part with pseudo-torsion profile ending in a loop with movable ring; the lower part is divided into two flat legs.

References: Waldbaum (1983), p. 82-84; pl. 29, no. 448, 460.

Hellenistic/Roman or later.

111.

J14-Kh-34-26

Suspension, probably from a balance.

Fig. 111.

AE.

L.: 9.7; W.: 1.

Short, solid upper part with a loop; the lower part is divided into two long, flat legs; each is perforated through the lower end.

References: Waldbaum (1983), p. 82-84; pl. 29, no. 448, 460.

Roman and later.

Cosmetic Implements

112.

J14-Kef-3s-339

Rim fragments from a mirror (?).

Fig. 112.

PB.

L.: largest fragment 3.3; W.: 1.2.

Six fragments of an openwork frame with zigzag ornament; probably parts of the same frame like fragments Khg-3s-311.

References: Patrich (2008), p. 425, 430; no. 73-79.

Hellenistic/Roman or later.

113.

J14-Kgh-3s-311

Rim fragments from a mirror (?).

Fig. 113.

PB.

L.: largest piece 2.7; W.: 1.3.

Three fragments of an openwork frame with zigzag ornament; probably parts of the same frame like Kef-3s-339.

References: Patrich (2008), p. 425, 430; no. 73-79.

Hellenistic/Roman or later.

114.

J14-Kh-34-11

Lid of a cosmetic tube.

Fig. 114.

AE.

H.: 2.7; Diam.: 2.2.

Cylindrical hull, closed at one end; with a little hole in the centre.

References: Waldbaum (1983), p. 108; pl. 41, no. 644.

Hellenistic/Roman or later.

115.

J14-Icd-35-3

Double-ended kohl stick.

Fig. 115.

AE.

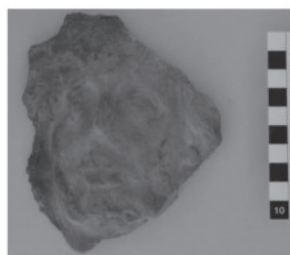
L.: 11.7; T.: 0.4.

Rod with thickened, moulded centre and tapered, but rather blunt ends.

References: Platt and Ray (2009), p. 209-211; fig. 12, no. 7-8.

Umayyad or later.

Dress Accessories



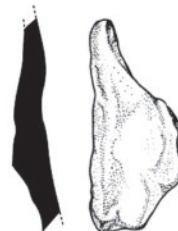
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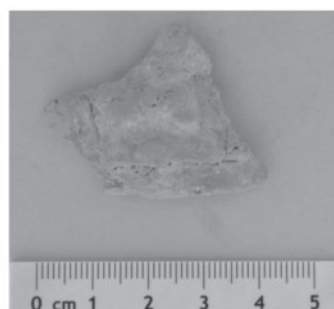
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150



151



152

116.

J14-Ke-3-211

Strap end.

Fig. 116.

AE.

L.: 3.4; W.: 1.1.

U-shaped plate; face with engraved ornament of stylized vegetable character.

References: Schulze-Dörrlamm (2009), p. 268-270.

Late Byzantine.

117.

J14-Kh-34-27

Strap end.

Fig. 117.

AE.

L.: 6; W.: 2.5.

U-shaped; upper end slightly fluted, with two small perforations for lost rivets.

References: Kazanski (2003), p. 122; fig. 14, no. 37.

Late Byzantine.

Horse Trappings (?)

118.

J14-Kh-34-2

Buckle.

Fig. 118.

FE, badly corroded.

L.: 4.4; W.: 5.2; T.: 1.6.

Almost rectangular loop, with eyes at the end of both arms which hold a pivoted axis; a triangular tongue is linked with the central, fixed axis.

References: Jantzen (2004), pl. 20, no. 748; similar buckles of copper alloy, with only one pivoted axis: Patrich (2008), p. 458, no. 211-212.

Roman – Late Byzantine.

119.

J14-Ke-3-7x

Loop of a buckle (?).

Fig. 119.

AE.

L.: 5.6; B.: 3.7.

Almost rectangular loop with extended rounded ends, each perforated to hold a pivoted axis which is lost.

References: Patrich (2008), p. 458, no. 211-212.
Roman – Late Byzantine.

Chains and Hooks

120.

J14-Ke-3-255

Fragment of a chain.

Fig. 120.

AE.

L.: 12.2; W.: 0.9.

Chain of small figure-of-eight-shaped links, which may have belonged to a glass lamp suspension.

References: Patt (2009), p. 279; fig. 13.23, no. 2; (iron example of the 4th to 8th cent. AD): Clark (1986-2), p. 269; pl. XXXII, 1; (a bronze example): Segal *et al.* (2007), p. 84; fig. 129.
Hellenistic/Roman or later.

121.

J14-Kh-34-7

Fragment from a chain.

Fig. 121.

FE.

L.: 4.9; W. (hook): 1.9.

Two chain links, each with two different sized loops, like a distorted figure-of-eight.

References: Patt (2009) p. 278-279; fig. 13.23, no. 9.

Hellenistic/Roman or later.

122.

J14-Kh-34-10

Bracket, probably from a chain.

Fig. 122.

AE.

L.: 7.3; W.: 1.4.

Flat plate of oblong triangular shape. Two extended, rounded ends; each perforated.

References: Waldbaum (1983), p. 101-102; pl. 38, no. 591-592; Jantzen (2004), pl. 1, no. 1-2.
Byzantine/Late Byzantine.

123.

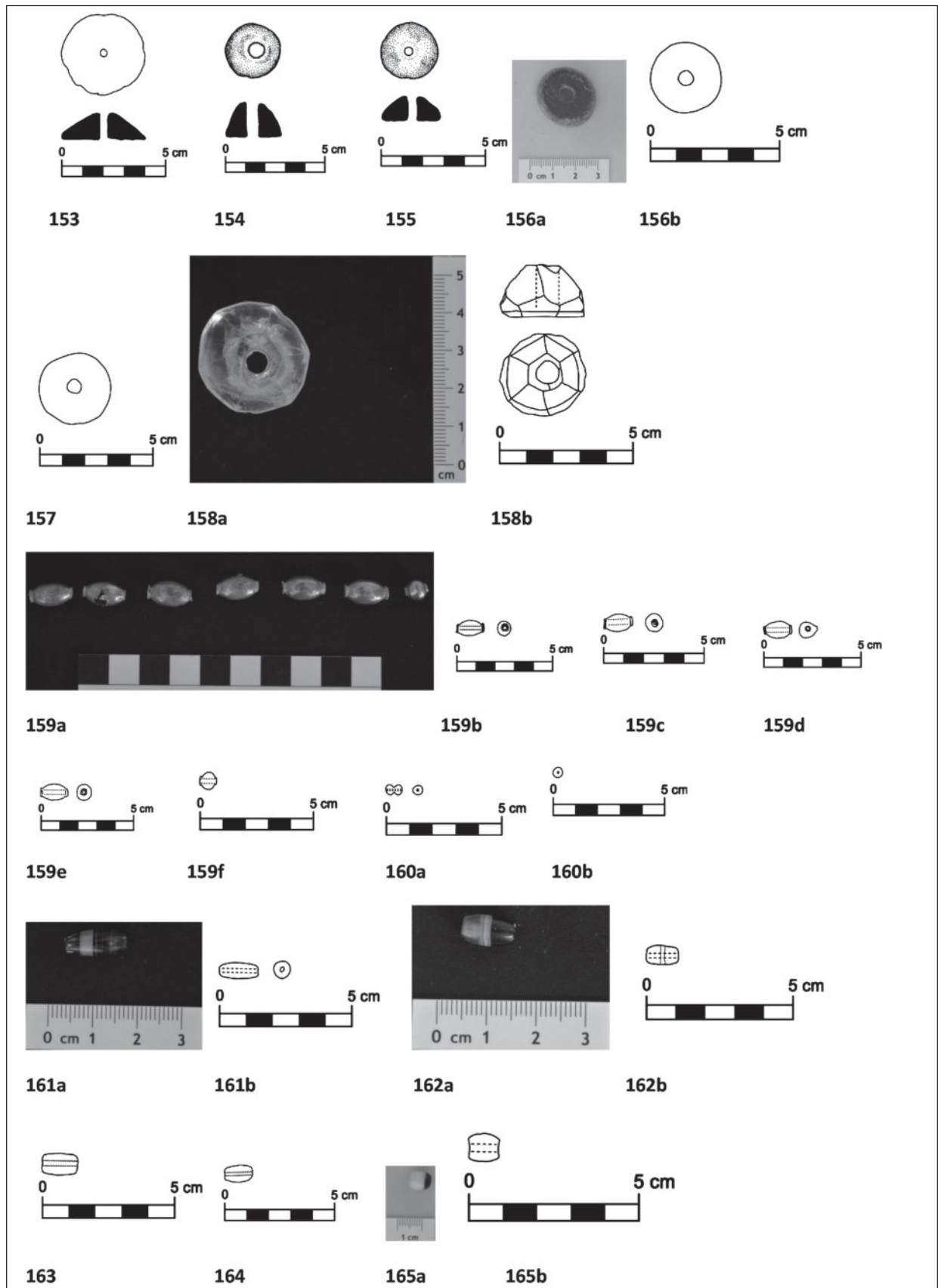
J14-Kh-34-14

Fragment from a chain.

Fig. 123.

FE, badly corroded and contaminated with other material.

L.: single link ca. 3.6; W.: 1.35.



A cluster of several oblong oval chain links.
Hellenistic/Roman or later.

124.

J14-Ke-3-5x

Hook.

Fig. 124.

AE.

L.: 3.6; W.: 1.3.

S-shaped hook, probably from a chain or a balance.

References: Patrich (2008), p. 460, no. 264; Platt (2009), p. 276, 279; fig. 13.23, no. 5; Gawlikowski and Musa (1986), p.152; fig. 10.
Hellenistic/Roman or later.

125.

J14-Ke-3-215

Fragment from a hook.

Fig. 125.

AE, badly corroded, contaminated with other material.

L.: 2.5; W.: 1.1.

Probably S-shaped; one end is missing.

References: Patt (2009), p. 275-279; fig. 13.23.
Hellenistic/Roman or later.

Nails and Rivets

126.

J14-Kh-34-4

Button/head of a rivet (?).

Fig. 126.

PB (?).

Diam.: 1.6; T.: 0.15.

Flat, slightly concave and discoid piece of metal.

Roman – Late Byzantine.

127.

J14-Kh-34-21

Boss or decorated head of a rivet (?).

Fig. 127.

AE.

L.: 5.9; Diam.: 1.6.

Solid, oblong, vase-shaped.

References: Waldbaum (1982), p. 64-65; pl. 18, no. 260.

Hellenistic/Roman or later.

128.

J14-Kh-34-31 + 32

Two small nails/rivets.

Fig. 128.

FE, badly corroded.

L 1.5 and 1.

Each has a round, slightly convex head.

References: Patrich (2008), p. 439, 455, no. 61-68.

Hellenistic/Roman or later.

Various

129.

J14-Ke-3-214

Fragment of unknown function.

Fig. 129.

AE.

Diam. (max.): 1.7; L.: 4.8.

Oblong, bi-conical, barrel-shaped tube; delicate horizontal grooves.

Hellenistic/Roman or later.

130.

J14-Kefgh-3-166

Bolt.

Fig. 130.

AE.

Diam. (max.): 0.6; L.: 4.2.

Oblong, bi-conical bolt with narrow central section and thickened, spherical ends.

Hellenistic/Roman or later (?).

131.

J14-Kf-3-167

Cramp.

Fig. 131.

FE, badly corroded.

L.: 5.1.

Angled band with open ends which bend upwards.

References: Raubitschek (1998), pl. 87.

Hellenistic/Roman or later.

132.

J14-Kf-3-360

Conical object of unknown function, bell (?).

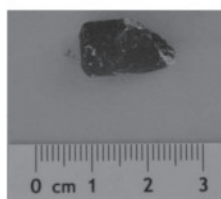
Fig. 132.

AE.

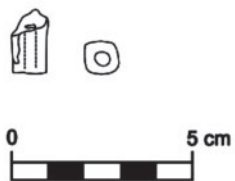
Diam.: 1.9; H.: 1.

Conical husk, made of sheet.

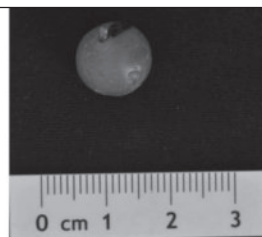
Hellenistic/Roman or later (?).



166a



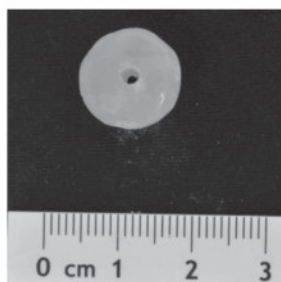
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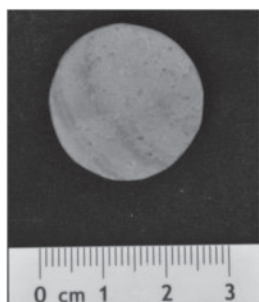
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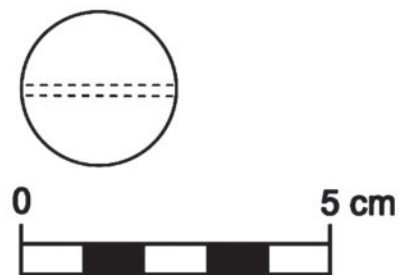
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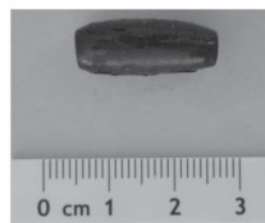
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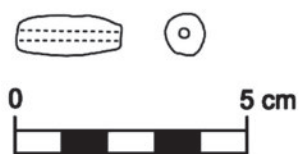
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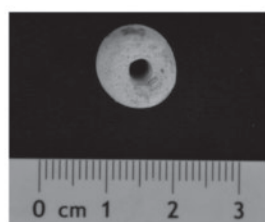
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171a



171b



172a



172b



173

133.

J14-Kg-3-20x

Plate with rivets.

Fig. 133.

AE.

L.: 5.4; W.: 1.1.

Flat plate with expanded, rounded, perforated ends; two hooks are attached in the eyes.

Hellenistic/Roman or later.

134.

J14-Kh-34-3

Tube/hull of unknown function.

Fig. 134.

AE, heavily corroded and contaminated with other material.

Diam. (max.): 2; L.: 6.2.

Almost cylindrical tube.

Hellenistic/Roman or later.

135.

J14-Kh-34-6

Fitting.

Fig. 135.

FE, badly corroded and contaminated with other material.

L.: 9.1; W.: 2.4; T.: 1.25.

Oblong, originally rectangular bar with eyeholes at the ends; a small rivet passes through each.

Hellenistic/Roman or later.

Miscellaneous

Stamps (CBH)

136.

J14-Kb-10-2

Stamp, fragmented.

Fig. 136.

Diam.: 5.3; H.: 1.8; T.: 1.8.

Munsell: core: 5YR 5/1; ext.: 5YR 5/1.

Circular bread (?) stamp. The stamp face is divided by 7 lines which pass through the fix point in the central hole, dividing the face into triangles/cunei, each with a dot. Four of the lines are thicker, forming a cross; one area is divided by horizontal and vertical lines. The design is carved "in negative".

References: Kakish (2014), p. 5; fig. 4-5; p. 7; fig. 9; Calavaris (1970), p. 83, fig. 41.

Umayyad (7th – end of 8th cent. AD).

137.

J14-Kf-3-477

Stamp, almost intact.

Fig. 137.

H.: 3.1; L.: 3.8; W.: 2.9; T.: 2.2.

Munsell: 10YR8/2.

Bread (?) stamp; Stamp surface is leaf shaped. The design is carved "in positive". Top of handle is broken off; indications that a hole pierced through one side.

References: Shape: Calavaris (1970), p. 61, fig. 29.

Late Byzantine – Umayyad.

Terracotta (AL, RR)

138.

J14-0-6

Relief fragment of a bearded head (giant or barbarian).

Fig. 138.

H.: 13; W.: 10.5; D.: 3.5.

Munsell: core: 2.5 YR 5/4; int.: 2.5 YR 7/4-5/4; ext.: 2.5 YR 6/4-5/4.

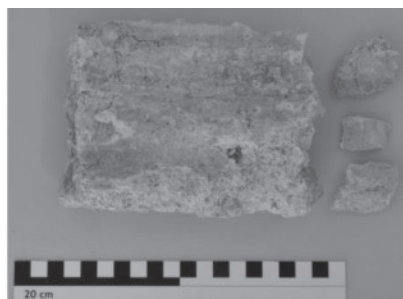
Head of a bearded male turned in an expressive movement to the right. The hair and beard are uncombed and fall in thick locks, the skin surface is expressive and has a vivid plasticity. The eyes are big and deeply set. The eyebrows are contracted in an expression of agony. On the left side, under the hair line, are two rounded knobs. The lips are full. It may depict a fighting/dying giant or barbarian.

The rear is plain; two small iron sticks were inserted for suspension at the top.

The mould made object was lying on the surface and had been exposed to fire; hence, the surface is worn, and it is broken on all sides. The left side of the hair is missing, as well as the lower part of the hair on the right side at ear level.

There is a cut on and under the nose.

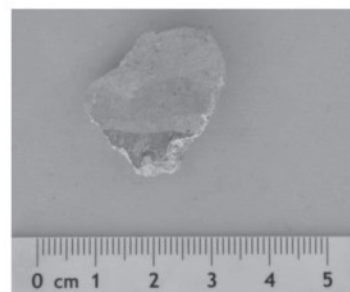
The object was a stray surface find, close to the transportable housing of the "Archaeologists' Camp" in Jerash. It is probably of Roman date. There are no direct comparisons known from the region, but the type "bearded barbarian male" occurs in Iliffe (1944) as type no. 16. However, since this piece is not a known Jerash figurine, and does not stem from an archaeological context, it cannot be ruled out



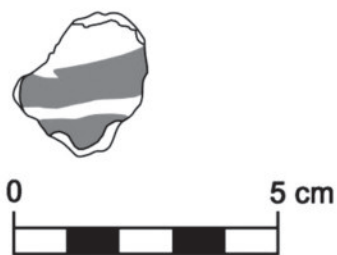
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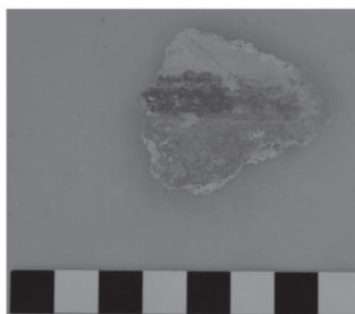
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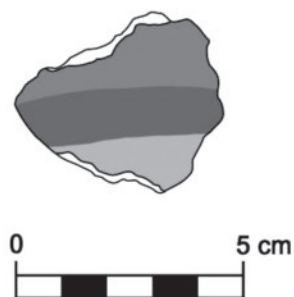
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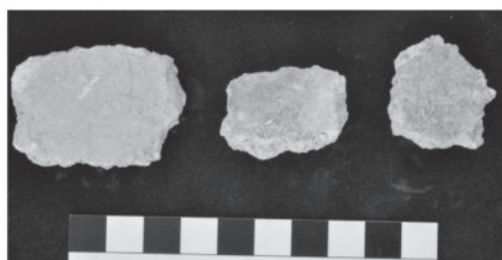
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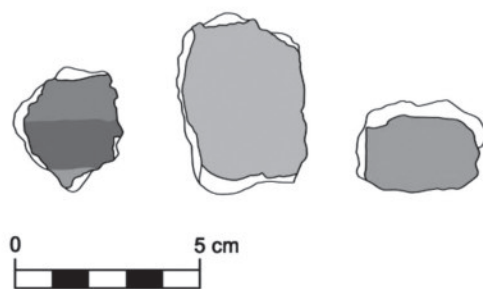
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178a



178b

that it is a modern object.

References: (likely) Illife (1944), no. 16.
Probably Roman.

139.

J14-Lb-39-4

Human head, fragmented.

Fig. 139.

H.: 6; W.: 5; D.: 3.

Munsell not available.

Only the lower part of the face is preserved, from above the nose and the right ear. The back of the head is missing, and the surface is covered in lime.

Mould made head of a human figure, with the neck turned slightly upwards to the left in an expressive pose. The left eye and ear are large, as well as the nose. The mouth is small. The face is chubby, with a full, short neck. It is not possible to say whether the head had hair or was bald.

The figurine belongs to a group of Jerash figurines, and may be compared to no. 33 in Illife (1944).

References: Illife (1944), no. 33, 41; Lichtenberger, Raja and Sørensen (2017), no. 139.

Roman (2nd cent. AD).

140.

J14-Jc-35-67

Fragment of a figurine.

Fig. 140.

H.: 3.0; W.: 3.0; D.: 0.8.

Munsell: core: 5YR8/3; int.: 10YR8/2; ext.: 10YR8/2.

Rather finely levigated terracotta clay. Fingerprints made during production of the terracotta are visible on the rear. The mould made fragment is broken on all sides, and depicts a piece of drapery, which falls in thick, heavy folds. It is possible to deduce that the person depicted was moving towards the right, as a piece of the limb is visible to the very right of the fragment.

Roman (2nd cent. AD).

141.

J14-Jc-47-1

Fragment of a terracotta arm.

Fig. 141.

H.: 7; W.: 3.5; D.: 2.

Munsell: core: 2.5YR6/6; int.: 7.5YR8/3; ext.: 7.5YR8/3.

Rather finely levigated clay with a whitish slip. The piece is a limb fragment, which is broken at the top and bottom. It probably belonged to a left arm; this has been deduced from the angle in which the arm is bent.

Roman (2nd cent. AD).

142.

J14-Jd-36-4

Small fragment of terracotta.

Fig. 142.

H.: 3; W.: 2.5; D.: 1.3.

Munsell: all: 5YR 8/4.

Small mould made fragment with voluminous T-shaped lines. Finger imprints caused by shaping are visible on the back.

Probably Roman.

143.

J14-Jd-32-207

Fragment of a figurine.

Fig. 143.

H.: 5; W.: 3; D.: 1-2.

Munsell not available.

The lower right side of a mould made figure, possibly showing some drapery. Heavily worn and fragmented.

Roman.

144.

J14-Ih-42-27

Fragment of a figurine.

Fig. 144.

H.: 3; W.: 1.3-1.8; D.: 1.1.

Munsell not available.

Terracotta fragment of a right hand, with six fingers. It is broken off at the wrist, and both the thumb and the index finger are damaged. The hand is grasping an object, which cannot be identified due to the state of preservation. (Solid clay extremities were often added after the molding of the main parts of the figure.)

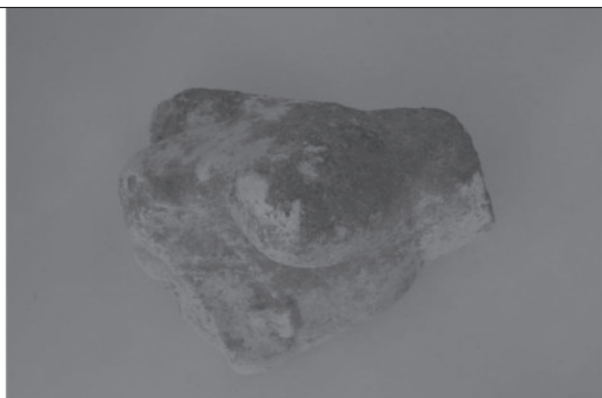
Roman (2nd cent. AD).

145.

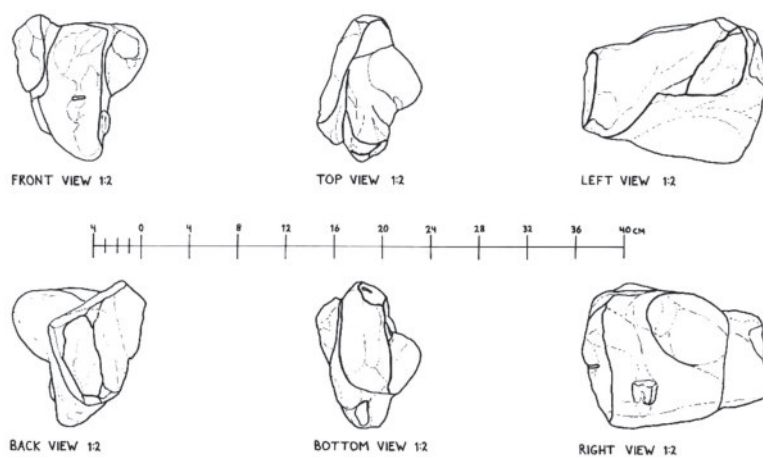
J14-Jcd-32-62

Terracotta fragment.

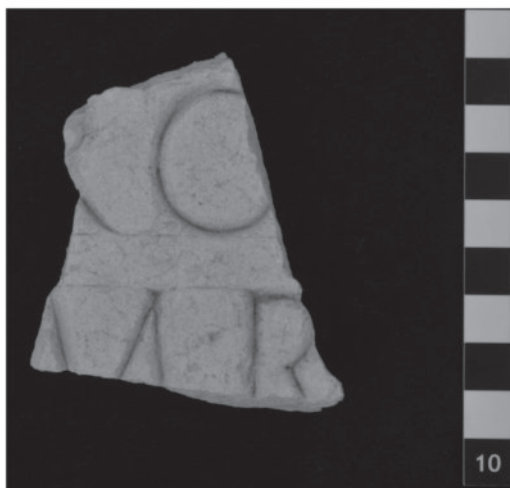
Fig. 145.



179a



179b



180a

H.: 4.1; L.: 3.1; D.: 0.5.

Munsell: all: 2.5YR 7/6.

The mould made fragment is decorated, and has an irregular knobby structure; it possibly belongs to the depiction of a rocky landscape, but is broken on all sides.

Roman.

146.

J14-Jc-35-60

Fragment of a figurine.

Fig. 146.

H.: 3.2; W.: 2.3; D.: 0.65.

Munsell: all: 2.5YR 7/6.

This mold made fragment most likely depicts the frontal top right corner of a female face and hair do. Only a small part of the face is visible, with a slight impression of the right eye. The hair is arranged in two tiers, with thick locks.

Roman (2nd cent. AD).

Bone Utensils (SK)

147.

J14-Kh-34-24

Worked bone disc, intact.

Fig. 147.

Diam.: 2; T.: 0.43.

Circular worked bone disc, with eight incised circles along outer edge; each circle has a central incised dot, from which incised lines are connected to the circles along the outer edge. Possibly a game piece.

References: Macalister (1912 Vol. II), p. 303, fig. 443, (1912 Vol. III), pl. CXXXII, no. 45, 47, 49; pl. CXCIV, no. 61, 61a, 72; Ayalon (2005), fig. 28, 29; Kotter and Ray (2009), fig. 9.27, no. 11; fig. 9.28, no. 1, 5.

Not datable.

148.

J14-Kgh-3c-323

Worked bone disc, intact.

Fig. 148.

Diam.: 2.13; H.: 0.54.

Circular worked bone disc; centrally incised dot, which is surrounded by three concentric incised circles, continuing to the outer edge. Possibly a game piece.

References: Macalister (1912 Vol. II), p. 303, fig. 443, (1912 Vol. III), pl. CXCIV, no. 61, 61a,

72; Ayalon (2005), fig. 28, 29; Kotter and Ray (2009), fig. 9.27, no. 11; fig. 9.28, no. 1, 5; Vincenz (2010), pl. 12.1, no. 12.

Not datable.

149.

J14-Kg-3D-408

Worked bone disc, intact.

Fig. 149.

Diam.: 2.8; T.: 0.41.

Circular worked bone disc; centrally incised dot from which eight incised concentric circles continue to the outer edge. Possibly a game piece.

References: Macalister (1912 Vol. II), p. 303, fig. 443; Macalister (1912 Vol. III), pl. CXCIV, no. 61, 61a, 72; Ayalon (2005), fig. 28, 29; Kotter and Ray (2009), fig. 9.27, no. 11; fig. 9.28, no. 1, 5; Vincenz (2010), pl. 12.1, no. 12. Not datable.

150.

J14-Kg-3-16x

Worked bone inlay, fragmented.

Fig. 150.

H.: 4; L.: 5.7.

Inlay with incised pattern; to the left is a half circle from which curving, oblique lines run to the right; possibly from a box.

References: For function, see: McNicoll *et al.* (1992), pl. 37; Kotter and Ray (2009), fig. 9.27, no. 1.

151.

J14-Ke-3-351A+J14-Kef-3s-334

Worked bone drapery, fragmented.

Fig. 151.

L.: 5.96; T.: 0.48 ; W.: 1.28.

Bone fragments which form part of a figure; drapery is preserved with soft oblique and curving folds; possibly lower part of clothing of a full figure.

References: Ayalon (2005), fig. 35, no. 336-338; fig. 59, no. 564.

Roman – Late Byzantine.

152.

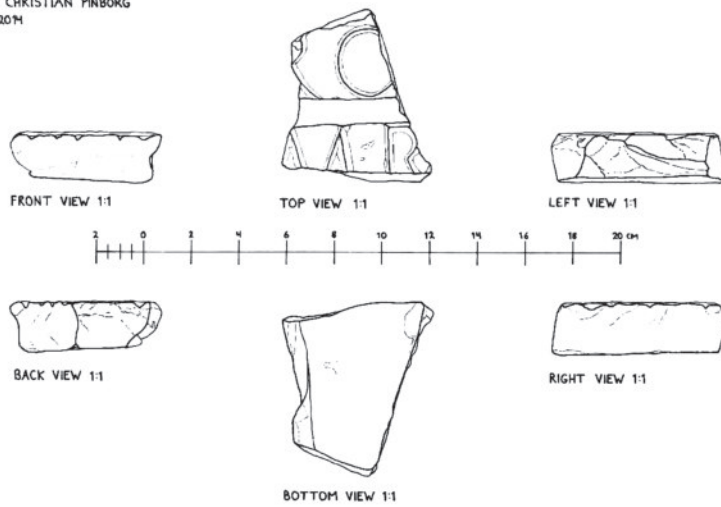
J14-Kh-3-26x

Worked bone cylinder, intact.

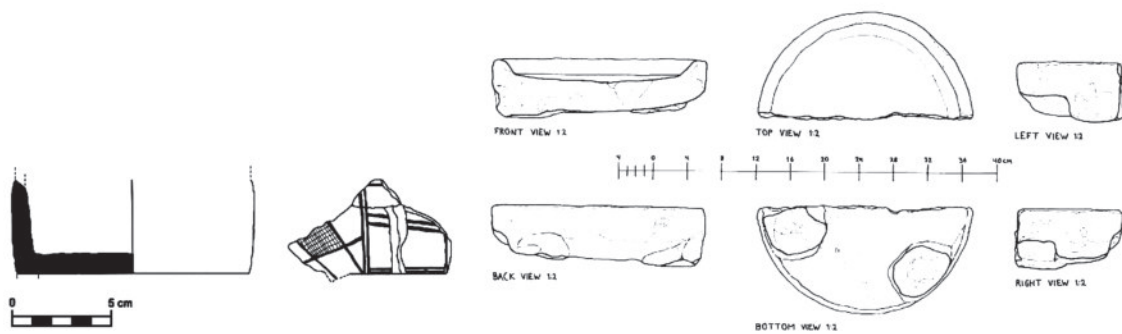
Fig. 152.

Diam.: 2.84; L.: 10.91; T.: 0.54.

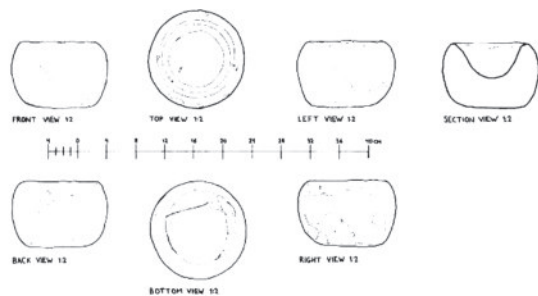
JENS CHRISTIAN PINBORG
28.08.2014



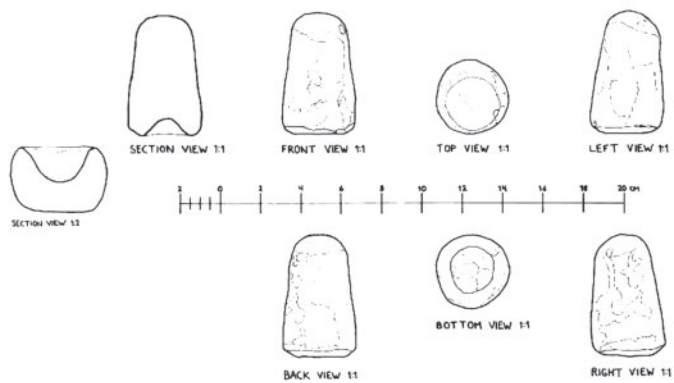
180b



181



182



183

183

Worked bone cylinder, six incised lines at both ends; slightly ribbed surface; possibly a container or (mirror?) handle.

References: McNicoll *et al.* (1992), pl. 72, no. 6; Findlater *et al.* (1998), fig. 7, 9; Ayalon (2005), fig. 1, no. 1-3; Wapnish (2008), fig. 34.5; Kotter and Ray (2009), fig. 9.27, no. 8; Panitz-Cohen, Yahalom-Mack and Mazar (2009), fig. 16.12, no. 2; Lichtenberger, Raja and Sørensen (2017), no. 152.

Late Roman – Mid Byzantine.

Spindle Whorls (SK)

153.

J14-Jd-32-205

Fig. 153.

Diam. (min.): 0.4; Diam. (max.): 3.9; H.: 1.2.

Almost intact, cone-shaped spindle whorl with central hole; bulging sides; flat base with circular grooves; sand stone, reddish brown.

References: Riis (1969), fig. 39, no. 8; Riis and Buhl (1990), fig. 97, no. 752-765; McNicoll *et al.* (1982), pl. 132, no. 7; Platt and Ray (2009), fig. 11.5, no. 6-11; Lichtenberger, Raja and Sørensen (2013), no. 158 and 159; (forthcoming b), no. 144.

Not datable.

154.

J14-Kh-34-19

Fig. 154.

Diam. (min.): 0.5; Diam. (max.): 2.7; H.: 1.74; W.: 0.89-2.7; Wt: 17.

Almost intact cone-shaped spindle whorl with central hole; flat base; steep sides; slight circular depression at the top; dark bluish-black stone.

References: Riis (1969), fig. 39, no. 8; Riis and Buhl (1990), fig. 97, no. 752-765; McNicoll *et al.* (1982), pl. 132, no. 7; (1992), pl. 69, no. 8; Platt and Ray (2009), fig. 11.5, no. 6-11; Lichtenberger, Raja and Sørensen (2013), no. 158, 159; (2017), no. 143.

Not datable.

155.

J14-Kh-34-20

Fig. 155.

Diam. (min.): 0.5; Diam. (max.): 2.5; H.: 1.15; W.: 0.60-2.68; Wt: 11.37.

Almost intact cone-shaped spindle whorl with central hole; flat base; curving sides; dark greenish-black stone.

References: Riis (1969), fig. 39, no. 8; Riis and Buhl (1990), fig. 97, no. 752-765; McNicoll *et al.* (1982), pl. 132, no. 7; (1992), pl. 69, no. 8; Platt and Ray (2009), fig. 11.5, no. 6-11; Lichtenberger, Raja and Sørensen (2013), no. 158, 159; (2017), no. 144.

Not datable.

156.

J14-Kh-3s-303

Fig. 156a-b.

Steatite.

Diam. (min.): 0.86; Diam. (max.): 2.56; H: 2.7; T.: 0.86; Wt: 11.87.

Almost intact cone-shaped spindle whorl with central hole; flat top and base, black steatite.

References: Riis (1969), fig. 39, no. 8; Riis and Buhl (1990), fig. 97, no. 752-762; McNicoll *et al.* (1982), pl. 132, no. 7; McNicoll *et al.* (1992), pl. 69, no. 8; Platt and Ray (2009), fig. 11.5, no. 6-11; Lichtenberger, Raja and Sørensen (2013), no. 158 and 159; (2017), no. 144.

Not datable.

157.

J14-Ke-3-210

Fig. 157.

Bone.

Diam. (min.): 0.7; Diam. (max.): 3.1; H.: 1.2; Wt: 9.23.

Almost intact cone-shaped spindle whorl with a central hole; flat base, curving sides; bone.

References: Dever, Lance and Bullard (1986), pl. 56, no. 4; pl. 59, no. 9; McNicoll *et al.* (1992), pl. 46, no. 3, 9.

Not datable.

158.

J14-Kgh-3s-309

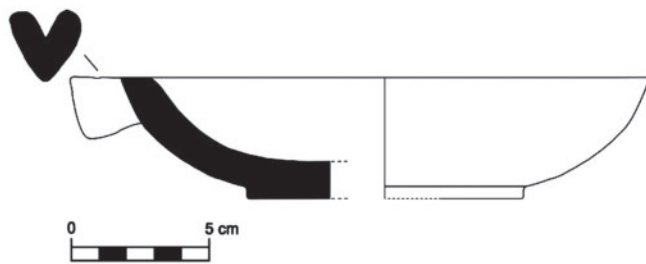
Fig. 158a-b.

Rock crystal.

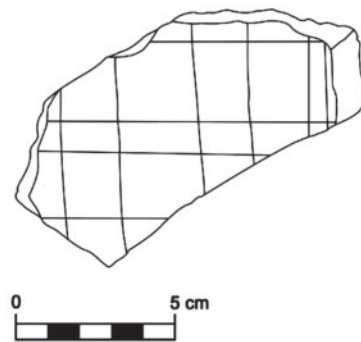
Diam. (min.): 0.68; (max.): 2.9; H.: 1.97; L.: 3.19; W.: 3.08; Wt: 22.17.

Intact trapezoidal spindle whorl with a central hole; flat base; curving sides; upper surface is worked in trapezoidal patterns; worked hexagon around central hole; rock crystal, clear.

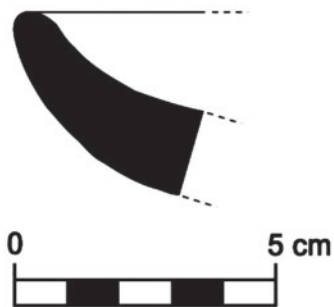
Not datable.



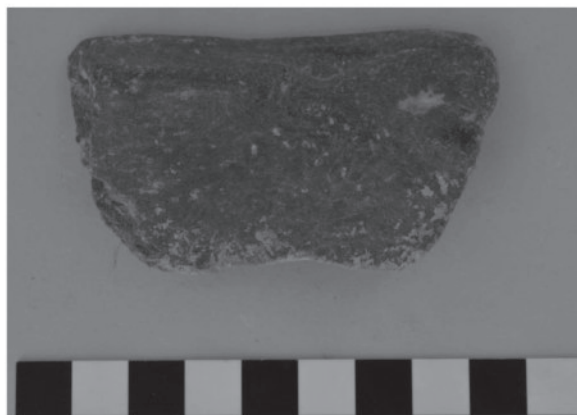
184



185



187



188

Jewellery (SR)

159.

J14-Kgh-3s-315, 316, 317, 318, Kg-3N-419, J14-Kg-39-6, 7

Metal beads.

Fig. 159a-f.

Kgh-3s-315: L.: 1.43; W.: 0.85/ Kgh-3s-316: L.: 1.29; W.: 0.80/ Kgh-3s-317: L.: 1.27; W.: 0.87/ Kgh-3s-318: L.: 1.44; W.: 0.84/ Kg-3N-419: L.: 0.76; W.: 0.70/ Kg-39-6: L.: 1.4; W.: 0.7/ Kg-39-7: L.: 1.4; W.: 0.8.

Cylindrical shape (419 is globular shaped) lead beads, coated with golden foil, pierced through lengthwise.

References: Riis (1948), fig. 203.

Not datable.

160.

J14-Kf-3-476

Two metal beads.

Fig. 160a-b.

No. 1: L.: 0.33; W.: 0.38/ No. 2: L.: 0.65; W.: 0.78.

No. 1: AE. Circular, bronze plate, central hole;

No. 2: AE. Two circular bronze beads, corroded.

Not datable.

161.

J14-Kgh-3s-320

Stone bead.

Fig. 161a-b.

L.: 1.39; W.: 0.61.

Agate.

Cylindrical shape, agate stone bead, pierced through the small sides, coloured in stripes of dark brown, white and light brown.

References: Ploug (1985), 209; Riis (1948), fig. 203.

Not datable.

162.

J14-Kgh-3s-321

Stone bead.

Fig. 162a-b.

L.: 1.07; W.: 0.62.

Agate.

Cylindrical shape, agate stone bead, pierced through the small sides, coloured with a dark brown part, which is separated from a very light brown part by a white line.

References: Ploug (1985), fig. 209; Riis (1948), fig. 203.

Not datable.

163.

J14-Kg-3D-412

Stone bead.

Fig. 163.

L.: 1.34; W.: 0.77.

Cylindrical shape carnelian bead, pierced through the small sides.

References: Ploug (1985), fig. 209; Riis (1948), fig. 203.

Not datable.

164.

J14-Kg-3D-413

Stone bead.

Fig. 164.

L.: 1.22; W.: 0.76.

Carnelian.

Cylindrical bead, pierced through the small sides.

References: Ploug (1985), fig. 209; Riis (1948), fig. 203.

Not datable.

165.

J14-Kg-3N-419

Stone bead.

Fig. 165a-b.

L.: 0.89; W.: 0.77.

Ovoid-shape, white and dark brown/ black coloured semi-precious stone bead. Pierced through on the short sides.

References: Riis (1948), fig. 203.

Not datable.

166.

J14-Kh-3-520

Stone bead.

Fig. 166a-b.

L.: 1.65; W.: 0.9; Diam. (hole): 0.34.

Cylindrical, blackish-brown stone bead. Pierced hole in the centre of the small sides.

Not datable.

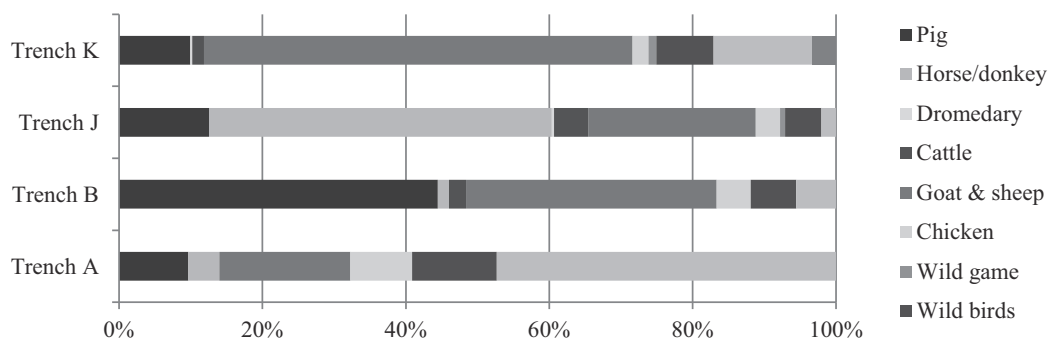
167.

J14-Ke-41s-7

Stone bead, almost intact.

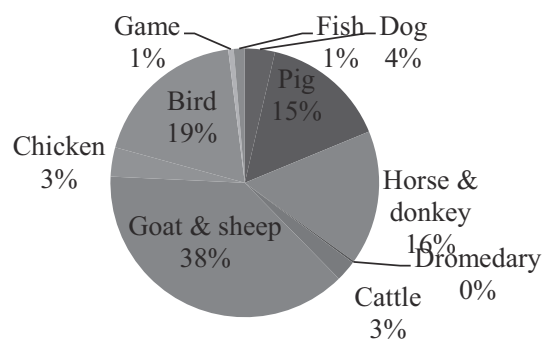
Fig. 167a-b.

	Trench A	Trench B	Trench J	Trench K
Pig	9	56	37	36
Horse/donkey	4	2	141	-
Dromedary	-	-	1	1
Cattle	-	3	14	6
Goat & sheep	17	44	69	217
Wild game	-	-	2	4
Chicken	8	6	10	8
Wild birds	11	8	15	29
Birds	44	7	6	50
Fish	-	-	-	12



189. Distribution of the main species at Jerash, according to the trench of origin.

	Total
Dog	33
Pig	138
Horse & donkey	147
Dromedary	2
Cattle	23
Goat & sheep	347
Chicken	32
Bird	171
Game	6
Fish	12



190. Distribution of the main species found at Jerash, with percentage of total NISP.

H.: 1.03; Diam.: 1.17.

Carnelian.

Circular reddish-brown carnelian stone, partly broken off. Remains of a bronze wire in the pierced hole.

References: Ploug (1985), fig. 209; Riis (1948), fig. 203.

Not datable.

168.

J14-Kg-39-8

Stone bead.

Fig. 168a-b.

L.: 1.35; W.: 1.0.

Circular, white stone bead, possibly made of quartz, pierced through on the small sides.

References: Riis (1948), fig. 203, 204; Smith (1973), pl. 80.

Not datable.

169.

J14-Kg-39-9

Semi-precious stone bead.

Fig. 169.

L.: 1.5; W.: 0.7.

The red brown/light brown bead is cylindrically elongated (thicker in the middle) and has white stripes running around it. Pierced through on the small sides.

References: Riis (1948), fig. 203.

Not datable.

170.

J14-Kh-3-450

Stone pendant.

Fig. 170a-b.

T.: 0.60; Diam.: 2.43.

Flat disc pendant. Yellowish stone with light brown stripes. Pierced hole in centre.

References: Riis and Buhl (1990), fig. 107.

Not datable.

171.

J14-Kgh-3s-322

Bone bead.

Fig. 171a-b.

L.: 2.15; W.: 0.88.

Black bone bead, secondarily burned, drilled hole through the small sides. Surface cracked and flaking off.

References: Riis (1948), fig. 203; Smith (1973),

pl. 80.

Not datable.

172.

J14-Kh-3-523

Glass bead.

Fig. 172a-b.

H.: 1.03; Diam.: 1.13; (hole): 0.27.

Opaque, white/light blueish glass bead, hole in centre of the small sides.

References: Riis (1948), fig. 203; McNicoll *et al.* (1992), pl. 73; Smith (1973), pl. 80.

Not datable.

173.

J14-Kh-3-514

Finger ring, fragmented.

Fig. 173.

Measurements not available.

Half a bronze ring, very corroded, with a whitish/blue glass pearl (weathered) inserted in depression on top.

References: Ploug (1985), fig. 54 I.

Not datable.

Stucco (CBH)

174.

J14-Kg-39-12

Stucco fragments.

Fig. 174.

Measurements and Munsell not available.

Unpainted.

Stucco panel, with three horizontal ledges, forming two horizontal grooves. The three small fragments are from the same panel.

References: Ploug (1985), p.164; fig. 32.

Late Roman – early Umayyad (early 4th – mid-7th century AD).

Wall Painting (CBH)

175.

J14-Ke-73-3

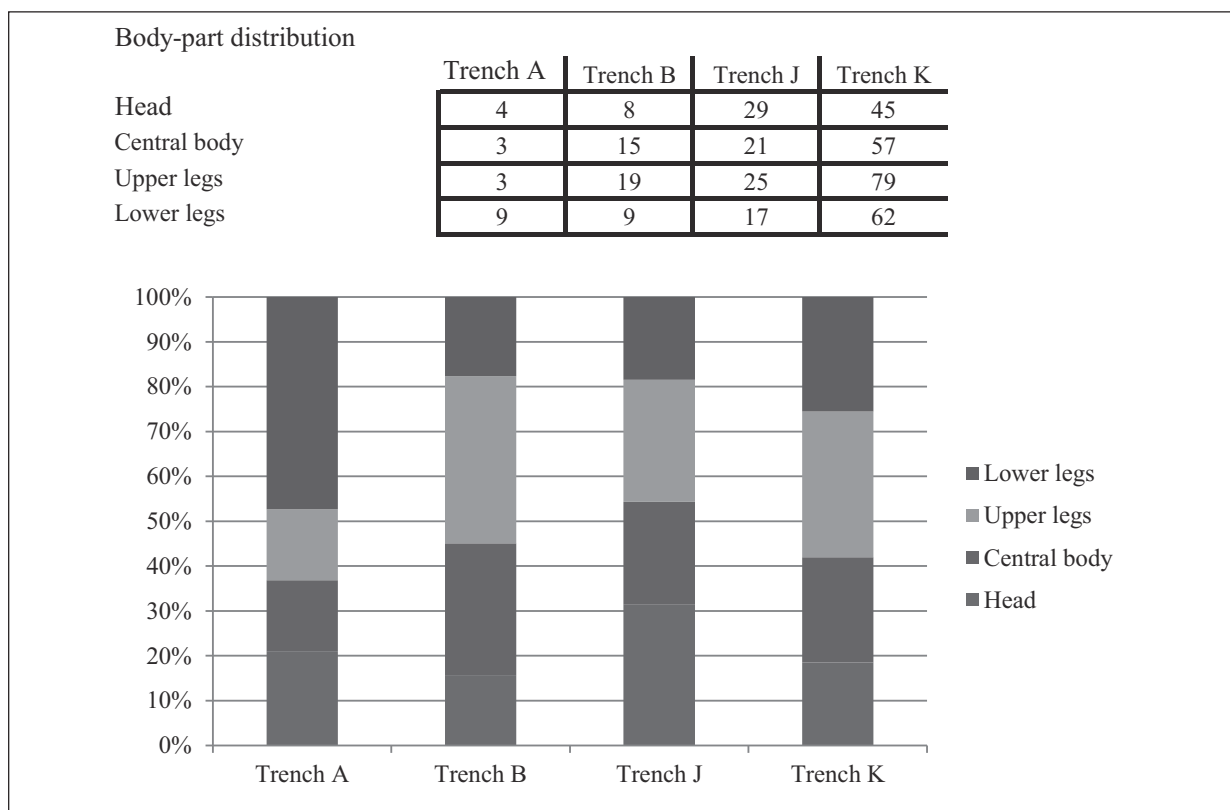
Plaster, fragmented.

Fig. 175.

Measurements not available.

Colours: White and red.

Three fragments with irregular painted deco. The base colour is white, various irregular lines are applied with red paint. The fragments



191. The distribution of sheep and goat remains, according to body part representation.



192. X-ray of three joined dog metapodiums, with clear fracture and regrowth stabilising the bones.

consist of two plaster layers: coarse plaster covered by a very finely levigated and thinner layer of lime. Painting technique not analysed.
References: Lichtenberger, Raja and Sørensen (2013, 2017), fig. 149; Ettinghausen (1962); Cruikshank Dodd (1997-98); Fowden (2004).
 Umayyad.

176.

J14-Ke-3-540

Painted plaster, fragmented.

Fig. 176a-b.

Measurements not available.

Colours: White, yellow and blue.

The deco. appears to have mainly consisted of parallel coloured bands of varying width. The fragment consists of two plaster layers: coarse plaster covered by a very finely levigated and thinner layer of plaster. Painting technique not analysed.

References: Lichtenberger, Raja and Sørensen (2017), fig. 149; Ettinghausen (1962); Cruikshank Dodd (1997-98); Fowden (2004).

Umayyad.

177.

J14-Kg-3s-378

Painted plaster, fragmented.

Fig. 177a-b.

Measurements not available

Colours: Green, black and white.

Munsell: 10Y-5GY 6/5GY; 2.5Y 3/1; 2.5Y 8/2.

The deco. seems to have mainly consisted of parallel bands of colours of varying width. The fragment consists of two plaster layers: coarse lime covered by a very finely levigated and thinner layer of lime. Painting technique not analysed.

References: Lichtenberger, Raja and Sørensen (2017), fig. 149; Ettinghausen (1962); Cruikshank Dodd (1997-98); Fowden (2004).

Umayyad.

178.

J14-Ke-3-258

Painted plaster, fragmented.

Fig. 178a-b.

Measurements not available.

Colours: Red and green.

Munsell: 10R 4/6; 10Y-5GY 4/2.

On one fragment, red and green deco. appears to

have parallel coloured bands of varying width. Two fragments have only one colour. The fragments consist of two plaster layers: coarse plaster covered by a very finely levigated and thinner layer of plaster. Painting technique not analysed.

References: Lichtenberger, Raja and Sørensen (2017), fig. 148; Ettinghausen (1962); Cruikshank Dodd (1997-98); Fowden (2004).

Umayyad.

Stone Objects

Sculpture (AL, RR)

179.

J14-Kc-3-133

Over-life sized white marble hand, fragmented.

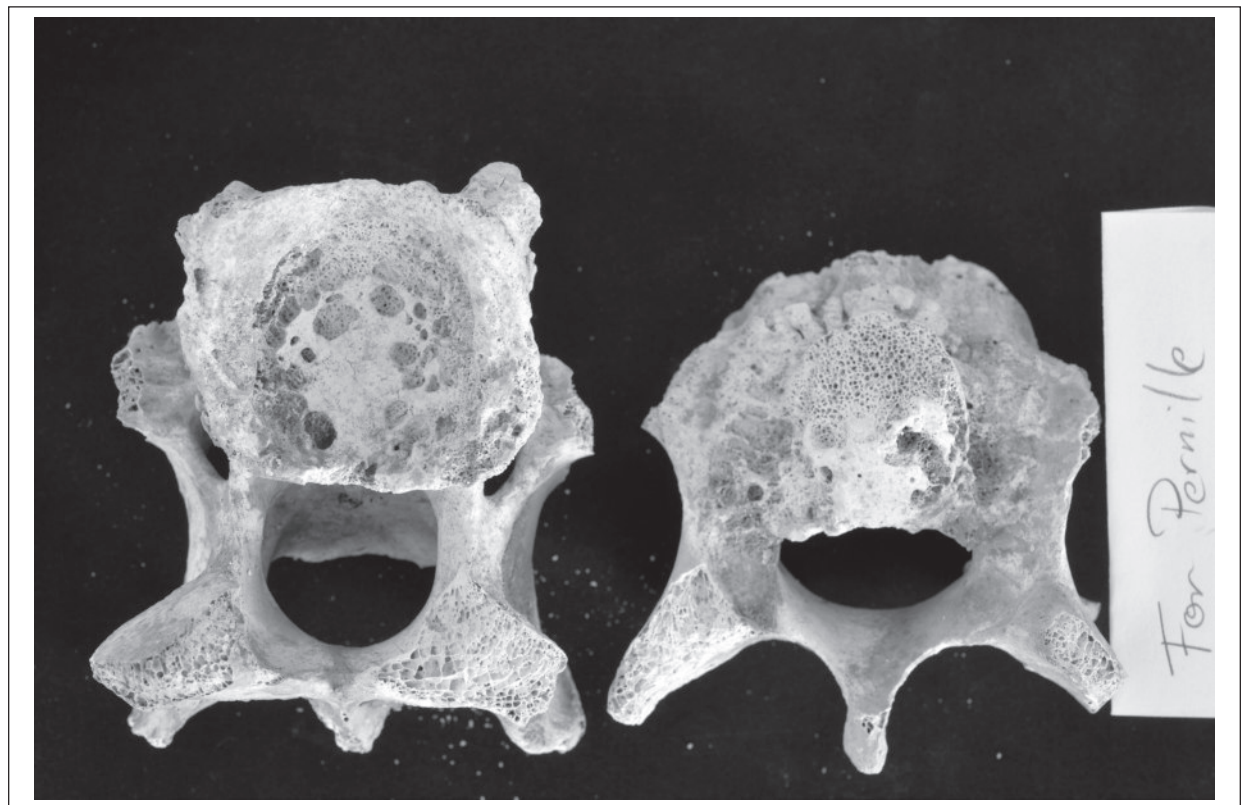
Fig. 179a-b.

H.: (broadest place, incl. fragment on top of the hand): 11; H.: (from lower part of thumb to upper part of hand): 8; L.: (from end of broken-off wrist to broken-off fingers): 14.5; W.: (across back of hand at the broadest place): 13; W.: (across the wrist): 8; Traces of an attribute running along the back of the hand: 6 (broad).

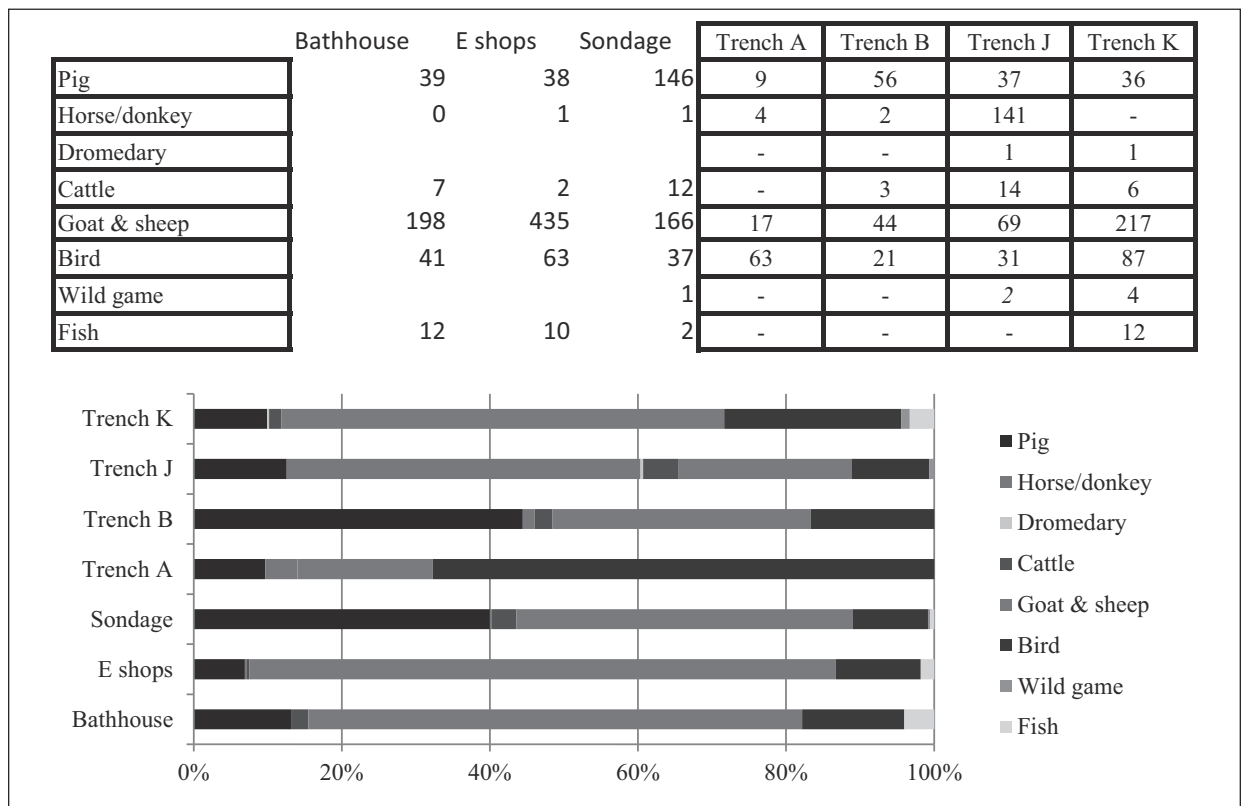
The fragment is of a larger than life sized right hand, made of white, finely grained marble. It is preserved from the middle of the wrist until the beginning of the fingers. An object/attribute ran along the top of the back of the hand. All breaks are clean and straight, which may indicate that the piece had been reworked for secondary use. The smooth surface of the stone is well preserved in the areas which are not broken, and is well done. There are some lime-spots on the marble, which have not been cleaned off.

Palm (inner side) of the hand: The lower joint of the thumb is preserved, and is broad and almost egg-shaped. The line which separates the wrist from the hand is visible, beginning immediately below the thumb joint. The line indicating the beginning of the fingers is also visible, beginning app. 2 cm from where the upper part of the lower thumb joint ends. On the right side of the palm, stretching across the line indicating the beginning of the fingers, is a fragment of a square piece of marble (2 by 2 cm), which may have been the beginning of a support for another part of the sculpture.

Upper (outer) side of the hand: On the upper



193. Two equid cervical vertebrae (6.-7. V.ce.) with significant osteoarthritis in the joint.



194. The distribution of species from a series of contexts in Jerash; from the North West Quarter and the town centre.

side of the hand, lines which indicate muscles and sinews are visible. There is a long break along the hand from above the index finger until the wrist, which stems from an attribute which cannot be identified. It is shaped as a 13 cm long wedge, which is 3 cm wide at the top and 8 cm wide at the other end.

The hand is massive, and heavy in its expression.
References: Weber (2002), p. 406-407; pl. 17; Taf. 45, A,B.

Roman (2nd – 4th cent. AD).

Inscription (AL, RR)

180.

J14-Jd-32-216

Fig. 180a-b.

Inscription, fragmented.

D.: 2.3; H.: 6.5 (longest preserved stretch); W.: 6 (widest preserved strip).

Letters:

Upper line: H.: 3; W.: 2 (preserved width, not complete); depth of letter cutting: 0.3.

Lower line: H.: 2.2 (preserved height, not complete); W.: 1.5 (broadest place); depth of letter cutting: 0.3.

Smoothly worked limestone. Two incised horizontal lines mark the separation of the letter lines. Fragments of five letters, arranged on two lines, are preserved. In the upper line an R as well as an O may be reconstructed. In the lower line, at least an M and an R. There are traces of intense red paint in all letters.

Roman (2nd cent. AD).

Stone Vessels (SR)

181.

J14-Keg-57-4 + J14-Kh-70-6

Base, stone vessel, fragmented.

Fig. 181.

Kh-70-6: L.: 3.17; W.: 2.88/ Keg-57-4: H.: 4.7; L.: 8.1; Diam.: 12.

Soft greyish-green stone vessel, with incised deco. of vertical, horizontal and diagonal lines and a net-pattern.

Not datable.

182.

J14-Jcd-32-60

Basalt mortar, fragmented.

Fig. 182.

H: 6.6 L: 24.5.

Black-bluish stone; rounded rim; standing on two feet.

References: Clarke (1986-1), fig. 24; Riis (1990), fig. 77, 78; Thuesen (1988), pl. 51.12.

Not datable.

183.

J14-Ke-23-1

Mortar with pestle, intact.

Fig. 183a-b.

Mortar: H.: 9.0; W.: 13.2; indentation: 4.8; W.: 8.4; Pestle: H.: 6.0; W. (min.): 2.6; W. (max): 3.6; indentation: 1.8.

Small grey-yellowish limestone mortar with pestle. Slightly weathered.

References: McNicoll *et al.* (1992), pl. 6.

Not datable.

184.

J14-Jd-32-180

Marble mortar, fragmented.

Fig. 184.

H.: 4.4; W.: 8.7; Diam.: 18.0.

Fragmented mortar in white marble. Rim, handle and base are preserved.

Not datable.

Game Board and Game Pieces (SR)

185.

J14-Kc-3-130

Marble game board, fragmented.

Fig. 185.

L.: 10.9; W.: 8.0; T.: 1.5.

White marble game board. Some very shallow incised lines on the upper surface.

Not datable.

186. (4 game pieces)

J14-Ka-3-102

Game piece.

H.: 0.96; L.: 2.49; W.: 1.77.

White-yellowish quartz stone. Rounded.

Not datable.

J14-Kc-3-131

Game piece.

H.: 1.2; L.: 0.3; W.: 0.2.

White quartz stone, rounded.
Not datable.

J14-Ke-3-207

Game piece.

H.: 1.0; L.: 2.0; W.: 1.4.

Light amber coloured quartz stone, rounded.

Not datable.

J14-Kefgh-3s-302a

Stone (game piece?)

H.: 0.7; W.: 0.3.

Sand coloured stone, round and flat. Probably a game piece.

Not datable.

Varia (SR)

187.

J14-Kgh-3s-310

Marble plate, fragmented.

Fig. 187.

H.: 3.5; L.: 5.2; W.: 4.7.

Worked piece of white marble.

Not datable.

188.

J14-Ke-3-179

Whetstone, fragmented.

Fig. 188.

H.: 7.3; L.: 4.0; T.: 1.5.

Trapezoidal black stone. Surface full of scratches.

Not datable.

Bibliography

Adler, N.

2004 *A Comprehensive Catalogue of oil Lamps of the Holy Land: from the Adler Collection*, Michigan.

Al-Khouly, M.

2001 Nouvelles Lampes Inscrites de la Période Omeyyade. Pp. 193-196 in E. Villeneuve (ed.), *La céramique byzantine et proto-islamique en Syrie-Jordanie (IVe-VIIe siècles apr. J.C.)*, Beyrouth

‘Amr, A.-J.

1988 Shallow Umayyad Painted Bowls from Rujm el-Kursi Excavations. *ADAJ* 32: 247-254.

‘Amr, Kh., Al-Momani, A. Farajat, S. and Falahat, H.

1998 The Petra National Trust Site Projects Archaeological Survey of the Wadi Musa Water Supply and Wastewater Project Area. *ADAJ* 42: 503-548.

‘Amr, Kh. and al-Momani, A.

2001 Preliminary Report on the Archaeological Component of the Wadi Musa Water Supply and Wastewater Project (1998-2000). *ADAJ* 45: 253-285.

Avissar, M.

1996 *Yoque’am, I. The Later Periods*. Qedem Reports 3, Jerusalem.

Ayalon, E.

2005 *The Assemblage of Bone and Ivory Artefacts from Caesarea Maritima, Israel 1st-13th Centuries CE*, BAR International Series 1457, Oxford.

Baitinger, H. and Völling, Th.

2007 *Werkzeug und Gerät aus Olympia*, Berlin and New York.

Ball, W., Bowsher, J., Kehrperg, I., Walmsley, A. and Watson, P.

1986 The North Decumanus and the North Tetrastyle at Jerash: An Archaeological and Architectural Report. Pp. 351-409 in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.

Barnes, H. Blanke, L., Damgaard, K., Simpson, I.

2006 From ‘Guard House’ to Congregational Mosque: Recent Discoveries in the Urban History of Islamic Jerash. *ADAJ* 50: 285-314.

Bendall, S.

1996 *Byzantine weights: An introduction*, London.

Cat. München

2009 *Die Welt von Byzanz – Europas östliches Erbe: Glanz, Krisen und Fortleben einer tausendjährigen Kultur*. Begleitbuch zur Ausstellung, Archäologische Staatssammlung München, Darmstadt.

Clark, V. A.

1986-1 The Church of Bishop Isaiah. Pp. 303-341. in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.

1986-2 Part II. The Archaeology of the Roman Theatre. Pp. 231-302. in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.

Clark, V. A. and Falkner, R.K.

1986 The Pottery, in V. A. Clark, Part II. The Archaeology of the Roman Theatre. Pp. 247-251. in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.

Clarke, G. W. et al.

2002 *Jebel Khalid on the Euphrates. Report on the Excavations 1986-1996*. Vol. I, Sydney.

Da Costa, K.

2001 Byzantine and Early Islamic Lamps: Typology and Distribution. Pp. 241-248. in E. Villeneuve (ed.), *La céramique byzantine et proto-islamique en Syrie-Jordanie (IVe-VIIe siècles apr. J.C.)*, Beyrouth.

2010 Economic Cycles in the Byzantine Levant: The Evidence from Lamps at Pella in Jordan, *Levant* 42, 1: 70-87.

Cruikshank Dodd, E.

1997-98 Christian Arab Painters Under the Mamluks. *ARAM* 9-10: 257-288.

- Dahl, G. and Hiort, A.
1976 *Having Herds, Pastoral Herd Growth and Household Economy*. Stockholm Studies in Social Anthropology 2, Stockholm.
- Dalby, A.
2010 *Tastes of Byzantium. The Cuisine of a Legendary Empire*, London.
- Daviau, P. M.
2010 *Excavations at Tell Jawa, Jordan, 4*, Leiden and Boston.
- Day, E. F.
1942 Early Islamic and Christian Lamps, *Berytus* 7: 65-79.
- Dever, W. G., Lance, H. D. and Bullard, R. G.
1986 *Gezer IV: The 1969-71 Season in Field VI, the "Acropolis". Part 2 Plates, Plans, Volume IV*, Jerusalem.
- Dornemann, R. H.
1990 Preliminary Comments on the Pottery Traditions at Tell Nimrin, illustrated from the 1989 Season of Excavations. *ADAJ* 34: 153-181.
- Von den Driesch, A.
1979 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum of Archaeology and Ethnology Bulletin 1, Harvard.
- Ettinghausen, R.
1962 *Arab Painting*, Cleveland.
- Ferguson, J.
2014 Late Hellenistic and Early Roman ceramic trends at Tell Madaba, Jordan. Pp. 171-189. in B. Fischer-Genz, Y. Gerber and H. Hamel (eds.), *Roman Pottery in the Near East. Local Production and Regional Trade. Proceedings of the Round Table held in Berlin, 19-20 February 2010*, Oxford.
- Findlater, G., El-Najjar, M., Al-Shiyab, A.H., O'hea, M. and Easthaugh, E.
1998 The Wadi Faynan Project: the South Cemetery Excavation, Jordan 1996: a Preliminary Report, *Levant* 30: 69-83.
- Fowden, G.
2004 *Qusayr 'Amr: Art and the Umayyad Elite in Late Antique Syria*, Berkeley, Los Angeles and London.
- Frangé-Joly, D.
2014 Economy and Cultural transfers: Evidence of Hellenization and early Romanization in Beirut. Pp. 89-103. in B. Fischer-Genz, Y. Gerber and H. Hamel (eds.), *Roman Pottery in the Near East. Local Production and Regional Trade. Proceedings of the Round Table held in Berlin, 19-20 February 2010*, Oxford.
- Franken, H. J. et al.
1975 *Potters of a medieval village on the Jordan valley*, Oxford.
- Gaitzsch, W.
2005 *Eisenfunde aus Pergamon. Geräte, Werkzeuge und Waffen*. Pergamenische Forschungen 14, Berlin.
- Galavaris, G.
1970 *Bread and the Liturgy. The Symbolism of Early Christian and Byzantine Bread Stamps*, London.
- Gawlikowski, M.
1992 Installations Omeyyades a Jérash. *SHAJ* 4: 357-361.
- Gawlikowski, M. and Musa, A.
1986 The Church of Bishop Marianos. Pp. 137-162. in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.
- Gerber, Y.
2012 Classical Period Pottery. Pp. 175-507. in J. A. Sauer and L. G. Herr (eds.), *Ceramic Finds: Typological and Technological Studies of the Pottery Remains from Tell Hesban and Vicinity*, Hesban 11. Berrien Springs, Michigan.
- 2014 Comparing Pottery Traditions from South TransJordan and from Middle and North TransJordan During the Nabataean/Roman Periods (1st to 5th Centuries AD), Pp. 189-205 in B. Fischer-Genz, Y. Gerber and H. Hamel (eds.), *Roman Pottery in the Near East. Local Production and Regional Trade. Proceedings of the Round Table held in Berlin, 19-20 February 2010*, Oxford.
- Gervasini, L.
2005 La Ceramica a Pareti Sottili, in *La Ceramica e i Materiali di età Romana. Classi, Produzioni, Commerci e Consumi. Vol II*, D. Gandolfi (ed.), Bordighera: 279-311.
- Gordon, B.
2007 The Pottery from the Peristyle and Southern House. Pp. 177-181. in E. Mazar (ed.), *The Temple Mount Excavations in Jerusalem 1968-1978. Directed by B. Mazar. Vol III, The Byzantine Period*. Qedem 52, Jerusalem.
- Harrison, D. and Bates, P.
1991 *The Mammals of Arabia*, Kent.
- Hayes, J. W.
1972 *Late Roman Pottery*, London.
- 1985 EAA. *Atlante delle Forme Ceramiche II – Ceramica Fine Romana Nel Bacino Mediterraneo (Tardo Ellenismo e Primo Imperio)*, Rome.
- 2008 *Roman Pottery Fine Ware Imports*. The Athenian Agora XXXII, Princeton.
- Illife, J. H.
1944 Imperial Art in Trans-Jordan: Figurines and Lamps from a Potter's Store at Jerash. *QDAP* 11: 1-26.
- Jantzen, U.
2004 *Die Wasserleitung des Eupalinos. Die Funde*, Samos 20, Bonn.
- Joguin, M.
2001 Des Pots et des Homme: L'Exemple d'Umm al-Walid. *SHAJ* 7: 641-645.
- Johnson, B. L.
2008 *Ashkelon 2, Imported Pottery of the Roman and Late Roman Periods*. Indiana.
- Johnstone, C. J.
2004 *A Biometric Study of Equids in the Roman World*. Unpublished Phd Thesis, University of York.
- Kakish, R.
2014 Ancient Bread Stamps from Jordan, *Mediterranean Archaeology and Archaeometry* 14: 19-31.

- Kazanski, M.
2003 *Qal'at Sem'an IV: Rapport final, 3: Les Objets Métalliques*, Beyrouth.
- Kehrberg, I.
1989 Selected Lamps and Pottery from the Hippodrome at Jerash, *Syria* 66: 85-97.
2009 Byzantine Ceramic Production and Organisational Aspects of Sixth Century AD Pottery Workshops at the Hippodrome of Jerash. *SHAJ*, 493-512.
- Kenkel, F.
2012 *Untersuchungen Zur Hellenistischen, Römischen und Byzantinischen Keramik des Tall Zira'a im Wadi al-'Arab (Nordjordanien) – Handelsobjekte und Alltagsgegenstände Einer Ländlichen Siedlung im Einflussgebiet der Dekapolisstädte*. Köln.
- Kennedy, Ch. A.
1963 The Development of the Lamp in Palestine, *Berytus* 14: 67-115.
- Kerner, S., H. Krebs and Michaelis, D.
1997 Water Management in Northern Jordan: The Example of Gadara Umm Qays. *SHAJ* 6: 265-270.
- Khairy, I. N. and Amr, A. J.
1986 Early Islamic Inscribed Pottery Lamps from Jordan, *Levant* 18, 1: 143-153.
- Konrad, M.
2001 *Der Spätromische Limes in Syrien. Resafa V*. Mainz.
- Kotter, W. R., and Ray Jr, P.J.
2009 Objects of Stone, Clay, Bone, and Ivory From Tell Hesban and Vicinity. Pp. 113-148. in P. J. Ray Jr. (ed.), *Small Finds: Studies of Bone, Iron, Glass, Figurines, and Stone Objects from Tell Hesban and Vicinity*, Hesban 12, Michigan:
- Krauskopf, K. B. and Bird, D.K.
1995 *Introduction to Geochemistry*, McGraw-Hill.
- Künzl, E. and Weber, Th.
1991 Das spätantike Grab eines Zahnarztes zu Gadara in der Dekapolis. *DM* 5: 81-118.
- Leonard Jr., A.
1987 The Jerash-Tell el-Husn Highway Survey. *ADAJ* 31: 343-390.
- Lichtenberger, A. and Raja, R.
forthc.a A Hoard of Byzantine and Arab-Byzantine coins from Jerash. *Numismatic Chronicle* (in print).
forthc.b Intentional Cooking Pot Deposits in Late Roman Jerash (Northwest Quarter). *Syria*.
- Lichtenberger, A., Raja, R and Højen Sørensen, A.
2013 The Danish-German Jerash Northwest Quarter Project 2012. Preliminary registration report. *ADAJ* 57:57-79.
2017 The Danish-German Jerash Northwest Quarter Project 2013. Preliminary registration report. *ADAJ* 58:11-103.
- London, G.
2012 Ceramic Technology at Hisban. Pp. 597-767. in J. A. Sauer and L. G. Herr (eds.), *Ceramic Finds: Typological and Technological Studies of the Pottery Remains from Tell Hesban and Vicinity*, Hesban 11, Berrien Springs, Michigan.
- Loyet, M. A.
1999 Small Ungulate Butchery in the Islamic Period (A. D. 632-1260) at Tell Tuneinir, Syria, *Journal of Near Eastern Studies* 58, 1: 33-45.
- Macalister, S. R. A.
1912 *The Excavation of Gezer. 1902-1905 and 1907-1909. Vol. II-III*, London.
- Mazar, A.
2006 General Studies. Pp. 281-333 in A. Mazar and N. Panitz-Cohen (eds.), *Timnah (Tel Batash) Vol III: Finds from the second Millennium BCE*, Qedem 42, Jerusalem.
- Mazar, E.
2007 The South House. Pp. 113-177 in E. Mazar (ed.), *The temple mount excavations in Jerusalem 1968-1978 directed by B. Mazar. Vol III, The Byzantine Period*. Qedem 52, Jerusalem.
- McNicoll, A. W. et al.
1982 *Pella in Jordan 1: an interim report on the joint University of Sydney and The College of Wooster Excavations at Pella 1979-1981*, Canberra.
1992 *Pella in Jordan 2. The Second Interim Report of the Joint University of Sidney and College of Wooster Excavations at Pella 1982-1985*, Canberra.
- McPhillips, S. and Walmsley, A.
2007 Fahl During the Early Mamluk Period: Archaeological Perspective, *Mamluk Studies Review* 11(1): 119-156.
- McQuitty, A.M. Sarleypontin, M. A., Khoury, M. Charles, M. P. and Hoppe, C. F.
1997-98 Mamluk Khirbat Faris. *ARAM Periodical* 9-10: 181-226.
- Melkawi, A., 'Amr, Kh. and Whitcomb, D. S.
1994 The Excavation of the Two Seventh Century Pottery Kilns at Aqaba. *ADAJ* 38: 447-468.
- Mlynarczyk, J.
2013 Terracotta Oil Lamps from Qumran: The typology. *Revue Biblique* 120, 1: 99-133.
- Milwright, M.
2005 *The Fortress of the Raven: Karak in the Middle Islamic Period (1100-1650)*, Leiden.
- Nasrallah, N.
2007 *Annals of the Caliphs' Kitchens*. Leiden. Palumbo, G., K. 'Amr, A. Musa and M. Rasson-Seigne, M, Salvage Excavations at "Tell Fayṣal", Jerash. *ADAJ* 37: 89-118.
- Panitz-Cohen, N., N. Yahalom-Mack and A. Mazar
2009 Various Finds: Clay, Stone, Ivory, Bone and Faience Objects and Vessels. Pp. 742-763 in N. Panitz-Cohen and A. Mazar (eds.), *Excavations at Tel Beth-Shean 1989-1996, Vol. III. The 13th – 11th Century BCE Strata in Areas N and S.*, Jerusalem.
- Parker, S. T.
1987 *The Roman Frontier in Central Jordan. Interim Report on the Limes Arabicus Project, II, 1980-1985*, Oxford.
1994 A Late Roman Soldier's Grave by the Dead Sea. *ADAJ* 37: 89-117.
2014 Coarse Ware Pottery from Roman Aila (Aqaba,

- Jordan). Pp. 205-215. in B. Fischer-Genz, Y. Gerber and H. Hamel (eds.), *Roman Pottery in the Near East. Local Production and Regional Trade. Proceedings of the Round Table held in Berlin, 19-20 February 2010*, Oxford.
- Patrich, J.
2008 *Archaeological excavations at Caesarea Maritima Areas CC, KK and NN. Final Report Vol I: The objects*, Jerusalem.
- Platt, E. E. and Ray Jr, P.J.
2009 *The Textile Tools From Tell Hesban and Vicinity*. Pp. 163-198 in P. J. Ray Jr. (ed.), *Small Finds: Studies of Bone, Iron, Glass, Figurines, and Stone Objects from Tell Hesban and Vicinity*. Hesban 12, Michigan.
- Ploug, G.
1985 *Hama, Fouilles et Recherches 1931-1938 IIII. The Graeco-Roman Town*, Copenhagen.
- Porter, R. and Aspinall, S.
2010 *Birds of the Middle East*. London.
- Raubitschek, I. K.
1998 *Isthmia VII. The Metal Objects (1952-1989)*. Princeton.
- Rapp, G.
2009 *Archaeomineralogy*. Berlin and Heidelberg.
- Rasson, A. M.
1986 *Matériel Céramique de la Deuxième Motié di Illeme Siècle ap. J.-C.* Pp. 67-69 in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.
- Rasson, A. M. and Seigne, J.
1989 *Une Cisterne Byzantino-Omeyade sur le Sanctuaire de Zeus*. Pp. 117-151. in F. Zayadine (ed.), *Jerash Archaeological Project 1984-1988, II*, Amman.
- Reitz, E. J. and Wing, E.S.
1999 *Zooarchaeology, Cambridge Manuals in Archaeology*, Cambridge.
- Reynolds, P.
2014 *The Homs Survey (Syria): Contrasting Levantine Trends in the Regional Supply of Fine Wares, Amphorae and Kitchen Wares (Hellenistic to early Arab periods)*. Pp. 53-67 in B. Fischer-Genz, Y. Gerber and H. Hamel (eds.), *Roman Pottery in the Near East. Local Production and Regional Trade. Proceedings of the Round Table held in Berlin, 19-20 February 2010*, Oxford.
- Riis, P. J.
1948 *Hama. Fouilles et Recherches de la Fondation de Carlsberg 1931-1938. Les Cimetières à Crémation*, Copenhagen.
- 1969 *Hama. Fouilles et recherches, 1931-1938. IV 3. Petits objets médiévaux sauf les verreries et poteries*, Copenhagen.
- Riis, P. J. and Buhl, M. L.
1990 *Hama, fouilles et recherché de la foundation Carlsberg (1931-1938) II 2. Les objets de la periode dite Syro-Hittite*, Copenhagen.
- Schaefer, J. and Falkner, B.K.
1986 *An Umayyad Potters' Complex in the North Theatre, Jerash*. Pp. 411-439 in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.
- Schulze-Dörrlamm, M.
2009 *Byzantinische Gürtelschnallen und Gürtelbeschläge im Römisch-Germanischen Zentralmuseum II. Die Schnallen mit Scharnierbeschlag und die Schnallen mit angegossenem Riemendurchzug des 7. bis 10. Jahrhunderts*. Katalog vor- und frühgeschichtlicher Altertümer 30, 3, Mainz.
- Segal, A. et al.
2007 *Hippos-Sussita. Eighth Season of Excavations (July 2007)*, Haifa.
- 2009 *Hippos-Sussita. Tenth Season of Excavations (July-September 2009)*, Haifa.
- 2010 *Hippos-Sussita. Eleventh Season of Excavation (July 2010)*, Haifa.
- 2013 *Hippos-Sussita of the Decapolis. The first Twelve Seasons of Excavations 2000-2011, I* Haifa.
- Seigne, J. W., auge, C., Bracmer, F. Dentzerfeydy, J., Montlivault, E. de., Dussart, O., Gatier, P. L. and Rasson, A. M.
1986 *Recherches Sur le Sanctuaire de Zeus à Jerash Octobre 1982 – Decembre 1983*. Pp. 29-105. in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.
- Silberstein, N.
2000 *Hellenistic and Roman Pottery*, Pp. 420-469 in Y. Hirschfeld (ed.), *Ramat Hanadiv Excavations*, Jerusalem.
- Silver, I. A.
1963 *The Aging of Domesticated Animals*. Pp. 250-268 in D. Brothwell and E. Higgs (eds.), *Science in Archaeology*, New York.
- Smith, R. H.
1973 *Pella of the Decapolis*, Vol. I, Wooster.
- Tsafir, Y. and Zissu, B.
2002 *A Hiding Complex of the Second Temple Period and the Time of Bar-Kokhba Revolt at 'Ain-'Arrub in the Hebron Hills*. Pp. 7-37. in J. Humphrey (ed.), *Journal of Roman Archaeology Supplementary series no. 49. The Roman and Byzantine Near East, Vol III*, Portsmouth.
- Thuesen, I.
1988 *Hama, Fouilles et Recherches 1931-1938 I. The Pre- and Protohistoric Periods*, Copenhagen.
- Uscatescu, A.
1995 *Jerash Bowls and Other Related Local Fine Wares from the Spanish Excavations at the Macellum of Gerasa*. ADAJ 39: 365-408.
- 1996 *La Cerámica del Macellum de Gerasa (Yarash, Jordania)*, Madrid.
- Vincenz, de A.
2010 *The Bone and Ivory Objects*. Pp. 185-186. in S. Kol-Ya'akow (ed.), *Salvage Excavations at Nesh-er-Ramla Quarry. Volume I*, Haifa:
- Vriezen, K. J. H. and Mulder, N.F.
1997 *Umm Qays: The Byzantine Building on the Terrace. The Building Materials of Stone and Ceramics*. SHAJ 6: 323-330.

- Waldbaum, H.
1983 *Metalwork from Sardis: The Finds Through 1974*. Archaeological Exploration of Sardis 8. Cambridge.
- Walker, B. J.
2012 The Islamic Period. Pp. 507-597 in J. A. Sauer and L. G. Herr (eds.), *Ceramic Finds: Typological and Technological Studies of the Pottery Remains from Tell Hesban and Vicinity*, Hesban 11, Berrien Springs, Michigan.
- Walmsley, A. G., Macumber, Ph. G. and Edwards, Ph. C.
1993 The Eleventh and Twelfth Season of Excavations at Pella (Tabaqat Fahl), 1989-1990. *ADAJ* 37: 165-240.
- Walmsley, A.G. and Grey, A.D.
2001 An Interim Report in the Pottery from Gharandal (Arindela), Jordan. *Levant* 33: 139-164.
- Walmsley, A. Blanke, L., Damgaard, K., Mellah, A., McPhillips, S., Roenje, L., Simpson, I. and Bassard, F.
2008 A Mosque, Shops and Bath in Central Jerash: The 2007 Season of the Islamic Jerash Project. *ADAJ* 52: 109-137.
- Wapnish, P.
2008 The Manufacture of Bone Artefacts, Pp. 587-638 in L. E. Stager, J. D. Schloen and D. M. Master (eds.), *Ashkelon 1: Introduction and Overview (1985-2006)*, Winona Lake, Indiana:
- Weber, T. M.
2002 *Gadara Decapolitana. Untersuchungen zur Topographie, Geschichte, Architektur und Bildenden Kunst einer "Polis Hellenis" im Ostjordanland*, Wiesbaden.
- Zayadine, F.
1986 The Jerash Project for Excavation and Restoration. A Synopsis with special reference to the work of the Department of Antiquities. Pp. 7-29 in F. Zayadine (ed.), *Jerash Archaeological Project 1981-1983, I*, Amman.
- 1986 *Jerash Archaeological Project. 1981 – 1983*. Amman.

