PRELIMINARY REPORT OF THE FIFTH SEASON OF THE DANISH-GERMAN JARASH NORTHWEST QUARTER PROJECT 2015

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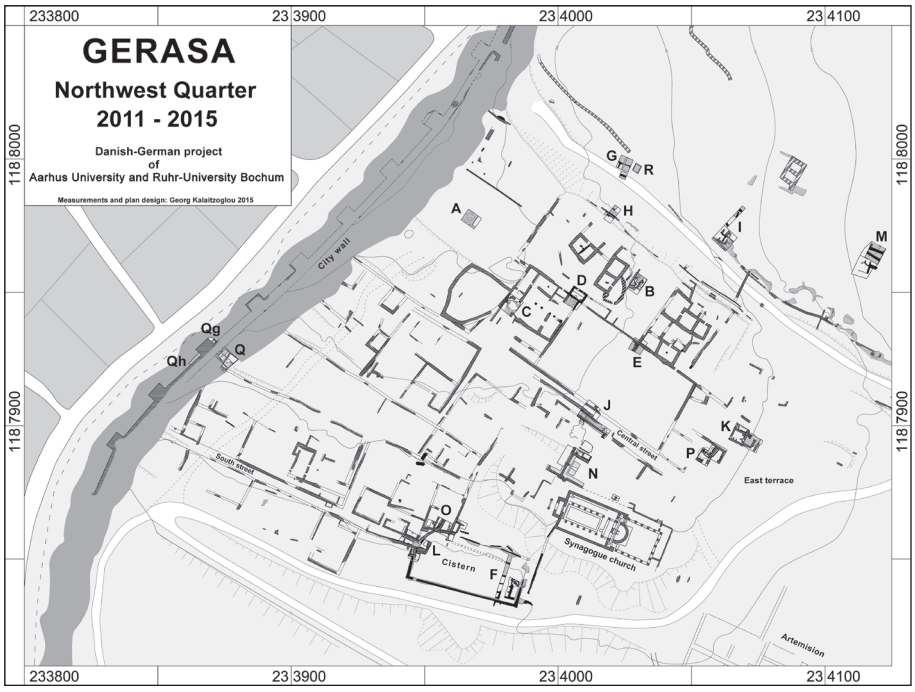
Introduction[1]

Between 21st July and 30th August 2015, the Danish-German team from Aarhus University (Denmark) and Ruhr-University Bochum (Germany) conducted its fifth campaign in the Northwest quarter of the ancient city Gerasa, modern Jarash, in Northern Jordan.

On the basis of results from the last campaigns, which included architectural, geodetic and geophysical surveys, as well as the excavation of thirteen trenches, it was decided to lay out five additional trenches and to extend one of the trenches excavated in 2014. The trenches were chosen to gain further insight into the settlement history of the Northwest quarter of the city, which is the highest area within the ancient city walls. The project, directed by Achim Lichtenberger and Rubina Raja, is funded by the Carlsberg Foundation, the Danish National Research Foundation (grant number: DNRF 119), the Deutsche Forschungsgemeinschaft (DFG) and H.P. Hjerl Hansens Mindefondet for Dansk Palæstinaforskning.

Based on results from the 2011 to 2014 campaigns, it was decided to continue with the exploration in some of the areas already excavated (**Fig. 1**). The cave complex and the structures of the central street in Trench J were especially chosen for further studies. Trench J was re-opened, and a new trench, Trench N, was laid out further south to explore the area of the supposed southern cave entrance. With Trench P, situated next to the Umayyad house in Trench K, excavated in 2014, the exploration of the so-called east terrace was continued in order to investigate further destruction deposits of the devastating earthquake of 749AD. With Trench O, located at the northwest corner of the large Roman cistern on the southern hill slope, the investigation of the relationship between

1. The team consisted of the two directors Prof. Dr. Achim Lichtenberger and Prof. Dr. Rubina Raja, head of the field team Georg Kalaitzoglou, heads of the registration team Annette Højen Sørensen and Heike Möller, architect Nicole Pieper (Vienna), conservator Margit Petersen (Viborg), the palaeozoologist Pernille Bangsgaard Jensen (Copenhagen) and the field and registration team: Malene Byø, Philip Ebeling, Julian Einschenk, Alessandra Esposito, Luisa Goldammer-Brill, Niels Benjamin Hansen, Charlotte Bach Hove, Nicole Jezewicz, Hans-Peter Klossek, Kevin Kremser, Mie Egelund Lind, Kevin Luijer, Line Egelund Nielsen, Mette Normann Pedersen, Alex Hunter Peterson, Sören Pfeiffer, Sara Ringsborg, Ulrike Rübesam, Karen Elizabeth Spencer, Janek Sundahl and Nicolai Broen Thorning. Dr. Peter Hambro Mikkelsen, Director of Department of Conservation and Natural Science at Moesgaard Museum (Denmark), and Peter Mose Jensen assessed the potential for archaeobotanical sampling, while Dr. Holger Schwarzer (Münster University, Germany) examined the ancient glass finds and Ingrid and Dr. Wolfgang Schulze (Essen, Germany) the Late Byzantine and Early Islamic coinage of the years 2012 to 2015. A sampling project for geochemistry and environmental history research was started by Prof. Dr. Ian Simpson (University of Stirling, Scotland) and Dr. Søren Munch Kristiansen (Aarhus University, Denmark). We would like to thank the director general of the Department of Antiquities, Dr. Monther Jamhawi, for permission to conduct the 2015 campaign and the director of the Department of Antiquities in Jarash, Ahmad Shami, for his and his staff's support during our campaign. Furthermore, thanks go to our representatives of the Department of Antiquities, Akram Atoum and Ali Oweisi, who were an invaluable help during our campaign. Many thanks also go to Christina Levisen who undertook extensive editing of this report



1. Plan of the Northwest quarter with trenches A-R (2012-2015).

the large water reservoir and the residential area in the vicinity was continued. On the northern hill slope, Trench R was laid out next to Trench G, which was excavated in 2013, to allow further investigations of the stratigraphy and to allow geochemical analysis of various soil layers. Already from the beginning of the project, the plan was to analyse the city walls, so in 2015 sondages on both sides of the city wall (Trench Q) were excavated in order to gain stratigraphic and chronological data for this important monumental undertaking and to establish its connection to the younger terrace wall system of the Northwest Quarter. A dating of the city wall, which forms the western border of the Northwest Quarter, is not only essential for the settlement history of the Northwest Quarter but will add more information to our understanding of the urban development of Gerasa in general.

In total, the six trenches J and N-R (**Fig. 1**) covered an area of approximately 347m². Altogether, 257,535 finds (diagnostic as well as undiagnostic) were processed during the campaign [A first evaluation and interpretation were made during the first registration process, called "total registration", to gain an insight into the chronology of the contexts. The pottery was arranged by functional groups (see catalogue) and within these groups by fabrics. An overview photo was taken of each piece of evidence. In a second step, new pottery types or fabrics were collected for further documentation to complete the typology- and fabric-based catalogue. The assorted sherds (diagnostics) - rims or bases, seldom handles - have been described, drawn and photographed, and kept for further studies. Each has a find number. Other sherds were dumped at the end of the season in the respective trenches from which they had been excavated, after statistical documentation had taken place. All bones and finds of metal, glass and stone, as well as assorted pieces of mortar and wall plaster, were kept]. The most important finds will be presented in the catalogue following the main text of this article in order to give an overview of the material culture of the 2015 campaign. The finds presented include metal, bones, architectural elements, stone artefacts, terracotta and pottery [Appendices with small reports by the specialists are included in this report].

General Outlook

After the 2015 campaign, samples were taken out on loan to Denmark and Germany for further studies, among them charcoal, mortar, raw glass, pottery and some metal slag. It is noteworthy that pigments were found in damaged vessels in fill layers of Trenches J and O (pl. 18). Further analyses will contribute to the determination of the provenance of these materials and to an understanding of the production

chain from raw material to use, for example as painting on walls [Extensive amounts of wall-painting were found in Trench P. Pigment analyses of the painting and the raw material found will contribute to a better understanding of ancient techniques.].

Elemental mass spectrometry and petrography were undertaken on various pottery samples [A short report concerning the first results by Merkel and Prange is attached to this report], and the results complement analyses that were done decades ago by other missions, thus contributing towards a more comprehensive understanding of the local fabric composition of Gerasa's extensive and long-lived pottery production (Watson 1989; Uscatescu 1996; Tarboush 2015). Samples of local and imported amphorae were analysed for their contents to gain an insight into food supply on a local/regional but also intraregional level [The samples are marked in the catalogue. See appendix by Springer and Polla].

Main Discoveries

The most surprising discovery was a large hall with floor mosaics and dated mosaic inscriptions in Trench N. The function of this hall is yet unclear, but it probably relates to the "synagogue church" south of it. Another important discovery was a second underground cave in Trench N, connected with the cave already partly excavated in 2014 (Trench J). Together, they form a pre-Byzantine cave complex. A large pottery deposition that was already discovered in 2014 (Lichtenberger *et al.* 2018), mainly dated to the end of the 3rd to the late 4th century AD, was further explored in the 2015 campaign by examining the fill layers of Trenches J and N. Their composition, consisting of locally produced table-, cooking- and common ware, provides a representative overview of the spectrum of local productions in Late Roman times. It also contributes to the studies of macro-regional networks by the numerous imports included in the contexts. Remarkable is the import of Almagro 50 Amphorae (pl. 14-15), which were probably produced on the Iberian Peninsula, and which are rarely found in the Eastern Mediterranean (*cf.* Bezeczky 2013: 179-180).

The excavation of parts of an undisturbed Umayyad courtyard house in a destruction context in Trench P offers insight into Islamic building complexes and their inventories immediately prior to the destruction caused by the earthquake in 749AD.

The excavation at the city walls provided new data for the chronology of the walls. It is suggested that at least this stretch was constructed in Roman times and destroyed by the earthquake in 749AD.

General Remarks on the Pottery

The find groups of the 2015 campaign are, in general, similar to the ones of the 2012-2014 campaigns. Overall, the type variation and development are quite low over the centuries compared to other sites, at least when it comes to locally produced wares. While in the older contexts, up to Byzantine times, table- and cookingwares dominate the functional groups, in Late Byzantine/Early Umayyad times, the composition changes slightly, and common wares, especially basins but also storage jars, occur in higher quantities. From the late 5th century AD onwards, tableware is mostly reduced to imitations or local variations of imported types, such as ARS and LRC Ware plates (Jarash Bowls).

Imported finds are rare; however, the few imported finds give insight into the exchange networks of Gerasa. African Red Slip Ware, of which the earliest finds are dated to the 3rd century AD and the latest to the 5th century AD, as well as the spectacular discovery of a high quantity of Almagro 50 Amphorae, probably produced in Spain or Portugal, demonstrate an interconnection between Gerasa and the westernmost parts of the Empire in the Roman and Early Byzantine periods.

Early imports of Eastern Sigillata A (ESA) and later Late Roman C Ware (LRC), produced in the Phokaean region, attest to interaction with Eastern Mediterranean neighbours. Amphorae, such as Kapitän II and Late Roman 1 (LRA 1), confirm the exchange connections and, although quantitatively low in number, provide insight into exchange networks, at least from Early Roman to Late Byzantine times within the Eastern Mediterranean.

The low import of pottery in general was due to the high amount of locally produced vessels in Gerasa itself. Several pottery dumps and kiln

sites (Kehrberg 2011 and Kehrberg 2009 for the Umayyad kiln sites *cf.* also Zayadine 1986) - the earliest of a Late Hellenistic/Early Roman date and the latest of an Umayyad date - have been discovered in Gerasa, indicating a tradition of pottery production from the early days to at least Umayyad times. With the Jarash bowls, the production of pottery reached a level of surplus in Byzantine times (Watson 1989 with a list of finds from Jarash at other sites in Jordan).

Roman-period material derives from fill layers in Trenches O, Q and R, and the earliest finds can be dated to the 1st century AD, consisting of imported tableware (Eastern Sigillata A, ESA) (pl. 5.40-44) and local (*cf.* Braemer 1989) or regional productions of the late 1st century BC or 1st century AD (pl. 3.19-22); however, Roman material is scattered all over the Northwest Quarter, and residual finds of Roman potsherds can be observed in much younger contexts.

The quantity of finds reached its peak in Late Roman/Byzantine times and continued into the Umayyad period. Especially Trenches J and N brought to light large quantities of Late Roman/Byzantine sherds. Particularly in Trench P, but also in other trenches, a large amount of sherds of the last occupation phase, before the earthquake of 749AD, were discovered. The absence of Abbasid finds, together with only very rare finds in earlier seasons, lends support to the assumption that only parts of Gerasa "Jarash" were resettled after the earthquake had destroyed the city, while other parts, such as the Northwest Quarter, remained more or less deserted until the Middle Islamic period (*cf.* Kalaitzoglou *et al.* 2018; Lichtenberger and Raja 2015a).

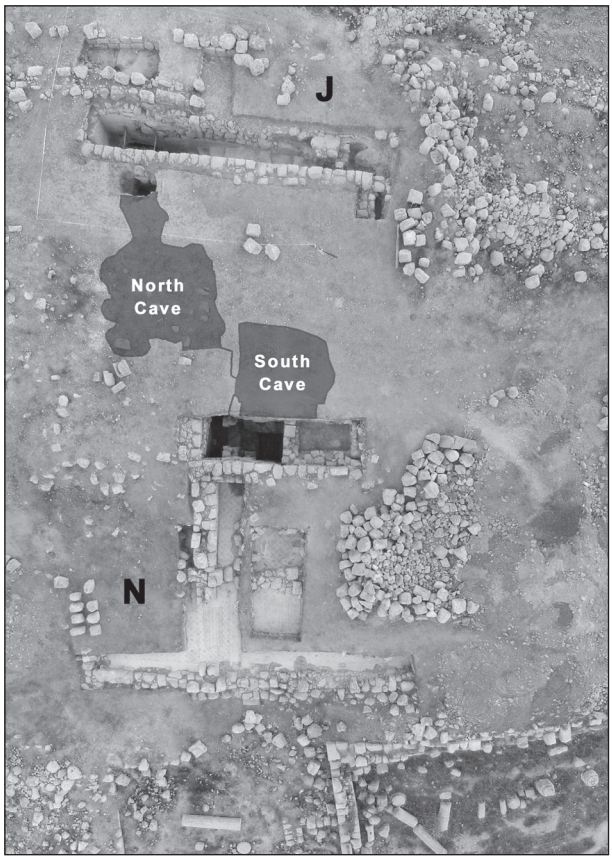
In 2015, only a few Mamluk sherds were found, all stemming from surface layers in Trench P (pl. 18.107-110). The youngest find is a fragment of an Ottoman pipe that was found in the top-soil layer of Trench N (pl. 18.104). It is the first Ottoman pipe found in the Northwest Quarter. Comparable pipes were found around the North Theatre [For further research concerning the Middle Islamic period in Jarash, see Peterson's current PhD project within the framework of the project Ceramics in Context: http://pure.au.dk/portal/en/projects/ceramics-in-context-Jarash-phd-project%28a145a00f-1fca-482d-9a2d-bc87dc22fa8c%29.html].

Stratigraphy and Contexts

Trench J

Trench J is situated on the southern side of the hilltop plateau. Its eastern part was already excavated during the 2014 campaign [Trench supervisor was Ulrike Rübesam]. The surface of the so-called Central Street with buildings running along its northern side was unearthed along with an older rock-cut shaft with a staircase south of the street, leading into a rock-cut cave room [For the previous results concerning Trench J, see the preliminary field report on the 2014 campaign in Kalaitzoglou *et al.* 2018]. After the 2014 campaign, the street and building remains were backfilled, while the shaft and the cave were secured and covered for further exploration in 2015. Especially the connection between the street and the rock-cut shaft needed further clarification, and the interior of the cave room was intended to be examined in more detail. Furthermore, it remained to be examined whether there was an older cave entrance located to the south (behind a later blocking wall); however, illicit digging activities in the cave undertaken between the campaigns not only destroyed the interior and excavated parts of the cave floor, but also the southern blocking wall had been removed, and a tunnel had been dug into the enormous earth fill behind the wall. East of the tunnel, another cave, the so-called South Cave, was discovered and also destroyed by the illicit excavation (**Fig. 2**). Although regrettable, the destruction yielded some important findings with far-reaching implications.

The amount of finds from Trench J is extensive, due to the large Late Roman pottery deposit that was brought to light in 2014, sealing the staircase of the northern entrance (*cf.* Lichtenberger *et al.* 2018; *cf.* Kalaitzoglou *et al.* 2018). The same pottery fill was encountered during the 2015 excavations in several evidences of the northern part of the trench. The fill material contains very well-preserved pottery, primarily of Late Roman date, and its unique composition makes it easy to recognize. The fill contained numerous Western-Mediterranean imports of Almagro 50 amphorae (pl. 14.89-90, pl. 15.91) occurring in two different types of fabric, Hayes 50B plates (pl. 5.39) and some Eastern Mediterranean amphorae, type Kapitän II (pl. 15.92). The fill was furthermore mixed



2. Air photo of trenches J and N with position of the caves.

with local table- and cookingware, as well as local storage jars or amphorae.

Noteworthy among the finds is a pottery base with traces of orange pigment (pl. 18.106). Apart from the well-preserved fill, the pottery of the other evidences occurs in the same preservation conditions as is characteristic of the other trenches. In these younger fills, the pottery is worn and medium to highly fragmented, as is typical for secondary deposits.

Apart from the Roman cave, the earliest contexts (phases 1-2) in Trench J, such as the quarry works or the northern cave entrance, contained hardly any finds. The earliest finds in these northern fills stem from phases 3-5 and can be dated to the Late Roman period. Large-scale building activity connected with the creation of the Central Street is well attested and took place in the Byzantine period (phase 6). Traces of Early or Middle Islamic activities were not detected in this campaign.

The Cave Room

It is clear that the cave room (J14-J-80) had an older phase in which it served as an oil-press installation, and that the original entrance was a wide southern opening, which was later blocked by the south wall (ev. J14-J-103). Thus, the second building phase, as described in the preceding excavation report, has become the third phase in Trench J. In the debris of the southern blocking wall (ev. J14-J-103), fragments of a press-pier were found. The shape and working traces of the press-pier resemble the ones found in 2012 in Trench B. After the round base of the central pillar (ev. J14-J-104) had been destroyed, it turned out to be a discoid grinding stone of a crusher (trapetum). The round niches in the west wall of the cave turned out to be oval-shaped settling basins for the oil (ev. J14-J-99b). These basins were cut into the bedrock and have a smaller bowl-like depression in the bottom (**Fig. 3**). It is clear that these basins were filled and covered by a new floor when the oil-press installation fell out of use. Under the modern dump, an untouched fill of soil and pottery (ev. 17) was found, and in the bowl-shaped depression, another soil fill (ev. 18) was encountered. The finds from both evidences point to the filling process and the conversion of the cave room being of Late Roman/Early Byzantine date. In this second phase, a door was situated behind the later blocking wall, as is attested by a door jamb (ev. 28) set against the eastern rock wall. The western jamb was not excavated, because it was too dangerous to excavate the dense but unstable soil fill (ev. 25); however, since the later blocking wall was set against bedrock on both sides, it is most likely an entrance of about 1.7 meters in width. The fill (ev. 25) is identical to that of Trench N (J15-N-57), and from this side, it is obvious that the bedrock runs northward, and that this fill was brought in from above. Although it remains

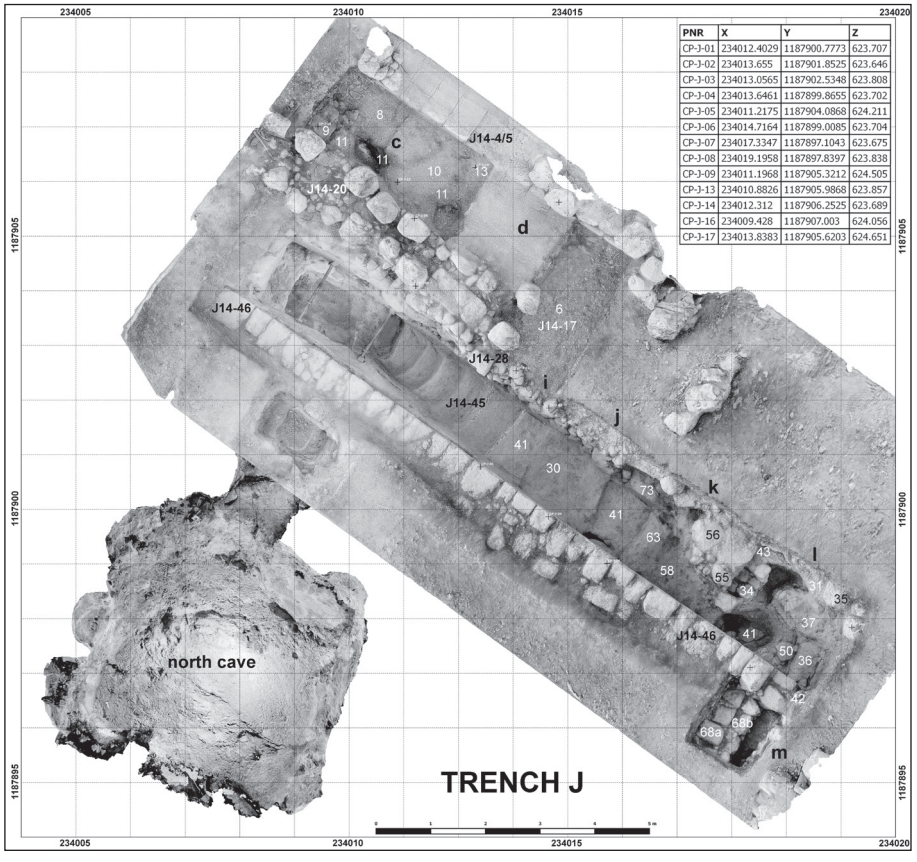
3. Trench J, south cave oil basin in front of the west wall.

unknown how wide the entrance area was, it is apparent that the area south of the former cave entrance was not covered by rock. The blocking wall (ev. J14-J-103) must have been erected before the area south of it could be filled (ev. 25), since the north cave (ev. J14-J-80) was found empty. The same is apparent for the south cave (ev. 27) [in Trench N, the cave is labeled ev. 75], since its main entrance was blocked by the wall (ev. 29) [in Trench N, the wall is ev. 85] before the area in front of it was filled (ev. J15-N-57). This implies that both the north cave (J14-J-80) and the south cave (ev. 27, J15-N-75) belong to the same complex in the second phase, and that their older history was also closely linked, as will be described in the context of Trench N below.

Building Phase 1 (Roman)

The earliest phase in this area is an east-to-west-running trench cut into the bedrock (**Fig. 4**). It was most probably created to quarry limestone blocks. In the 2015 campaign, the rock trench and the long parallel running wall (ev. J14-J-46) were followed for about 13.5 meters in an easterly direction to trace their extension. While the end of the wall was not found, the end of the rock-cut trench was reached only about 4.8 meters beyond the eastern limits of the 2014 excavation. The worked part of the limestone rock (ev. 41) has a total length of 8.7 meters, and the remaining 4.0 meters have an unworked natural rock surface. At the eastern end of the worked part, the trench widens from 1 meter to about 1.5 meters, and the rock surface slopes downward. On both sides of the upper steps in the staircase shaft (ev. J14-J-45), shallow V-shaped grooves were found, which could stem from cutting the stairs, but their shape is slightly rounded. Traces of a similar channeling were discovered further east where the rock-cut trench starts. These grooves surround the shape of a rectangular block, which was quarried in this place (**Figs. 4-5**). The bedrock north of the rock-cut trench and below the later Central Street displays a natural and uneven surface with deep depressions similar to the eastern part of Trench J.

This first phase characterised by open quarrying is not datable with any precision, since associated finds are not at hand. But some observations suggest an approximate dating in the



4. Trench J, excavated structures.

5. Trench J, structures in the rock-cut trench, view from north.

Roman period. First of all, it is obvious that the quarry works are older than the wall (ev. J14-J-46), because the bedrock was not cut in order to construct the wall. This is evident from the fact that although the wall runs along the southern side of the rock trench, it rests on the uneven rock surface and extends in both directions beyond the quarry work. Secondly, the quarry is older than the second utilisation phase of the north cave, because the western part of the trench was later transformed into a staircase and used to access the cave after the older south entrance had been closed. Since the north cave fell out of use in the late 3rd-early 4th century AD, an earlier Roman date for the quarry is plausible (Lichtenberger *et al.* 2018).

Building Phase 2 (Roman)

The long wall (ev. J14-J-46) seems to be the oldest-built structure in Trench J. There is the possibility that the first utilisation phase of the subterranean cave is contemporary with or even older than this wall, but the lack of direct connections and datable material in the foundation prohibits any assessment. The long wall (ev. J14-J-46) was built on top of the southern quarry wall (ev. 41). For the most part, the wall rests on a thin soil layer above the rock and follows the irregular rock surface. Further east, where the rock remained unworked, as in the eastern sectors k and l, a thicker foundation fill (ev. 52) of stones and clayish soil was brought in to level the wall alignment. This fill contained only very small and non-diagnostic sherds. In sector j at the eastern end of the quarry, a cleft in the bedrock was filled with small stones to retain the wall stones (**Fig. 5**). In the eastern part of Trench J, a backfill would have been expected to protect the wall foundation (ev. 52) and level the uneven surface of the bedrock (ev. 41), but this area was disturbed down to bedrock and backfilled when the Central Street was constructed. Over an excavated length of 13.5 meters, neither a doorway nor an opening was found in the wall. Communication from north to south was thus impossible in this area. The masonry of well-fitted rectangular blocks with smooth bosses only in the northern wall face proves that this side was the outside. Taking these observations into consideration, the wall seems to have been the northern limit of a large building complex situated south of it. Several walls adjoining the long wall from the south confirm this conclusion, although some of the walls are surely younger. A younger age is attested for the (ev. J14-J-83-) wall, which was partly excavated and removed in 2014, because it was built into the pottery-rich fill above the vertical rock shaft. But another wall (ev. 68), unearthed in sector m at the western end of Trench J, was composed of an older wall (ev. 68a), made of larger blocks, and a younger wall (ev. 68b) of a very simple building technique, set from the east against the older wall. Because of the limited space in sector m, it was not possible to prove whether the older wall (ev. 68a) belongs to the large building complex, but this possibility cannot be ruled out.

Building Phase 3 (Late Roman)

The use of the staircase shaft (J14-J-45) and the rock-cut trench to access the north cave can be divided into two Late Roman sub-phases on the basis of two succeeding floors. It is probable that also the second phase correlated with the two utilisation phases of the north cave and the staircase shaft [in phase 2 (now phase 3), the cave was used, and in phase 3 (now phase 4), mostly the staircase shaft was used, *cf.* Lichtenberger *et al.* 2018]. The new results enable a description of the construction of the cave access in more detail.

After the staircase shaft (ev. J14-J-45) had been dug, the wall (ev. J14-J-28) was built on the northern side of the former rock trench to fill all the gaps in the bedrock and to create a wall parallel to the older wall (ev. J14-J-46). The newly built wall was made of mostly small

and irregular stones and set between the rising bedrock in the west and a step (ev. 73), cut into the bedrock to enter the corridor-like cave entrance from the north. Inside this corridor, the V-shaped grooves and the worked bedrock were covered with a mortar layer (ev. 30) in sectors i and j. In sector k, the residual clay (ev. 66) in the rock depressions, as well as the uneven rock surface, was covered by a thin foundation layer of a very compact yellowish soil (ev. 65), and this was covered with the same mortar (ev. 30). Pottery finds are rare. The sherds are worn and no diagnostic sherds were found.

The relatively flat area further east seems to have been left untouched. To be stabilised, the northern wall (ev. J14-J-28) must have been backfilled to some extent also from the north, as the excavation in the northern sectors c and d displayed an uneven rock surface with deep depressions, filled only with some sterile residual clay (ev. 13). Such fills were removed by later building and filling activities associated with the foundation of the Central Street. Since the step (ev. 73) leads in northern direction, it is likely that an older building discovered north of the later Central Street also belonged to this third phase. Of this building, only the southwest corner walls (ev. J14-J-56 and ev. J14-J-57) were excavated in 2014, but it is evident that it was built over by a younger edifice (ev. J14-J-4/5) before the Central Street was laid out.

For the dating of this phase, we have to rely on the relative stratigraphy, because dated material is available only from the foundation layer (ev. 65) below the mortar floor (ev. 30), and this pottery was broken into small pieces of which hardly any were diagnostic.

Building Phase 4 (Late Roman)

This phase is attested only in sector k and probably also in sector l, where the flooring was renewed and an eastern exit was built. In the easternmost sector l, the original filling of the south-wall foundation (ev. J14-J-46) must have been removed to place a stone step (ev. 36) and its stone foundation (ev. 50) from the north against the wall (ev. J14-J-46). While the foundation was laid and the stone step was placed, the northward-rising bedrock (ev. 41) was covered with thick mortar layers. First, the mortar (ev. 47, ev. 48 and ev. 51) was filled in against the foundation (ev. 50) and up to its top. In the next step, the mortar (ev. 37) was placed on top of the former to reach the upper side of the step (ev. 36). Then the step (ev. 36) was covered with a thin mortar layer (ev. 43), visible only in the east baulk. It is likely that the step and the leveled mortar platform east of it were meant to create a new eastern exit of the rock-cut trench. Immediately west of the step (ev. 36) and the mortar platform, only soil layers laid against them were found (ev. 49, ev. 45, ev. 46). They did not contain any diagnostic sherds; however, in sector k, parts of a second floor made of mortar (ev. 63) were discovered on almost the same level. It was better preserved only on the northern side. The southern part was disturbed by the younger fill layer (ev. 58). The pottery of this fill is similar to the large Late-Roman pottery deposition found in the staircase shaft in 2014 (Lichtenberger *et al.* 2018), consisting of Almagro 50 (pl. 14.89-90, pl. 15.91) and Kapitän II amphorae (pl. 15.92) mixed with local table- and cookingwares and some storage vessels (pl. 12). Part of this floor (ev. 62) also covered a thin residual clay layer (ev. 61) on top of the rock step (ev. 73) belonging to the northern exit. In front of the northern exit, the new floor (ev. 63) was separated from the older mortar floor (ev. 30) by the thin soil layers (ev. 59 and ev. 60). While the mortar was void of finds and the foundation layer (ev. 60) held only small and hardly diagnostic sherds, the uppermost foundation layer (ev. 59) contained a composition of Late Roman to Early Byzantine pottery, which again is very similar to the material found in the fill of the staircase shaft and also above the new floor; however, due to the poor preservation of the new floor, these sherds might have been intrusions from the later covering fill layer (ev. 58).

Building Phase 5 (Late Roman)

In this phase, the cave fell out of use, and the staircase shaft, as well as the corridor-like access, was filled. The filling material between the walls (ev. J14-J-28 and ev. J14-J-46) was relatively homogeneous and consisted mainly of soil and large amounts of well-preserved Late-Roman pottery. Different fill portions and layers of soil and pottery can be discerned [The sequence of undisturbed fill layers from bottom

to top is ev. 16/26, ev. 14, ev. 58, ev. 4/5, ev. 57, ev. 33 and ev. 3]. Clusters of stones (ev. 15, ev. 21 and ev. 55) and also some boulders occurred in the western part of the trench close to the staircase shaft (ev. J14-J-45). A dating of this fill is based on the homogeneity of the finds and the radiocarbon dates from the 2014 campaign. The charcoal from the lower portion of the fill in the staircase shaft favours a date in the 4th century AD, and the pottery is mainly of the same date. Similar finds were also unearthed outside the staircase shaft north of the wall (ev. J14-J-28). In sectors c and d, a cluster of stones (ev. 9) was deposited in a bedrock depression, which was backfilled (ev. 12) with similar pottery as described above. Thus, the filling activity seems to have been limited not only to the cave access but reached also the area north of it. Although the reason for this filling activity remains unknown, it was not immediately connected with the construction of the Central Street, as becomes evident in the next phase. Nevertheless, it is more likely that the final closure of the caves also caused the filling of the entrances, and both were initiated by large-scale activities in the vicinity prior to the construction of the street. It is remarkable that the majority of fillings north of the long wall (ev. J14-J-46) contain mainly Late Roman and only a few Early Byzantine finds, whereas the fills south of the same wall contain finds from the Byzantine to Umayyad periods [samples of the older and younger fill excavated in 2014 were used for fabric and content analysis and therefore occur in the catalogue of this report. See J14-Jc 61 and J14-Jc-67 (for the older fill) and J14-Je-77, J14-Jc-84 and J14-Jh-95 (for the younger fill)].

Building Phase 6a (Byzantine)

Building phase 6a is characterised by a complete transformation of the area into a residential area with a long street arranged parallel to the filled shaft. In the preceding report, this phase was labeled as phase 4 of either Late-Roman or Byzantine date. On the basis of more dating material, it is now possible to assign this building phase to the Byzantine period.

The excavation under the street in sectors c and d clarified that the south wall (ev. J14-J-4/5) of the younger house was built partly on bedrock (ev. 11) and partly on the residual clay (ev. 13). The higher portions of the bedrock were later covered by a layer of mortar (ev. 10). This mortar also covered parts of the older filling (ev. 12) in the rock depressions and was set against the stone fill (ev. 9) as well as against the house wall. Above this, the fill layer (ev. 7) was placed to cover the stones of ev. 9 and served as the foundation for the street. The street consisted of a rough mortar surface (ev. 6) above a thick mortar underlay (ev. 7). Both were set against the house wall, and the mortar surface also covered the older wall (ev. J14-J-28). It is therefore evident that the older walls (ev. J14-J-28 and J14-J-46), bordering the rock-cut trench, were cut down and leveled before the Central Street was covered with mortar (ev. 6). Furthermore, it could be clarified that the street never extended over the backfilled area south of the wall (ev. J14-J-28). The southern roadside required stabilisation east of this wall, too, and this is a plausible explanation for the fact that the backfill in the eastern part of Trench J was disturbed and partly removed and filled in again. Such a disturbance of the Late-Roman fill is evident only in the eastern sectors k and l. In sector l, the old fill (ev. 32 and parts of ev. 33) was removed, and the mortar (ev. 31) was brought in to stabilise the southern side of the street. During the working process, an obviously ephemeral installation (ev. 34) was built into the remaining fill (ev. 33) connected with the mortar (ev. 31). It was built of irregular stones of different sizes and was only 1.2 meters wide and about 0.7 meters long. The installation was constructed as a base of small stones of irregular form and size, with two side walls of larger rectangular stones. The bottom bore traces of burning, and charcoal was found in it. It is therefore probable that this installation (ev. 34) was an oven used during the building activities. This oven was used for only a short period, which is proved by the fact that the remaining space between it and the southern wall (ev. J14-J-46) was filled, as was the oven itself, covered with parts of the same fill (ev. 32). This is attested by joints between the pottery from fill in ev. 32 and ev. 33 and sherds of a large basin (joint on pl. 8.63). In the neighbouring sector k, similar activities took place concurrently. Here, the older filling was removed down to ev. 57,

and a cluster of stones (ev. 55) was deposited in the fill, but a gap was left between both the stones and the wall (ev. J14-J-46). While the gap was filled again with the removed filling (ev. 54), the area north of the stone cluster (ev. 55) was stabilised with soil and mortar (ev. 56). During this phase, the western part of the oven (ev. 34) was also covered by the same mortar.

A dating of these large-scale building activities in Trench J is complicated, since a lot of older material was reused, and most of the building structures yielded no finds. The removed and refilled portions of the old fill (ev. 33, ev. 32 and ev. 54) revealed no distinct younger material. Larger amounts of Late Byzantine pottery are present only in the layer of ev. 53 above ev. 54, but it was covered by topsoil. Additional finds of Late Byzantine pottery came to light only embedded into the street surface (ev. 6) and on top of it.

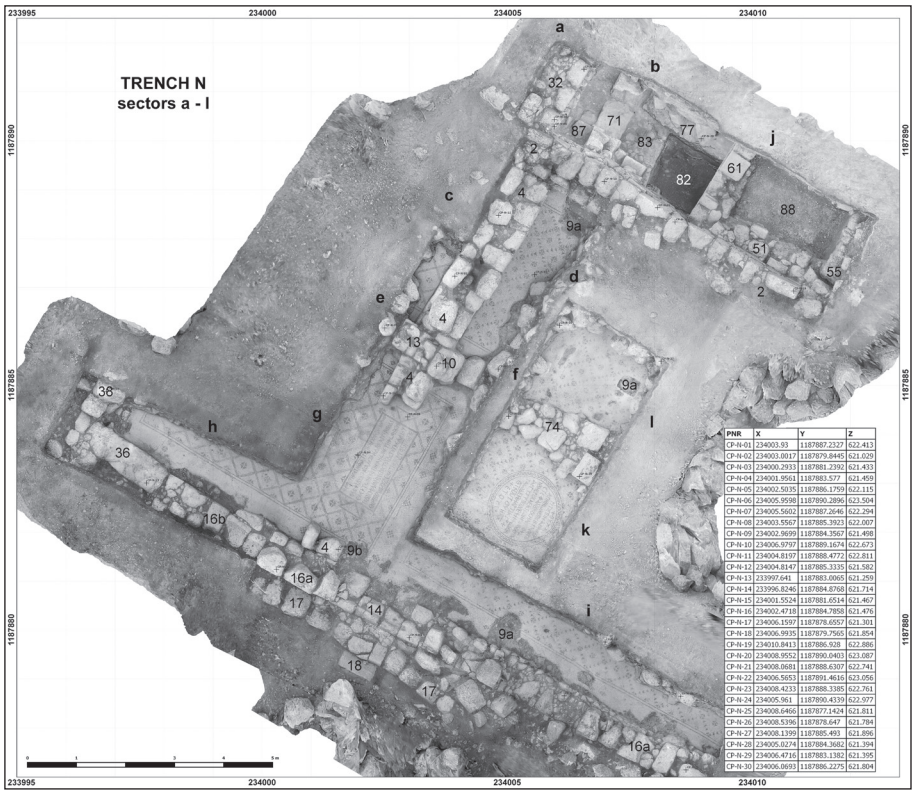
Building Phase 6b (Byzantine)

In this phase, the younger part of the wall in sector m (ev. 68b) was built from the south against the wall (ev. J14-J-46). It forms the western wall of a room that was built against the older wall (ev. 68a) on top of a fill layer (ev. 74). The fill layer was covered by the mortar floor (ev. 72), which ran against both the wall (ev. 68b) and the older wall (ev. J14-J-46) and contained only few diagnostic sherds of Byzantine date. The succeeding layers above this floor are a clayish reddish soil layer (ev. 71), containing a Byzantine coin (minimus (J15-Jm-71-1)), a layer of yellowish-greyish soil (ev. 70) and the stone layer (ev. 69). They probably all stem from the collapse of this room. The stone layer (ev. 69) (similar to the other soil layers, in that it yielded hardly any finds) was covered by a fill rich in Late Byzantine pottery (ev. 67), including a Jarash Lamp (*cf.* for the type pl 17), common ware (*cf.* for the types pl. 10), some cookingware (*cf.* for the types pl. 2 (casserole), storage jars/amphorae (*cf.* for the types pl. 13-14) and a few tableware items. It also ran against a repair (ev. 42) in the wall (ev. J14-J-46). The repair was recognisable by the different kind of stones used to fill the gap. The pottery fill (ev. 67) is very similar to a layer found in the 2014 campaign in the vicinity of the vertical shaft and the wall (ev. J14-J-83), which rested on a similar high level. These younger buildings south of the wall (ev. J14-J-46) seem to be part of a larger building complex connected with Trench N to the south. The walls (ev. 68a and b) seem to be more or less in line with a wall (J15-N-55) excavated at the eastern limit of Trench N and founded on a similar level. If it is not the same wall, it could well belong to the same building complex.

Structures or finds that attest Early and Middle Islamic activities were not found in Trench J. Even the stones (ev. 35) in the northeast corner of sector l, which seem to form a corner-like structure, were embedded into a layer (ev. 2) disturbed in modern times, containing a minimus (J15-Jl-2-21). The topsoil covering the entire Trench J contained one of the few Late Roman C (LRC-ware) tableware imports (pl. 6.45).

Trench N

The main aim of Trench N was to find the assumed southern entrance to the north cave in Trench J as well as to clarify if an east-to-west running terrace wall was hidden under a terrain edge in the same area [Trench supervisor was Ulrike Rübesam]. Since the south cave had already been discovered at the beginning of the excavation by surface cleaning, the trench was laid out further to the south and only about 10 meters south of Trench J, with two sectors on top and another two sectors south of the aforementioned terrain edge (**Figs. 1, 2**). Among the most important discoveries in this trench, aside from the confirmation of an older utilisation phase of the cave system, was the finding of a large mosaic hall with well-preserved mosaic pavements next to the so-called synagogue church, which was an older synagogue that had been transformed into a church in 530/31AD, at the latest (**Fig. 6**) (Kraeling 1938: 234-241, 323, 324 and 484 for the inscription with date 530/31AD. Most recently, for the synagogue church, *cf.* Dvorjetski 2005). The excavation of the mosaic hall required extensive work and forced an extension of the trench in several directions to detect the boundaries of the hall. Thus, a total of 13 sectors (a-m) were explored with a total area of 108m², although some of the western sectors (a, c and e) were only cleaned and the top soil removed or partly excavated. Since an eastern boundary of the mosaic hall



6. Trench N, excavated structures.

was not found, sector m was placed about 11.5 meters east of Trench N on the line of the southern wall and at a spot where a north-to-south running wall seemed to exist.

To sum up, the earliest activities were connected with the use of a Roman cave complex, which ended with the erection of the mosaic hall in the Byzantine period. The history of the hall is documented by four phases from its founding to its destruction, probably by an earthquake in Umayyad times. While Trench J was characterised by large Late Roman pottery fill, Trench N was dominated by later fill of Late Byzantine/Early Umayyad pottery. Roman finds are rare in original contexts but occur in later fill. It is remarkable that solely in the vicinity of the church, pottery with Christian symbolism occurs, such as a Jarash Bowl (pl. 3.26) with an incised cross, as well as a stamped cross on the ground of an imported Late Roman C plate (pl. 6.47) and a pilgrim flask with an impressed bust of a male (pl. 16.97). The youngest find is an Ottoman-period pipe (pl. 18) that was found in one of the surface layers (ev. 3). Until today, not many Ottoman pipes have been found in Gerasa, and the actual type is unique so far. Other examples stem from the North Theatre (Clark and Bowsher 1986: 264-267).

Sector M (Byzantine)

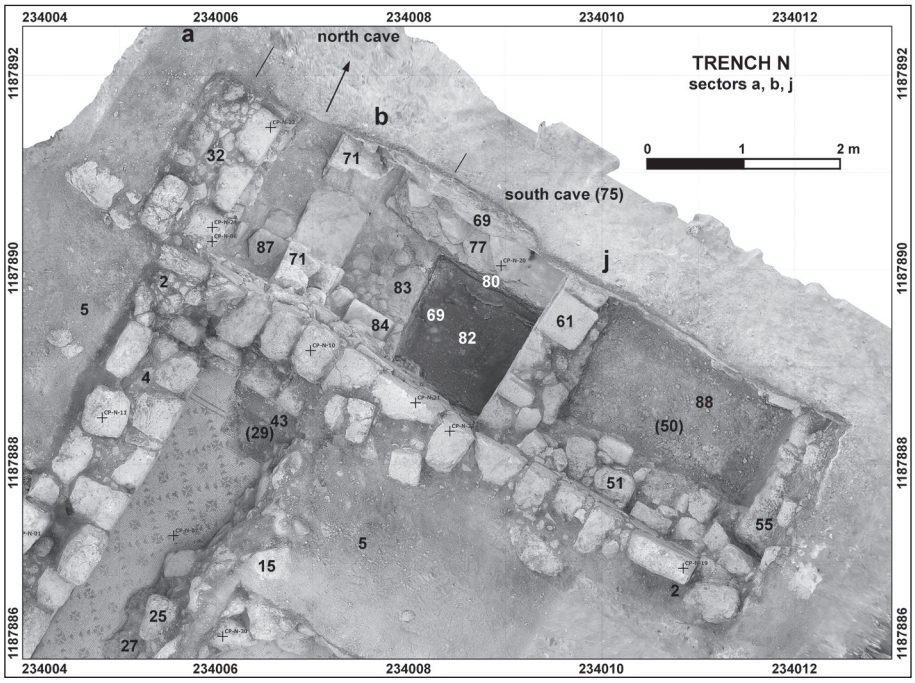
Since the stratigraphy in sector m was seriously disturbed and cannot be linked to the results in other sectors, it seems reasonable to summarise the results separately. This sector, with a length of 2.6 meters and a width of 1.8 meters, was placed only 3 meters north of the church on top of a long terrace wall (see **Fig. 1**). In the sounding, walls running east to west were found on both sides of an arched doorway, in which a floor made of smooth whitish mortar was situated (**Fig. 7**). The masonry of the walls and the collapsed arch seemed to be of good quality, because well-fitted blocks were used. Because of the restricted dimensions of the sounding, it is not possible to come to far-reaching conclusions, but it is obvious that the floored space must have been roofed. The wall west of the arch seems to take approximately the same course as the terrace wall along the northern side of the church and could thus be the northern wall face of the same wall. Furthermore, this wall seems to be more or less in line with the south wall of the mosaic hall (ev. 16a). Different to this situation, the wall east of the arch starts further north but does not seem to be connected with a wall taking a course parallel to the southern terrace wall. Although it is

7. Trench N, structures in sector m, view from west.

almost impossible to get a clear view of the architectural setting north of the church, it is very likely that the structures in sector m and the mosaic hall further west were integrated into the retaining wall system around the church. Thus, a Byzantine date is most likely, even though these walls were marked as later walls in the plan by Kraeling (Kraeling 1938: plan XXXVI). Finds worth mentioning from sector m are fragments of decorated marble slabs and an arm fragment of a marble statue (pl.23.145).

The Roman Cave System

The south cave (ev. 75) (J15-J-27) has an almost rectangular shape and measures about 4 meters (east to west) by about 3.2 meters (north to south) and is thus smaller than the north cave (see **Fig. 2**). It was cut from the south into a rock cliff (ev. 69) of about 3 meters. The front was straightened and bends northward in the direction of the north cave, which is situated only 3.5 meters further north. In front of the cave, a vestibule-like entrance room was found (**Fig. 8**). Its eastern side was closed by a wall (ev. 61), which was built against the rock. The western boundary was formed by a wall corner (ev. 84), also set against the rock wall and accessible through a wide door (ev. 71). The gap between the eastern wall (ev. 61) and the western wall corner (ev. 84) suggests that either another door must have been situated on the south side of the small room, or another room was situated further south. The lack of a door frame seems to favour the latter suggestion, but this could not be proved, since this part was later built over by the north wall (ev. 2) of the mosaic hall. Access to the vestibule in front of the south cave, as well as to the south entrance of the north cave, was afforded by a staircase (ev. 87) set from the west against the southwest corner of the vestibule, leading from a higher level in the south down to the caves. Since the bottom of the south cave lies at a still deeper level, a pedestal (ev. 83) was placed inside the vestibule behind the threshold, leading down to a mortar floor (ev. 82) on top of the bedrock (ev. 69) in front of the cave entrance. From this floor, further steps must have led down into the cave, but a staircase is not visible and probably



8. Trench N, excavated structures in the northern sectors a, b and j.

remains hidden under a younger blocking wall (ev. 77) and deliberate fill (ev. 80 and ev. 57). The approximately 3.13 meters wide rock-cut opening in the southern side of the cave was partly closed by a wall (ev. 85, J15-J-29) from inside. This wall was bound to the outer wall (ev. 61) from both sides, and in its longer western part of 1.83 meters in length, a door was placed, which could be closed from inside. From inside, an upper door stop is visible, cut into the bedrock ceiling, and the lower part of the stone-built western door jamb was found still *in situ*. On the shorter side east of the outer wall (ev. 61), an opening seems to have been left in the upper part of the wall for a window (**Fig. 9**). Since the interior of the south cave was destroyed by illicit digging, the floor was found covered with the debris of the wall (ev. 85), and heaps of the younger fills were set against this wall from outside. The only original installation that could be identified is a rectangular lamp niche, cut into the centre of the eastern rock wall. A small opening in the southwest corner of the cave is probably modern and was dug during the looting. It is too narrow and irregular to be a regular entrance, and it bears fresh traces of modern work [The opening measures only 0.82m in width and about 0.65m in height, and the soft rock is only 0.35m thick].

Cuts and beam rests in the vertical rock (ev. 69) attest to the vestibule originally being roofed. Some stones resting on top of the rock cliff above the beam holes could have been connected to such roofing. Not only the threshold and the pedestal, as well as the floor inside the vestibule, were covered by mortar but also the outer staircase and the access way to the north cave. This suggests another roofed room or passage situated in front of this cave.

9. Trench N, western door frame inside the south cave, view from north.

The lack of finds from undisturbed contexts prevents a precise dating of the south cave. The interior of the cave was completely disturbed, and in the vestibule almost no pottery was found. A copper coin (J15-Nj-81-1) embedded into the top of the mortar floor (ev. 82) awaits analysis, and the same applies to the charcoal samples from the same floor. But the stratigraphy and building sequence suggest that the structures belonging to the cave are the oldest in this spot. If alterations have not taken place - and there is no evidence so far - the north cave and the vestibule are contemporary with the first phase of the north cave in Trench J. For this reason, a dating in the Roman period is likely.

The Byzantine Mosaic Hall

Three major phases can be distinguished for the Byzantine mosaic hall that was discovered south of the cave. In the first phase, the hall was built, and the first mosaic floor was laid. In the second phase, the hall was enlarged to the west, and this part was covered with a new mosaic. The third phase is characterised by the transformation of the long hall into smaller room units for different purposes than in the preceding phases. The building structures belonging to the mosaic hall in the first and second phases are recognisable from the mosaics because the mosaics were set against them. These are the north wall (ev. 2), the south wall (ev. 16a/b) with the bedrock (ev. 36) and the door (ev. 14), the west wall (ev. 38) and the only inner buttress (ev. 13) found so far. Since the east wall was not yet detected, only the minimum dimensions of the enlarged hall can be determined. The hall was at least 15 meters in length and 10.46 meters in width, with an area of more than 157 m². The buttress (ev. 13) was situated not on the centre line of the room but was offset about 0.6 meters to the north. The span of the roof beams was thus measured at 3.85 meters and 4.47 meters, far less than the 7.15 meters in the nearby church. The mosaics of the first and second phases together covered an area of more than 123.8 m² (see **Fig. 1**).

An architectural connection between the so-called “synagogue church” and the 45-year-younger mosaic hall is clear. The hall was located on a long terrace, which retained the higher

terrain north of the church, and both buildings were accessible from a small courtyard in front of the church. From here, there was access to a corridor, towards which inscriptions were orientated within the mosaic hall.

Building Phase 1 (Byzantine, before 576AD)

In its first layout, the mosaic hall seems to have been shorter, and it ended behind a prominent joint visible between the older and younger parts of the south wall (ev. 16) (see **Fig. 6**). This joint corresponds with the western side of the buttress (ev. 13), and the older mosaic could be detected only west of this line. Architectural observations, together with the soil stratigraphy, confirm that the north wall (ev. 2) of the mosaic hall was built over the walls (ev. 71, ev. 84 and ev. 61) of the Roman cave vestibule and on top of a soil fill of Late Byzantine date (ev. 80), which covered the Roman mortar floor (ev. 82). The north side of the hall was therefore situated at a distance of about 1.8 meters from and parallel to the rock cliff (ev. 69), and the pavement of the hall was laid on a 1.4-meter-higher level. The gap remained open for the most part, as only the entrance to the south cave had been blocked from the outside by a rubble wall (ev. 77) to stabilise the foundation layer (ev. 80). On top of the foundation fill (ev. 80), only the younger fill (ev. 57) was found, which could have been deposited soon after. This area was completely backfilled with an almost 2-meter-thick layer (ev. 57), mainly of soil with small pieces of charcoal, partly well-preserved pottery sherds and a few larger stones (ev. 58), as well as pieces of wall plaster and some stucco profiles. The fill consists of a large Late Byzantine pottery deposition with mostly well-preserved sherds. It consisted of locally produced tablewares, such as Jarash Bowls (pl. 3.26, pl. 4.29), cookingware (pl. 2.13-16), common ware (pl. 8.62), fragments of Jarash Lamps and one pilgrim flask (pl. 16.97). It occurs mixed with imported tableware (LRC), one fragment with a stamped cross (pl. 6.47), African Red Slip Ware of Hayes Type 91B (pl. 5.38) and fragments of LRA 1 amphorae - one with dipinto (pl. 16.96). All of them are of 5th- and 6th-century AD date. Architectural elements, such as tegulae and wall plaster (pl. 20-21), many glass finds and some metal objects (*e.g.* a lot of different-sized nails [See Eger in this report, cat. 150]) are also well-preserved in the fill layer. However, the context is mixed with Roman finds, such as a fragment of a Kapitän II amphora. Charcoal samples taken from the fill (ev. J15-J-25) in front of the north cave are available as well. Besides some Roman sherds, the backfill (ev. 57) contained large amounts of Byzantine pottery of the 6th century AD. Of the 40 coins found in this fill, 8 were not identifiable, and 19 have not been analysed yet. The remaining coins are composed of 12 so-called minimi and one Late Roman coin. On this basis, we have to assume a Byzantine date for the filling activity. The charcoal samples taken from the same fill (ev. 57/J15-J-25) inside the tunnel of only 1.2 meters in height, which was dug by the looters, seem to contradict such a young date. The sample from the bottom was dated to 340-535AD [Sample no. 23928 (J15-Jh-22), Department of Physics and Astronomy, Aarhus University (Denmark), C^{14} age 1636±28, d13C (dual-inlet) -24.88±0.05, calibration curve IntCal13, 1σ 383-526AD (383-429AD 60.2%), 2σ 340-535AD (340-435AD 73.7%)], while the sample from the middle part yields the date 411-543AD [Sample no. 23929 (J15-Jh-23), Department of Physics and Astronomy, Aarhus University (Denmark), C^{14} age 1585±28, d13C (dual-inlet) -23.7±0.05, calibration curve IntCal13, 1σ 423-535AD, 2σ 411-543AD] and the date given by the sample from the soil ceiling is 428-605AD [Sample no. 23930 (J15-Jh-24), Department of Physics and Astronomy, Aarhus University (Denmark), C^{14} age 1522±28, d13C (dual-inlet) -23.15±0.05, calibration curve IntCal13, 1σ 437-592AD, 2σ 428-605AD]. The same compact fill (J15-J-25) sealed the southern blocking wall (ev. J14-J-103) of the north cave.

The entrance situation found in the older south wall (ev. 16a) formed a stairway between the mosaic hall and the small yard west of the "synagogue church". The threshold (ev. 14) has a length of only 1.07 meters and the door a width of only 0.8 meters, underlining that this narrow door could have been secondary and not the main entrance. Against this, a low wall (ev. 17) of only about 5 meters in length was set from the south. A single stone step (ev. 18) of only 0.74 meters in length was attached from the south against the low wall, completing the

stairway. The door and the attached wall seem to belong to the original layout of the hall, because the first was integrated into the old south wall, and the second seems to have protected the foundation of the wall. Nevertheless, it is possible that the low wall (ev. 17) and the step (ev. 18) were attached or modified in a later phase. However, this could not be proved, since these structures were disturbed as a result of seemingly having been excavated already in 1929 [In the plan given by Kraeling 1938 (plan XXXVI), only the northwestern boundaries of the yard were marked as excavated, although it is obvious that a wider area was unearthed, and the door with two steps were found; *cf.* Crawfoot and Hamilton 1929: 212].

The mosaic (ev. 9a) of this first layout (ev. 19a) of the hall has a geometric decor of lozenges with rosettes and a tondo inscription field, in which the date March 576AD for the mosaic is given (see **Fig. 6**) [The publication of the inscriptions of the mosaic hall is in preparation by R. Haensch, A. Lichtenberger and R. Raja]. The inscription is situated close to the entrance and facing west. Thus, it was readable to a visitor entering the hall and walking through it. The foundation (ev. 43) of the mosaic was just a soil layer mixed with soft mortar, small stones and some non-diagnostic pottery sherds. This was apparently the first flooring of the building.

The sparse finds from the wall foundation (ev. 80) can be dated no closer than to the later Byzantine period. A precise dating of the first phase is possible on the basis of the inscription, which gives the year 576AD for the tessellation. It is self-evident that the construction of the hall must have been finished before the mosaic could be laid, and the temporal interval between the two events could not have been too long, although it has to be emphasised that the date 576AD could refer only to a repair phase, thus making the hall several decades older.

Building Phase 2 (Byzantine, before 591AD)

In this phase, the former west wall was removed and the hall enlarged in westerly direction for about 5 meters (see **Fig. 6**). The joint between the older (ev. 16a) and the new south wall (ev. 16b) is also discernible by a change of the wall thickness as well as an offset course of the wall stones. Furthermore, the slightly northward-bending course of the new south wall required that the southernmost rows of tesserae were laid in a wedge shape. On its course, part of the bedrock (ev. 36) was integrated into the new part of the south wall. The west wall (ev. 38) was also attached to the bedrock (ev. 36) but could be traced for only 1 meter in northern direction. Although only about two meters of the southwest corner were excavated, it seems as if another wall diverges from the corner in southern direction. This wall was probably aligned with the wall that constitutes the western limits of the court in front of the church (see **Fig. 1**). Inside the room, a new mosaic (ev. 9b) was laid with decor similar, in terms of style and technique, to the older mosaic (ev. 9a). Most of the framed fields of the older mosaic (ev. 9a) were retained. In the northwestern part of the hall, a new field seems to have been laid out, differing from the old in the form of the lozenge lines and the dimensions of the rosettes, but also differing from the mosaic in the room south of it [It was not possible to prove this deduction without removing the rest of the younger wall (ev. 4)]. In contrast to this, the southern field of the new mosaic (ev. 9b) was shifted to the east and attached to the old. The junction between the two mosaics is a curvy seam with a slight disorder of the tesserae rows. In this field, a tabula ansata was placed close to the entrance with a new inscription facing east. Thus, the inscription was readable when entering the hall and situated facing the old inscription. The new inscription gives the date July 591AD for the tessellation of "*this western part of this kellion*", which was therefore completed only 25 years after the laying of the other part of the mosaic.

Building Phase 3 (Umayyad)

The main features of this phase inside the hall are some walls and at least one door, which were carefully built directly on top of the mosaics, thus dividing the long hall into smaller units. This shows that the hall was still in good order and useable when these additions were made. North of the hall, a complete modification took place, because the space between the hall and the rock was backfilled, as was the open surface of the bedrock. On this higher level, buildings were erected and set against the north wall (ev. 2) of the hall. Fully excavated was the new wall

(ev. 4), which was carefully founded on top of the mosaic between the south wall (ev. 16a) and the north wall (ev. 2). This wall integrated the buttress (ev. 13) and covered the younger inscription field [The southern part of the wall (ev. 4) had to be removed to document the inscription hidden underneath]. An installation of large boulders (ev. 10) was set on top of the mosaic (ev. 9a), against the eastern side of the buttress (ev. 13) and connected to it by means of mortar. This seems to be the western jamb of a doorway situated at the western end of a wall, leading in an easterly direction, and was perhaps connected with the older roof supports further east. A trail of debris containing only undiagnostic sherds (ev. 74) was unearthed east of the door (ev. 10), in sectors k and l; it seems to be the remains of this wall. It is obvious that the former spacious open hall was split into smaller rooms by the new walls. The southern entrance was obviously kept, and in the eastern part of the hall, at least two rooms were created by the construction of the wall (ev. 74) between the old buttresses. Access from the south to the north room was possible through the door (ev. 10). In contrast to this, the western part of the former hall was completely separated from the rest by the wall (ev. 4). An entrance to this western room could have existed only in the west wall (ev. 38), because in the western part of the south wall (ev. 16b), no door was found, and the north wall (ev. 2) was too high up. The continuous utilisation of the hall explains the lack of deposits with datable material in the interior. What was found are the disturbed and eroded remains of the destruction debris. The last hall modification thus took place between the end of the second phase and the destruction of the hall.

Much more informative are the evidences in the sectors excavated north of the hall (see **Fig. 8**). A wall (ev. 32) of 1 meter thickness was founded on top of the fill (ev. 57) and set against the northern wall face of the hall. The lower part of this wall was backfilled with soil (ev. 49 and ev. 56) from the east to cover the foundations. The soil was filled with well-preserved fragments of local tableware, cookingware and amphorae, as well as some Jarash Bowls. Furthermore, imported tableware - a Late Roman C Ware (pl. 6.48) - as well as one minimus were among the finds. Since flooring was not found east of the wall (ev. 32), it is probable that this part constituted the outside, and that the building extended west of the wall. In the northeastern part of the trench, a room 3.25 meters in width and at least 1.90 meters in length was unearthed on almost the same level. It, too, was built on top of a fill (ev. 57) and against the wall (ev. 2). This is evident from inside the north cave where the fill east of the wall (ev. 61) is visible. For the layout of this room, the old wall (ev. 61) was reused as the west wall. Against the hall, a new south wall (ev. 51) was set and connected to the new east wall (ev. 55). The masonry of the inner walls was bound by a thick mortar coating, and the floor (ev. 88) was made of mortar as well. So far, such a thick mortar coating has only been met in cistern contexts, but the mortar floor (ev. 88) seems to not be waterproof. The top of the fill (ev. 49 and ev. 56) must have marked the walked-on level between the two new buildings north of the hall.

A date for this enormous building activity can be established on the basis of finds in the foundation layers (ev. 49 and ev. 56). The foundation layer (ev. 49 and ev. 56) confirms that mainly Byzantine pottery from the 6th century AD was incorporated in the fills, and the coins do not contradict this [In ev. 49, only a minimus was found (J15-Nj-49-1) and in ev. 56 only a corroded fragment]. At this point, we have to mention another complex unearthed on top of a thin soil layer (ev. 78) above the floor (ev. 88). There, an open fireplace (ev. 50) was found, which was covered by soil and wall debris (ev. 48). It must therefore belong to a later phase of the eastern room before it was destroyed. The soil layer (ev. 78) underneath the fireplace contained Late Byzantine pottery, well preserved and consisting mainly of locally made table- and cookingwares, a high amount of amphorae or storage jars and an imported Late Roman 1 Amphora, similar to the finds from the backfill (ev. 57). A sample from the charcoal in the fireplace yields the early date 92-252AD [Sample no. 23927 (J15-Nj-60), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1826±26, d13C (dual-inlet) -25.27±0.06, calibration curve IntCal13, 1σ 139-225AD, 2σ 92-252AD]. This is far too old, because the fire place (ev. 50) is not only younger than the buildings above the backfill

but also much younger than the mosaic hall, for which a reliable date is at hand. Also in ev. 57 Roman intrusions have been noticed in a context of a much later date.

Phase 4 (Destruction, Umayyad)

A sudden destruction of the former mosaic hall is evident from a broken grey-ware vessel (ev. 29 and ev. 28, pl. 12), which was found in front of the north wall under the wall debris and pressed into the older mosaic pavement (ev. 9A). The reason for this destruction was a heavy earthquake, the impact of which can also be traced in other areas of the trench. An undulation of the mosaic pavement is clearly visible in sector l and could be the result of an earthquake. Furthermore, it is discernable that mainly the soil body with the mosaic and the walls on top of it moved in southern direction, and that the bedrock either did not move or only moved slowly. In front of the south wall, but especially in front of the bedrock (ev. 36), the mosaic was bent upwards like a carpet. Inside the hall, the remains of the destruction, like the debris (ev. 24 and ev. 25), were better preserved close to the north wall (ev. 2). The upper portions of the debris were either lost by erosion or disturbed and partly removed in much later times when this area was used for agriculture (ev. 5 and ev. 15). In the southern part of the hall, under the top soil (ev. 3) and a layer of brownish soil, only a relatively thin layer of yellowish soil (ev. 12, ev. 40 and ev. 70) of Late Byzantine/Early Umayyad date was preserved on top of the mosaic. It contained mainly pottery, but also some tiles - among these one imbrex (pl. 20.126). In other parts, too, this layer was replaced by a layer rich in humus (ev. 22, ev. 37 and ev. 35), with hardly any diagnostic sherds and two tegulae (pl. 20.122-123), probably of Late Byzantine date. In front of the south wall (ev. 16), pieces of wood (ev. 53 and ev. 54) were embedded into the layer of yellowish soil (ev. 40). This layer also appeared close to the north wall (ev. 21, ev. 22, ev. 27, ev. 28 and ev. 34) where it was much better preserved, covering not only the mosaic but also the broken grey-ware basin (ev. 29). Since the layer of yellowish soil seems to cover most parts of the floor and some of the objects as well, it is likely that it stems from the collapsed roofing of the hall.

North of the hall, traces of the destruction are less distinct, because the contexts are closer to surface level and this area was leveled in modern times. Above the walked-on level and inside the eastern room, debris of collapsed stones (ev. 42 and ev. 48) and soil (ev. 20) remained undisturbed. This soil layer contained a high amount of pottery of mixed dates. The earliest finds are Roman imports (Eastern Sigillata A, ESA); however, a lot of local Byzantine tableware (Jarash Bowls) and local lamps, as well as fragments of a LRA 1 Amphora, are mixed in the context along with architectural remains (pl. 20.125). Two Islamic coins, found in the same context, date the fill to Umayyad times. It was covered by a relatively thick layer of mixed topsoil.

The finds from the debris and the layers inside the hall stem mainly from the Late Byzantine to Early Umayyad period, although some Roman sherds were present. The only *in-situ* find, the grey-ware basin (ev. 29), can be dated between the 7th and middle of the 8th century AD (pl. 12). The same goes for the finds in the surrounding yellowish soil (ev. 28), in which fragments of this vessel were found as well. A more precise date for the earthquake is gained from the debris north of the hall. While the stone collapse (ev. 42 and ev. 48) did not contain finds, ev. 20 was a mixture of Roman to Late Byzantine pottery. Among the coins from this layer, two Umayyad coins suggest a later date, the late 7th to perhaps the early 8th century AD, to be specific [One is an Islamic copper coin with a countermark (J15-Nj-20-80) and the other an Umayyad copper coin of perhaps Standing Caliph type (J15-Nj-20-42). The rest of the coins are two minimi and one Late Roman coin (J15-Nj-20-11) struck at the end of the 4th century AD]. On this basis, it seems justifiable to take the earthquake of 749AD to have caused the destruction.

Trench O

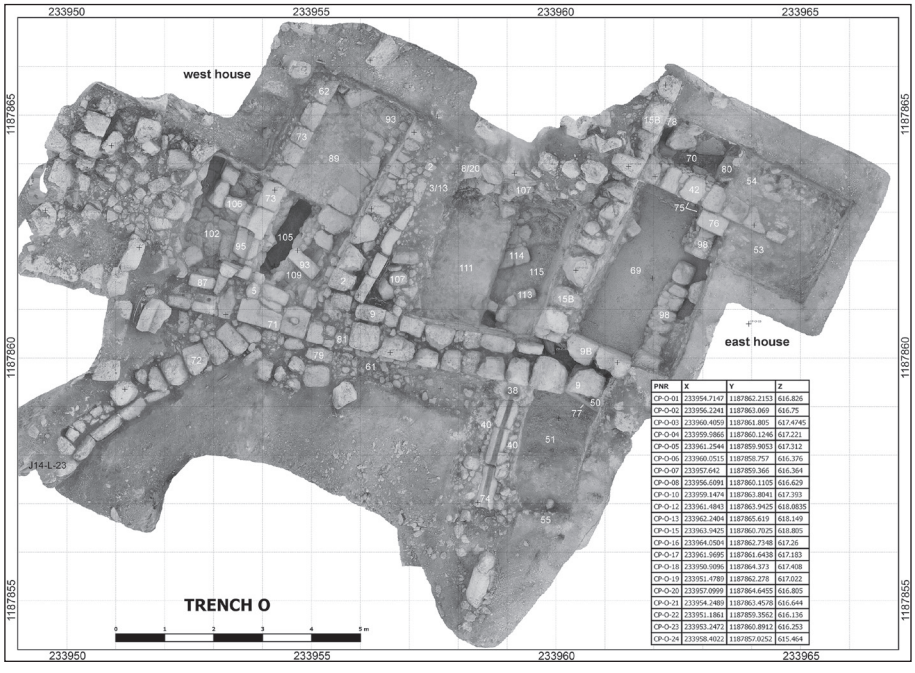
With Trench O, situated along the northwestern edge of the large Roman cistern, the investigation of the cistern and the surrounding area was continued (see **Fig. 1**) [Trench supervisor was Malene Byø]. To gain a better overview, it was decided to open an area with 12 sectors (sectors a to l), resulting in a total area of about

70.5 m² (**Fig. 10**). Below a mostly thin layer of topsoil (ev. 1), an intentional fill (ev. 3 and ev. 13) was unearthed, which covered the entire area and the leveled remains of multi-phase buildings situated north of the Roman cistern. The cistern itself, as well as the discovery of the continuation of a built water channel (ev. 109), enable us to link the stratigraphy in Trench O with the main building phases detected in trench L in 2014 (for the results of the 2014 season, see Kalaitzoglou *et al.* 2018). Furthermore, it is possible to establish a connection with the structures unearthed in Trench F based on a retaining wall (ev. 55) found in Trench O, which also takes a course inside the cistern parallel to the northern border, supporting an intentional fill (ev. 51 and ev. 47) very similar to the one found in 2013 further east (for the results of the 2013 season, see Kalaitzoglou *et al.* 2017).

The building sequence in Trench O starts with the Roman cistern (phase 1) and could be traced through several phases of Byzantine habitation along the northern edge of the former cistern (phases 2-4), until the area was finally covered and leveled in Umayyad times. It is noteworthy that, especially in the layers of Roman date, hardly any material was found. This changes in Late Byzantine/Early Umayyad contexts, where the quantity of finds increases. The sherds are in general high to medium fragmented and not very well preserved. This points to secondary deposition in almost all evidences, with the oldest finds dating back to Roman times.

Phase 1 (Roman)

Traces of the first phase were found under the younger wall (ev. 9) in the southeastern part of the trench. There, a thick mortar lining (ev. 77) covers the natural bedrock (ev. 50) and marks the vertical northern side of the Roman cistern (for the Roman date and dating method see Lichtenberger *et al.* 2015). Although the bottom of the cistern was not reached in this very limited part of the trench, the situation was very similar to that of Trenches F and L, where the mortar coating covered the northern and western sides of the cistern in the same way. In all three trenches, the mortar coating of the cistern marks the oldest phase, since distinct traces of quarrying predating the cistern were not found. North of the cistern, the bedrock rises from west to east for about 1 meter, and its surface is uneven and unworked in most parts, showing traces of cutting and leveling only in some places. Especially under and west of the later east house, such rock work is present. The concrete floor (ev. 69) was set against low rock walls (ev. 75), onto which the wall (ev. 42) and arch support (ev. 76) were later built. Immediately north of this wall, the rock remained unworked and is still fissured. The younger wall (ev. 15B) was also built on top of a vertically cut rock step, and the wall (ev. 114) west of it



PNR	X	Y	Z
CP-O-01	233954.7147	1187862.2153	616.826
CP-O-02	233956.2241	1187863.069	616.75
CP-O-03	233960.4059	1187861.805	617.4745
CP-O-04	233959.5865	1187860.1246	617.221
CP-O-05	233961.2544	1187859.9053	617.312
CP-O-06	233960.0515	1187858.757	616.376
CP-O-07	233957.642	1187859.366	616.364
CP-O-08	233956.6991	1187860.1105	616.629
CP-O-10	233959.1474	1187863.8041	617.393
CP-O-12	233961.4843	1187863.9425	618.0835
CP-O-13	233962.2404	1187865.619	618.149
CP-O-15	233963.9425	1187860.7025	618.805
CP-O-16	233964.0504	1187862.7348	617.26
CP-O-17	233961.5695	1187861.6438	617.183
CP-O-18	233959.9096	1187864.373	617.408
CP-O-19	233951.4789	1187862.278	617.022
CP-O-20	233957.0999	1187864.6455	616.805
CP-O-21	233954.2489	1187863.4578	616.644
CP-O-22	233951.1861	1187859.3562	616.136
CP-O-23	233953.2472	1187860.8912	616.253
CP-O-24	233958.4022	1187857.0252	615.464

10. Trench O, excavated structures.

was founded on the leveled rock (ev. 115) at the bottom of this step. In this place, a natural canal was unearthed leading southwards into a natural gully, which must have already been closed in Roman times to keep the cistern clean. Since traces of rock cuttings occur only in the vicinity of the concrete-like floor (ev. 69), it is probable that these features belong together as parts of the same construction. The floor, of which only the northern and western limits could be detected, is very compact and made of pebbles embedded into a hard mortar. This technique is different from all other floors excavated so far in the Northwest quarter. Furthermore, the idea that this pavement predates the building erected above it is proved by the facts that it was set against rock walls, and that the walls (ev. 9B, ev. 15B and ev. 98) were founded on top of it. Therefore, it cannot be ruled out that it belonged to a larger hydraulic construction extending in eastern direction along the northern side of the cistern. This would match well with the sought-after sedimentation tank of the Roman cistern; however, this remains to be clarified in the next season.

Another structure probably of this early date is the base of a wet-built two-faced wall (ev. 114) resting on top of the leveled bedrock east of the concrete floor. Its southwestern-to-northeastern orientation is completely different from the structures found in higher levels, and a mortar layer mixed with soil (ev. 116) is connected to the wall and covers the bedrock north of it. To this installation, one can perhaps add the rounded structure (ev. 113), which was set with mortar against a protruding part of the bedrock (ev. 115). The function of these structures is still debatable, but they could belong to the Roman cistern, because they were all built outside the water basin and on bedrock. Original deposits of Roman date were not found in this place, since even the lowest soil layer (ev. 112), which covered the bedrock, contained pottery of Late Byzantine to Umayyad date and runs against the post-Roman wall (ev. 9). A thick fill layer (ev. 104) of probable Roman date, containing small and worn sherds, was found further west under the so-called west house. There, it covers the unworked bedrock, and the western wall (ev. 73) of the younger house was founded on it. Although the sherds in this brown layer are worn (pointing to a secondary deposit), they seem to be of purely Roman date.

In general, the find rate of Roman contexts is very low. Neither coins, nor metal or glass of Roman date could be found in non-mixed contexts. Ev. 104 is one of the few useful contexts, containing pottery - mainly table- and cooking-wares, and also a Roman lamp, some amphora fragments and a better preserved terracotta figurine (pl. 134a-c). Remarkable is the find of a vessel containing traces of green pigment (pl. 18.105) in the same context.

Phase 2a (Byzantine?)

Most of the buildings excavated could not have been built before the Roman cistern fell out of use and its northern part was separated by a wall and filled, because their southern walls (ev. 9, ev. 81 and ev. 87) were built on top of this fill. Only the so-called east house is situated fully outside the cistern, and furthermore, it shows a slightly different orientation parallel to the northern cistern edge. Therefore, this building could belong to an older phase. Its orientation was given by the rock step (ev. 115), as well as the rock walls (ev. 75) and the older concrete floor (ev. 69) upon which the house was built. Of this house, only the southwestern corner was excavated, but it is obviously part of a larger building complex extending in an eastern and northern direction. What was excavated in the eastern part of the trench is the ground plan of an oblong room 3.5 meters in width in a north-south direction and at least 3.4 meters in length in an east-west direction. The total extension in eastern direction could not be determined in this campaign. The western boundary of the complex is given by the wall (ev. 15B) whose southern part rests on the concrete floor (ev. 69), and whose course at surface level follows the rock step for at least 13 meters. This wall was connected by mortar to the southern wall (ev. 9B), which rests on the concrete floor, together forming a corner. In a later phase, the southern face of this wall (ev. 9B) was replaced by another wall (ev. 9). Parallel to the southern wall, the northern wall (ev. 42) takes course. This wall was built on top of the rock-cut wall (ev. 75), which had to be leveled for this purpose with a thin foundation layer (ev. 84). Two buttresses supported an arch, bridging the room

from north to south. One (ev. 76) was set on the bedrock wall against the northern wall (ev. 42 and ev. 76), and on the south side, a similar buttress was built on top of the concrete floor and into the wall (ev. 9B). The southern, western and northern walls were linked by a white wall plaster (ev. 34), which also covered the arch support (ev. 76). The older concrete floor was also used as a floor in the first layout of this room. North of the wall (ev. 42), an open space or courtyard was situated. This is evident by the presence of only two fill layers (ev. 70, ev. 67 and ev. 68) covering the uneven bedrock (ev. 80) and protecting the foundation of the wall (ev. 42). The top of the stony fill layer (ev. 67 and ev. 68) marks the slightly higher walked-on level outside the room and contains a few - mostly undiagnostic - finds of probable Late Byzantine/Early Umayyad date.

The dating of this phase is difficult, since almost none of the associated layers or structures contained any artefacts or diagnostic finds. Since the west wall (ev. 15B) seems to be part of the overall plan of the housing on the south slope, this argues for a post-Roman, probably Byzantine or even later, date.

Phase 2b (Byzantine?)

This sub-phase is attested by an alteration of the east house that cannot be connected with the other building structures. The transversal arch was closed with a wall (ev. 98), dividing the room into a small western room and an eastern room. At 3.5 meters in length and only 1.4 meters in width, the new room was very small and accessible through a door at the northern end of the wall (ev. 98). Since this wall was built on top of the concrete floor (ev. 69) and the northern door jamb set against the plaster coating (ev. 34) of the buttress, it is most probable that the modification took place not too long after the house had been built. Its interior must have been still intact. The only finds that can be connected with the construction of the wall (ev. 98) are three small copper coins [J15-Oe-98-2, J15-Oe-98-3 and J15-Oe-99-1] (minimi) found in the wall core (ev. 99), which for now cannot be dated more precisely than Late Roman to Umayyad.

The next building phase of the house can be related chronologically to the other buildings.

Phase 3 (Byzantine)

In this phase, large-scale alterations took place, which can be linked with evidences excavated in Trenches F and L. In phase 2 of Trench L, the western part of the cistern was separated from the rest by a tower-like structure with a staircase leading into the cistern, and the area outside the cistern was transformed into a habitation area. In Trench F, a high wall (ev. J13-F-19) was found inside the cistern, which takes course parallel to the cistern's north side, thus separating a narrow and backfilled northern strip from the southern part of the basin, which was by then used for housing (for Trench F, see the preliminary field report in Kalaitzoglou *et al.* 2018). As an extension of this wall, which must have met the tower-like structure in Trench L, a very similar wall (ev. 55) was discovered in Trench O. This wall (ev. 55) is most probably the same wall that was found in Trench F (ev. J13-F-19); it was built to support a fill (ev. J13-F-12 and J13-F-16) very similar to the fill (ev. 51 and ev. 47) unearthed north of the wall (ev. 55 in Trench O). These congruent features confirm that, in this phase, the entire northern part of the older cistern was filled up to its edge, and a staircase was constructed at the western side to grant access to the settled part of the cistern. The latter is apparent from the results in Trench L.

In Trench O, all built structures except the east house demonstrate prior filling of the cistern, because their southern walls were built above the northwest corner of the cistern, and must therefore rest on the fill. The evidence for dating the filling is limited, because finds were scarce or non-diagnostic. The lower fill (ev. 51) was sterile, and the upper fill (ev. 47) contained a few diagnostic sherds, mainly tableware, cookingware and some food-preparation ware of Roman to Late Byzantine or Early Umayyad date. Ev. 48, a small concentration of pottery between these two evidences, contained few sherds of Late Byzantine date.

The oldest building assigned to this building phase is the so-called west house in its first layout. Of this house, only the southeastern part with a door was excavated in the eastern part of the trench. If not already in this phase, at least in the next phase, it belonged to a larger building complex extending northward. This complex

was connected by walls to the neighbouring complexes west and southwest of it (see **Fig. 1**). Especially informative is the connection by a wall of the southwest corner with a house of the same phase, excavated in Trench L. This wall connection created an almost right-angled inner corner, leading to the south street on a zigzag course above the fill along the northern side of the former cistern. Such a course was already assumed for this phase based on the results in Trench L.

The ground plan of the east house is defined by the eastern wall (ev. 62 and ev. 73) and a western wall, which is outside the trench but takes a parallel course 3.1 meters further west (see **Fig. 10**), as well as the south wall (ev. 87) connecting both walls. An exterior door (ev. 95) is situated in the eastern wall (ev. 73), next to the southeast corner. The northward extension of this room was excavated to a length of 4.95 meters, but it most probably met an east-to-west running wall, visible on surface level at 7.2 meters (see **Fig. 1**), resulting in an oblong building with an area of about 22.3m². The floor of this first layout was a pavement of irregular shaped stones (ev. 102) laid into soil (ev. 103). The dating of this building relies on finds from the foundation layers and the floor. They all consist of few diagnostic, unspecific and badly preserved sherds. The eastern wall (ev. 73) and the threshold of the door (ev. 95) were founded on top of the fill layer (ev. 104), which contained only worn fragments of Roman pottery (pl. 21 and pl. 22.134a-c). In the foundation layer (ev. 101), which was set from the west against the wall and the door to level the terrain outside, no diagnostic sherds were found. Inside the house, in the soil (ev. 103) between the pavement stones, some sherds of grey fabric were found. They point to a post-Roman date. A similar date was assumed for the connected building in Trench L, and this house also was founded on a fill layer rich in Roman pottery.

Phase 4 (Late Byzantine - Early Umayyad)

In this phase, major alterations occurred, as the house was consolidated and the zigzag course of the street changed to a more diagonal course, because the water channel (ev. 72 and ev. 109) was laid. As a result of discovering the built water channel (ev. 72 and ev. 109) in Trench L also (ev. J14-L-23), we are able to correlate this phase with the fifth building phase of Trench L.

In this phase, the west house was transformed into an enclosed building complex that extended eastward to the east house. Parallel to the wall (ev. 62 and ev. 73), the new wall (ev. 2) was built on top of the former walked-on level (ev. 101), with hardly any diagnostic sherds. A wall (ev. 9) was built in alignment with the south wall (ev. 87), with the two meeting in the corner (ev. 81). The southern wall (ev. 9) was built on the upper part of the cistern fill (ev. 47) to connect the extension of the west house with the south wall (ev. 9B) of the east house. The cistern fill contains a few diagnostic sherds of mixed date. The earliest finds date to Roman times (Pl. 3), but a handle with painted decoration in white and brown dates to the Umayyad period. The door (ev. 95) in the wall (ev. 73) had to be blocked by a wall (ev. 110), because the corridor between the walls (ev. 2, ev. 62 and ev. 73) was filled (ev. 100) to construct the water channel (ev. 109). Above this fill, a thin foundation layer (ev. 88 and ev. 94) was laid for the new clay floor (ev. 89), reaching the tops of the covering slabs (ev. 93) of the channel. The clay floor contained pottery finds of Late Byzantine to Early Umayyad times. Inside the former west house, the level was raised with a similar fill (ev. 97) of the same period, containing just a few diagnostic sherds, in which the foundations were laid for a small wall enclosure (ev. 106) set against the western face of the wall (ev. 73). Since the new clay floor (ev. 91) was found both inside and outside this enclosure, it could not have been a bench or a podium. The few worn diagnostic sherds date to Late Byzantine/Early Umayyad times.

After implementing these building activities, the room was accessible only from further north, but the entrance (ev. 71) to this enlarged building complex was situated in the south wall next to the blocked door. At the same time, the threshold of the new entrance served as a cover for the water channel (ev. 72/109), leading from the north through the corridor and underneath the door in a southwestern direction to the south street. South of the house, the street was paved with stone slabs (ev. 79) next to the channel or covered with smaller stones and soil (ev. 61).

Of this street surface, only a small strip along the walls (ev. 87 and ev. 9) was not eroded or covered by topsoil. Since neither a floor nor any structures or installations were found in the space defined by the walls (ev. 2, ev. 9 and ev. 15B), the space between the two houses was not used for domestic purposes.

Inside this enclosure, only a yellowish fill (ev. 111) was found that covered the older structures and ran against the walls (ev. 2 and ev. 9). The preservation of the few finds in the fill was very good. One complete basin with comb-decoration (pl. 11) and the base of a storage vessel (pl. 13) were found, both of Umayyad date. A water inlet (ev. 38), which was set with mortar against the southern face of the wall (ev. 9) in this phase, indicates that the room might have been roofed and that a water pipe could have been connected to the inlet. The soil inside the inlet (ev. 39) contained a few sherds, among them a piece of tableware (Jarash Bowl, pl. 4.32) of Late Byzantine date. A channel (ev. 74) is attached to the inlet; it consists of four carved column drums which led above the backfill and through the top edge of the retaining wall (ev. 55) into the former cistern. Both the inlet and the channel were fixed to the backfill and protected carefully by a compact foundation of stones and mortar (ev. 40, ev. 41, ev. 45 and ev. 49); the channel was covered by stone slabs.

The building sequences prove that all these modifications belong to the same construction process and certainly took some time to be accomplished. For the contemporary building phase 5 in Trench L, a date in the Byzantine period was assumed. For Trench O, the youngest finds seem to favour a slightly later date in the Late Byzantine to Early Umayyad period.

The fill (ev. 100) under the channel and corridor floor is mixed in date. A few, mostly undiagnostic sherds point to a date in Late Byzantine/Early Umayyad times (pl. 4.28, Jarash Bowl). However, there is a coin of Late Roman date in the fill too [J15-Oi-100-1 is a copper coin of Constans as Caesar, struck 333-337AD]. In the corresponding fill (ev. 97) above the older pavement inside the former west house, sherds of probable Early Umayyad date were found. In the new clay floors inside the room (ev. 91) and in the corridor (ev. 89), the youngest sherds are Late Byzantine to Umayyad. An Umayyad date is assumed for the well-preserved pottery found in the fill (ev. 111, pl. 11.73 and pl. 13.84). Even in the fill (ev. 10) between the older wall (ev. 9B) and the later attached wall (ev. 9), the few pottery sherds included fragments of Late Byzantine to Early Umayyad times - these being the youngest [in this fill, a minimus was also found (J15-Oc-10-1)]. The eroded soil (ev. 24) above the wall (ev. 9) contains a fragment of a lamp (pl. 17.101), probably of Umayyad date. The find contexts connected to the street south of the wall (ev. 9) cannot clarify this dating further, since they were partly eroded and disturbed [ev. 41 for example was contaminated by modern material].

Because of the dating material, we can also add to this fourth building phase the third alteration of the east house. The wall (ev. 98), which was built in phase 2b to close the arch and divide the room, was broken down to the lowest course, and also a higher part of the northern door jamb was kept. This re-enlarged room was filled with a layer of stones and soil (ev. 64 and ev. 65) that contained a lot of pottery of Late Byzantine and Early Umayyad date, including a fragment of an LRA 1 Amphora with dipinto (pl. 16.95) and a lot of common ware, mainly large basins (pl. 8.61) and tableware. A new simple clay floor (ev. 90) was laid on a higher level, and yielded a few finds of Byzantine and Early Umayyad date. The surface, located to the north outside the room, seems to have remained unchanged. In the fill (ev. 64) and new clay floor (ev. 90), pottery of the Late Byzantine to Early Umayyad period was found, as well as some minimi [Two minimi stem from the floor (ev. 90; J15-Oe-90-1 and J15-Oe-90-2) and three minimi from ev. 64 (J15-Oe-64-22, J15-Og-64-2 and J15-Og-64-7)]. It is therefore most likely that this alteration took place in this phase as well.

On this basis, it is both possible and necessary to refine the dating of building phase 5 in Trench L, which is contemporary with phase 4 in Trench O, as Byzantine/Late Byzantine to Early Umayyad.

Phase 5 (Early Umayyad)

The following phase was a complete modification of the area north of the former cistern. In none of the rooms was debris of a sudden destruction or gradual decay found. The walls

were cut down, and the spaces between them were backfilled to the level of the terrain. The interior of the east house and the area north of it were deliberately backfilled at the same time with corresponding layers of soil and some big stones [The layer sequence inside the room is ev. 57, ev. 53 and ev. 44; outside the room it is ev. 56, ev. 54 and ev. 43]. Above the preserved walls, continuous fill layers of soil and smaller stones covered the ruins (ev. 31, ev. 37 and ev. 30), creating a large leveled area north of the former cistern. It is remarkable that, in the upper fill layers (ev. 53, ev. 54, ev. 32, ev. 31 and ev. 30), a lot of semi-finished tesserae were found, along with big lumps of such tesserae embedded in mortar. The lumps (ev. 36, ev. 52, ev. 58 and ev. 59) were found only above and north of the wall (ev. 42, **Fig. 11**). This presence of typical tessellation waste shows that such waste products were available to fill this area in Early Umayyad times (Piccirillo 1986: 40). An Early Umayyad date for the filling activity is attested by an Islamic coin [J15-Og-53-5 is a copper coin with an Islamic but unreadable inscription] found in the fill layer (ev. 53). The pottery of the fill - more than 230 vessels of cooking- and tableware - is difficult to narrow down in date to productions of Byzantine and Late Byzantine to Early Umayyad times. Different to the other contexts, these fill layers are the only pieces of evidence containing a lot of archaeological material, certainly secondarily deposited due to their state of preservation.

In the western part of the trench, a very similar filling practice was observed, since the walls of the west house, too, were cut down to a distinct level, and the ruins backfilled and leveled.

11. Trench O, a lump of raw tesserae (ev. 52) bond by mortar.

The area next to the former east house between the walls (ev. 2 and ev. 15B) was filled with layers containing fair amount of big stones (ev. 108 and ev. 107), perhaps to adjust the higher level of the east house and the area east of the long wall (ev. 15B). The few pottery finds of these layers date to Early Umayyad times (pl. 10). Also a few tegulae and a coin have been found (pl. 19 and pl. 20), as well as a chain link of copper alloy (Kat. 18). The stones used for this purpose probably stem from the demolition of the walls. In the area west of the wall (ev. 2), even thin fill layers (ev. 85 and ev. 86) would have been sufficient to level the ruins. They contained only a few sherds, mostly common ware of Early Umayyad date and an earlier Byzantine coin (minimus, J15-Ob 86-15). The entire area was then covered with a dense and compact packing of stones up to fist size (ev. 3) set in soil (ev. 13). It contains mixed material of Roman, Late Byzantine and Early Umayyad date (pl. 10.70), including two cosmetic spoons or probes of copper alloy (Kat. 7), one possible furniture fitting and a knife (pl. 24.153). This kind of platform ranges from the wall (ev. 15B) in the east, of which the uppermost stones were still visible, to the buildings north of the south street. This is proved by a room in Trench L, which was covered with a corresponding stone packing. The finds stemming from the backfill confirm that the filling activities of the west and the east house took place simultaneously. In the fill layers (ev. 107 and ev. 86) underneath the stone packing (ev. 3 and ev. 13), Early Umayyad pottery was found, and in the stone packing itself, which contained a chronologically mixed find composition, an Umayyad copper coin was also found [J15-Oa-13-13 originates from the Damascus mint and shows an overstrike]. It is worth mentioning that under the topsoil in the upper part of the stone packing (ev. 3 and ev. 13), some Middle Islamic sherds were also found. These could, however, be modern intrusions like the fragment of modern glass found in the uppermost fill layer (ev. 30) above the east house.

So far, there is no indication that the residential area in the vicinity of the cistern was destroyed by the earthquake of 749AD, or that the plot was transformed after this date into spacious platforms. Based on the dating material, it

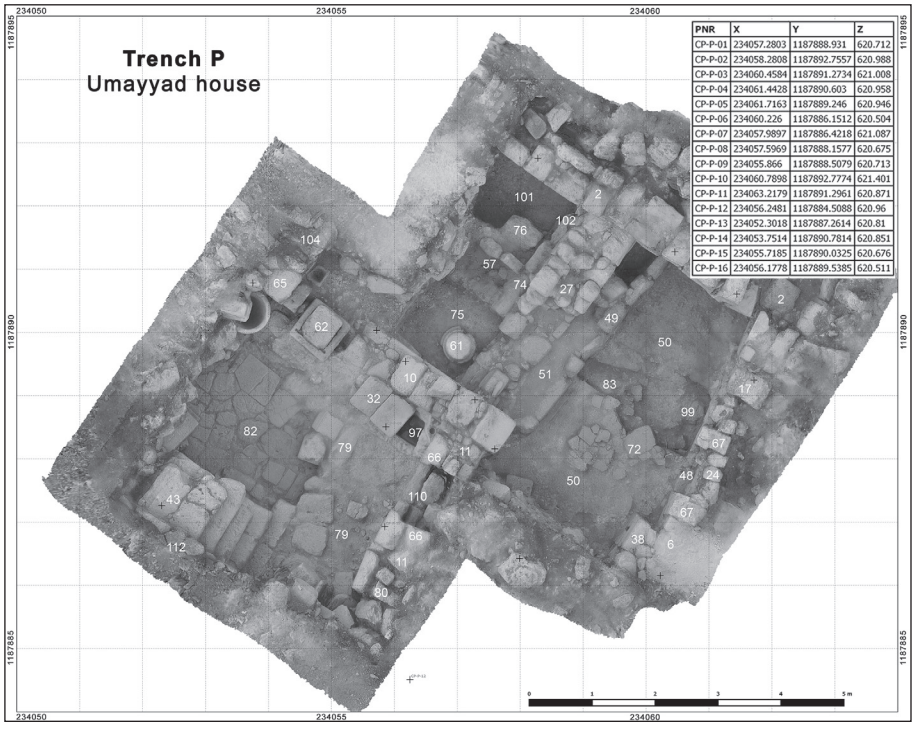
is more likely that this transformation happened before the earthquake, although the purpose of this intervention remains obscure.

Trench P

The main aim of Trench P was to continue with the research of the eastern terrace and to find other undisturbed destruction contexts that could possibly be related to the earthquake of the year 749AD [Trench supervisor was Line Egelund Nielsen]. Therefore, a square of 6 by 6 meters was opened (sectors a to d) south of Trench K, with some wall structures already visible at the surface. This area was later extended towards the southwest with a square of 5 by 5 meters (sector e) with some overlap. In this trench, only 4.3 meters south of the Umayyad edifice excavated in 2014, another large house with an inner courtyard was found, covered completely by debris. If the house plan is more or less symmetrical, and the rooms were arranged around the courtyard, parts of the northeast wing and most of the courtyard were excavated (**Fig. 12**). An additional east room behind the eastern wall (ev. 6/17), attested by a blocked door (ev. 67) opening towards the east, was left unexcavated for the next campaign. About 51.50m² could be excavated out of a total of at least 188.50m², which is the estimated size of a symmetrical and square ground plan of the courtyard house. The area of the eastern room cannot be determined with any precision yet, but if it were linked with the east wall of the house in Trench K, which continues towards the south, this room would add some 66.50m², resulting in a total area of about 255m² for the house (see **Fig. 1**). As a result of illicit digging in Trench K, two blocked and formerly not visible doors were discovered in the west wall of the house (see **Fig. 1**). Since both doors are relatively narrow, they could not be the main entrances to the house in Trench K but rather connected the excavated room with other rooms further west. Hence, this house also seems to have been much larger than previously suspected.

The dimensions and the diversified ground plan with an inner courtyard is different from the one- or two-room house found so far and underline the high living standard of the building in Trench P. Like the house excavated in Trench K, the edifice in Trench P had a relatively short occupation history with only minor architectural changes prior to its destruction by a heavy earthquake.

Since the destruction context is undisturbed, the finds in general are well preserved and not greatly fragmented, which underlines the fact that there was no heavy accumulation process after the abandonment of the site. Nevertheless, destroyed vessels sealed by the destruction



12. Trench P, excavated structures.

debris were not unearthed. The earliest material dates to Late Byzantine/Early Umayyad times, and the youngest finds stem from a surface layer and date to the Ayyubid-Mamluk period. Umayyad pottery dominates in the destruction layers. The main steps of its building history can be traced based on the construction sequences and the two succeeding floors, beginning and ending in the Umayyad period.

Building Phase 1 (Umayyad)

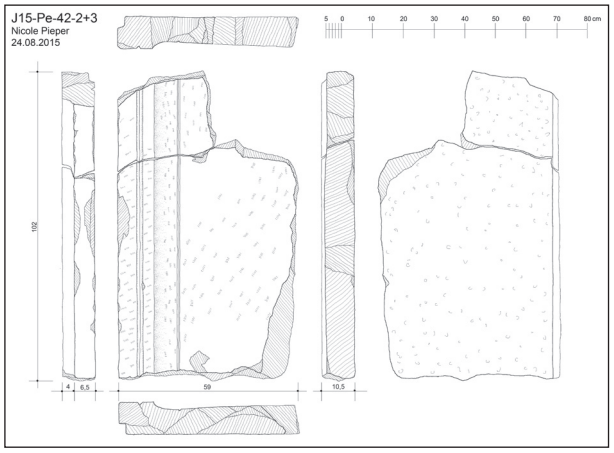
In its first layout, the edifice seems to have been planned as a spacious building with rooms arranged around an inner court with a rock-cut cistern situated under the northern part of the building (**Fig. 13**). This bottle-shaped cistern (ev. 77) was found intact and almost empty; it measures about 4.5 meters in diameter and 3.8 meters in depth [since the opening was still closed by a square stone slab (ev. 62), only a pile of the broken mortar coating and washed in soil was found in the center of the cistern. Because of safety concerns and the narrowness of the opening, the cistern was measured using the Structure from Motion (SfM) technique]. It was cut into bedrock and lined with stones and mortar. The edifice was built on three levels rising from north to south, since the courtyard lies on a higher level than the surrounding rooms, and the massive built staircase (ev. 43) at its southern end leads to a still higher level.

The walls of the first phase rest on bedrock (ev. 99), which was leveled and covered in places with mortar (ev. 103) to fill gaps and cracks. One of the outer walls in the first layout is the north wall (ev. 2), which can be followed on the surface in western direction for at least 5 meters beyond the trench limits (see **Fig. 1**); it also continues towards the east. The eastern limit is given for now by the interim east wall (ev. 6 and ev. 17) with the door (ev. 67), which provided access to another room further east. Of the walls which surrounded the atrium, only the northern and eastern walls, as well as a small part of the southern limits, were excavated. The northern limit is defined by a wall (ev. 10) which runs against another wall (ev. 104), first on a higher and then on a deeper level. Along its course, the wall (ev. 10) runs over the round opening of the cistern (ev. 109). This consists of four stones and is a constructional part of the wall (ev. 10). The opening was covered by a square-shaped well-head (ev. 63) resting on a thin foundation (ev. 107). The about 2-meter-wide opening above the well-head was spanned by an arch leading from the higher western part of the wall (ev. 10) to the arch support (ev. 65) which was built into the southeast corner of the wall (ev. 104). The wall (ev. 104) runs in a northerly direction and seems to have divided the rooms north of the atrium. Access to the cistern from the north was granted by the staircase (ev. 105), set from the east against the wall (ev. 104, **Fig. 13**). Towards the east, the atrium is bordered by the wall (ev. 11) with the two doors (ev. 66 and ev. 80). Both doors connect the atrium with the eastern rooms. Although the area east of the doors was not excavated, it is most probable that one or two staircases led from the lower level to the doors and the atrium. The northeast corner of the atrium was connected with the eastern wall (ev. 6 and ev. 17) by an arch leading from the corner of the walls (ev. 10 and ev. 11) to the base (ev. 38) in front of the wall (ev. 6 and ev. 17). On the southern side of the atrium, a short east-to-west running wall (ev. 112) and the tower-like staircase (ev. 43) were found. Since the wall (ev. 112) is only as wide as the staircase and covered with stone slabs, it is perhaps not the southern wall of the atrium which takes course somewhat further south, but it could belong to it as a partition wall. The flight of stairs leads eastwards from the platform on top of the staircase (ev. 43) down to the courtyard.

Next to the staircase, fragments were found of a banister that was made of a reused stone slab

13. Trench P, northwest corner of the atrium with well head and staircase, view from north.

set into a groove along the western side of the staircase platform (**Fig. 14**). In the northeastern inner corner of the atrium, a vertical water pipe (ev. 31) is still *in situ* and coated with mortar [segments of the collapsed clay water pipe (ev. 18) were found in the debris next to the wall corner]. It drained rainwater from the roof into a channel (ev. 97), which was covered with stone slabs (ev. 32) and mortar (ev. 33), and through it into the cistern (ev. 77). As the channel was coated with plaster, it formed a bench-like structure along the northern side of the courtyard. In this first building phase, the courtyard had a pavement of irregular stone slabs (ev. 82), suggesting an open courtyard without roofing. This would also explain the noticeable height of the threshold (ev. 110) under the door (ev. 66) and the installation of the stone-blocking structure (ev. 106) in the gap between the well-head (ev. 63) and the wall (ev. 104). These features would have kept rain water inside the courtyard for collection in the cistern. Since the round basin (ev. 64) rests on the pavement (ev. 82) of the atrium, and the younger floor (ev. 79) was later placed against it, this installation can also be assigned to the first building phase. The square-shaped well-head (ev. 63) with a round opening bears a square cutting with two side slots for pins of a cover plate. This proves that the well-head could be closed originally, either with a thin stone slab or more likely with a cover plate made of wood and a hinge of other material. The square stone (ev. 62) found on top of the well-head is slightly too long and does not fit into the cutting, and therefore, it seems to be a later substitute. The original lid was to open towards the south, hindering access from this side. Some rope marks solely on the south side of the opening, prove that water was later pulled from the south, as opposed to the first phase, in which water seems to have been pulled with a rope winch, perhaps mounted on the arch.



14. Trench P, fragmented banister slab (J15-Pe-42-2-3) of the western staircase side (ev. 43).

In the east-to-west direction, arches [wedge-shaped imposts were found still *in situ* at both ends of the wall (ev. 10) and arch supports (ev. 65 and ev. 38)] were used to bridge the gaps and support an upper floor in a north-to-south direction. The walls (ev. 104 and ev. 27) served as room dividers in the corridor-like space surrounding the atrium and as supports for an upper storey. The wall (ev. 27), although built on bedrock, must have had a door at its southern end in the original layout, otherwise the western part of the northern rooms would have been separated from the eastern rooms. In a later building phase, this door was closed. The floor of the first building phase in the rooms outside the courtyard was a simple clay floor (ev. 101 in sectors a/c and ev. 83 in sector b/d), which covered a thin foundation layer (ev. 96) west of the wall (ev. 27). This was brought in to level the lower bedrock. The finds from the early phase contain hardly any diagnostic sherds.

The flooring on the first storey was different from that of the basement and must have been mosaic pavement, because large amounts of tesserae, as well as larger mosaic pieces (ev. 9, ev. 29, ev. 39) and large stones with mosaic pieces still attached to them, were found in the debris above the rooms outside the atrium (**Fig. 15**). The mosaic pavements, and the fragments of painted wall plaster found along the north and east walls (ev. 2 and ev. 6/17), which were not connected with the walls - being above them (ev. 27), demonstrate that the upper rooms were well equipped and decorated with more value than the basement. The same conclusion was drawn for the house in Trench K.

Specific functions of the rooms around the courtyard could not be detected, and it is possible that they served more or less as corridors or storage rooms. In its first layout, the basement of the courtyard house does not seem to have been used for residential purposes. Rather, it was open space and well appointed, with doorways granting access to the courtyard and the communication around it.

15. Trench P, collapse (ev. 22) of the upper storey in the northeast wing of the building.

Building Phase 2 (Umayyad)

Some alterations of the original layout took place in this phase, of which new floors and the closing of some of the doorways are the most important interventions. In the courtyard, the older pavement was covered with a layer of reddish-brownish soil, onto which a new floor (ev. 79) was laid. This floor consisted mostly of mortar mixed with some soil and raised the level inside the atrium to the top of the water channel (ev. 97) and the lowest step of the southern staircase (ev. 43). In the eastern part of the courtyard, a row of stones was laid into the new floor, leading from the staircase to the water channel. The function of this installation is not yet clear, but some of these stones are reused architectural elements. The round stone basin (ev. 64) was kept and integrated into the floor, and north of the well-head a small hollowed stone of cubic shape (ev. 84) was placed onto the new floor, which north of the well-head also covered the staircase (ev. 105). Most probably in this phase, the cover of the well-head (ev. 63) was modified and the stone slab (ev. 62) used as a cover.

In the north and northeast rooms, divided by the wall (ev. 27), many modifications took place. The door at the southern end of the wall (ev. 27) was closed with masonry, thus blocking access between the two rooms. East of the wall, a new clay-mortar floor (ev. 50) was laid out, which consisted partly of a cluster of different-sized stones, which was placed in front of the door (ev. 67). As with the row of stones in the new courtyard floor, it is unclear what purpose this installation served. One of the stones is part of a decorative relief, placed face down. It is also probable that the door (ev. 67) was blocked by the wall (ev. 24) in this phase, but this cannot be ascertained because both the older door and the blocking wall rest on the foundation wall (ev. 48), which is part of the eastern wall (ev. 6 and ev. 17). Therefore, none of the succeeding floors run against the blocking wall (ev. 24).

On top of the new floor (ev. 50), a low wall (ev. 49) was built parallel to the wall (ev. 27) at a distance of 0.4 meters, thus forming a long but narrow trough some 0.44 meters in depth, of which the floor (ev. 50) was the bottom. The trough was filled with enormous amounts of new white tesserae. Hardly any other finds, except some soil, undiagnostic sherds and tegulae (pl. 20.120-121) were associated (**Fig. 16**) [only very few black tesserae and some examples with mortar sticking on them were found]. It is still uncertain why the inhabitants stored mosaic stones in this trough, and whether this

16. Trench P, built stone trough ev. 49 with tesserae fill (ev. 51), view from south.

construction was accomplished in the beginning of the second phase or constituted a later addition.

West of the now-closed wall (ev. 27), a new floor (ev. 60 and ev. 75) was laid, and at the same time a foundation layer (ev. 111) was filled in, onto which the following structures were built. The very basic wall-like structure (ev. 74) consists of a column drum and rough masonry and was built from the west against the wall (ev. 27). The gaps between it and the north wall (ev. 2) were filled with stones (ev. 102). When this was completed, a hearth or oven (ev. 57) made of clay and some bigger stones was set from the west against it. Later, the large stone (ev. 76) was placed north of the hearth and next to the wall-like structure. South of the hearth, a Corinthian column base (ev. 61) was set on top of the new clay floor (ev. 75), probably to be used as a table or rack. These features created a kitchen that was installed in this phase in the room between the walls (ev. 27 and ev. 104). The kitchen was accessible only from the west or from the courtyard across the well-head. The hearth shows at least three renewals of its clay coating, all baked and separated by layers of ashes [the layers were counted from ev. 68 as the youngest to ev. 70 as the oldest], pointing to a longer period of use. Inside the youngest hearth, a mixture of soil, ashes and undiagnostic pottery sherds (ev. 56) was found, which are probably the remains of the last use, contaminated by debris. The waste from frequent cleaning of the hearth (ev. 57) was found south of it. It is a wedge-shaped layer (ev. 59) full of ash, which accumulated in front of the hearth above the floor (ev. 75) as well as the northern part of the column base. The quantity of finds around the hearth is very low. The layer (ev. 59) consists of a very low number of vessels of table- and common ware of Late Byzantine and Early Umayyad date. North of the hearth, to its rear, another soil layer rich in charcoal (ev. 55) was found above the floor (ev. 60). Pottery finds from this place (ev. 55) date to Umayyad times. The vessels are very low in number and well preserved (pl. 13.78-79). Also, this layer seems to stem from the cleaning and renewal of the hearth. Embedded in it, two fragments of hardened but unbaked clay plates (ev. 58) were found, which could stem from the clay lining of the hearth.

Most characteristic of this last phase of the edifice is the modification of its layout and probably also its function, before it was destroyed by a heavy earthquake. The formerly well-organised structure with easy access to all rooms was altered to a compound of smaller, separated units with more rural function. Based on the remains of a more luxurious interior, such as mosaics [ev. 9, ev. 13, ev. 29 and ev. 39 were found solely in the northern rooms], white and painted wall plaster (*cf.* pl. 21.130-132) [ev. 35, ev. 44, ev. 45, ev. 54 and ev. 100 were found solely in the northern rooms] and stucco-profiles [ev. 26, ev. 28 and ev. 36 were found in the debris above the wall (ev. 27)] found in the debris, this most probably applied only to the ground-floor rooms. A comparable transformation was observed in the neighbouring house in Trench K.

The Earthquake Destruction of the House

A heavy earthquake caused the final destruction of the courtyard house. This is indicated by the proximity to the destruction complex in Trench K and is also evident from the very similar kind of destruction in this trench and the shifting of the walls. The debris found inside and also above the walls consists mainly of collapsed wall stones (ev. 3, ev. 12, ev. 14, ev. 21, ev. 25, ev. 71 and ev. 73) and a few tegulae (pl. 19.119), as well as large amounts of soil of different kinds (ev. 8, ev. 13, ev. 15 and ev. 30), stemming from the wall cores and wall lining. It is mainly a yellowish-clayish soil (ev. 16), which is very similar to the soil found in the collapse of the neighbouring house (ev. 3 in Trench K). Ev. 15 and ev. 16 contained architectural remains, such as fragmented waterpipes, a few tegulae (pl. 19.113-118) and wall plaster (pl. 21.128-129), mixed with a low amount of pottery, amongst which was one well-preserved Jarash Lamp (pl. 17.102), and a metal strainer (pl. 25.161). Only very few and small fragments of roof tiles were found, suggesting that the courtyard house had no tiled roof.

The Date of the Courtyard House

The finds from the courtyard house were less rich than in the house excavated in 2014 in Trench K. Datable finds of the first building phase are sparse because of the renewal of

the floors. Destroyed *in-situ* vessels stemming from the last phase were not found, and pottery finds are generally rare except in the vicinity of the hearth (ev. 57). The accumulated soil layer (ev. 55) north of the hearth contained Umayyad pottery (pl. 13.78-79). The debris, especially the soil (ev. 16), holds a great deal of datable pottery, of which the youngest is also Umayyad. A sieve (pl. 12.76) with a production phase not before Umayyad times supports this dating. The sherds are not greatly fragmented and, in general, the quantity of vessels is very low due to the non-existent accumulation in the debris layer. Among the better preserved pottery are table wares (pl. 7.57), cooking wares, storage jars (pl. 12.76) and one outstanding find - a sieve, produced in the manner of the common grey-ware basins (pl. 11.74). Among the architectural elements were tiles, plaster and painted plaster. Glass and metal finds are very common; the latter included a keyhole plate, knives and large nails (pl. 24.147 and 151; pl. 25.159 and 162).

More distinct than the pottery, which only provides a rough date, are the coins. The youngest coins prove that the courtyard house in Trench P was built and destroyed in Umayyad times. In the lowest foundation layer (ev. 96) above bedrock (ev. 99) and the mortar coating (ev. 103), an Islamic copper coin was found [J15-Pbd-96-2x. A charcoal sample (ev. 85) taken from the same foundation layer under the floor (ev. 83) obviously stems from old wood, since it gives a Late Roman date. Sample no. 23933 (J15-Pbd-85), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1697±26BP, d13C (dual-inlet) -22.75±0.05, calibration curve IntCal13, 1σ 332-391AD, 2σ 256-407AD]. In the north room, on the oldest floor (ev. 83) above this foundation, only some minimi and Byzantine coins of the 5th and 6th century AD were found [J15-Pbd-83-1, J15-Pbd-83-1x to J15-Pbd-83-4x, J15-Pbd-83-5x]. The fact that older coins are only found at a higher level coincides with the Late Byzantine pottery recovered from those contexts. Between the stone slabs of the oldest pavement (ev. 82) in the courtyard, an Umayyad coin of the Tabariya mint appeared [J15-Pe-82-1x], proving that the first layout of the house was in use in Umayyad times. Also in the debris (ev. 16) of the house, some better-preserved Umayyad coins are the youngest among older coins [*e.g.* J15-Pc-16-2x (Umayyad of Iliya mint in Jerusalem), J15-Pb-16-4x (Umayyad of Jarash mint), J15-Pc-30-4 (Arab-Byzantine)]. The two Byzantine coins stemming from the 6th century AD [J15-Pa-75-1x and J15-Pc-75-2x], found on the younger floor (ev. 75) under the waste layer (ev. 59), prove that older coinage was still available, only to be lost during Umayyad times. The composition of coins found in Trench P differs in some respect from what was found in 2014 in the neighbouring house. Aside from the coin hoard, which included Byzantine and pre-reform Umayyad coins, the remaining identifiable coins in Trench K consisted of 11 or 12 Umayyad coins, six Late Roman coins, only four minimi and no further Byzantine coins. In contrast to this, the monetary finds in the courtyard house in Trench P consist of only five Umayyad coins and the same number of Byzantine coins, eight minimi and only three Roman coins, of which one even dates to the 1st century AD. Although some of the pre-Umayyad coins probably stem from the collapsed construction material, this explanation is most unlikely for the Byzantine coins found on the floor surfaces in the courtyard house.

Radiocarbon samples taken from the layers in the hearth (ev. 57) confirm the Umayyad dating of the courtyard house and its destruction by the earthquake in 749AD. Charcoal from the middle layer (ev. 69) with no pottery finds yields a date between 650 and 770AD [middle layer: sample no. 23931 (J15-Pc-69), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1319±36BP, d13C (AMS) -21±1, calibration curve IntCal13, 1σ 658-764AD, 2σ 650-770AD].

Modern and Middle Islamic material (pl. 18.107-110) stems from the uppermost layers (ev. 5 and parts of ev. 13). The presence of some Ayyubid-Mamluk sherds, together with Umayyad pottery, in ev. 8 can be explained by the rodent burrowing (ev. 23) documented in sectors c and d.

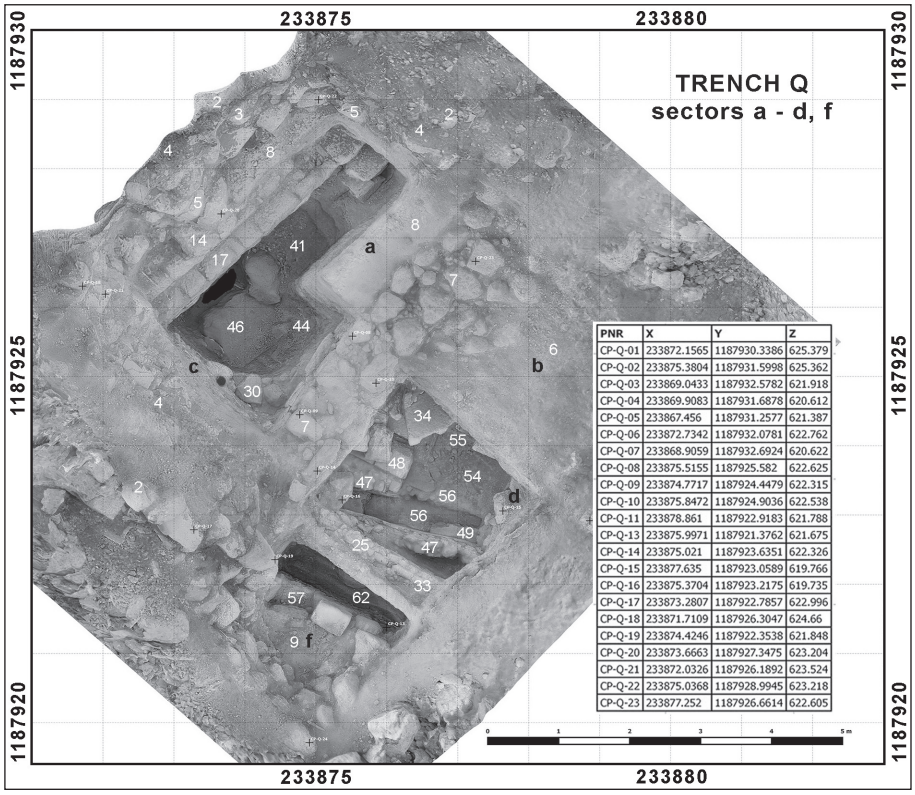
Even though no *in-situ* finds were preserved, the finds present the inventory of the house-complex before its destruction. The finds are well preserved and the low fragmentation hints at a low accumulation process - that is to say, an undisturbed destruction context. The

quantity of sherds in general, but also the variation of types, is low, especially in the earliest building phases of the complex. However, this characterisation continues in later phases. Even though the quantity of fragments increases, the number of vessels and the type variation remains low. Mainly common ware, especially basins and storage jars, dominates the composition of finds, which seems to be typical for this type of Umayyad context. The catalogue of finds of this trench contributes once more (*cf.* Trench K) (Kalaitzoglou *et al.* 2018) to a better understanding of the inventory of Umayyad houses in Jarash.

Trench Q

Jarash is encircled by a 4-km-long and partly well-preserved city wall with 111 towers or massive bastions and some monumental gates. Previous excavations demonstrated that the city wall has a long history of repairs and renewals, but no consensus has so far been reached regarding the date and conception of the original wall. The assumed dates range from the 1st century AD to the Late Roman period [Kraeling 1938: 41 (1st century AD); Kehrberg and Manley 2001 (early 2nd century AD); Seigne *et al.* 1986: 55-59 (3rd/4th century AD)]. To advance the discussion with new archaeological data and to connect this monument with the interior system of retaining walls, we decided to explore the city wall, which forms the western boundary of the Northwest quarter, with three sondages (Q, Qg and Qh) - from the inside as well as from the outside (see **Fig. 1**). The squares were placed close to one of the bastions [we decide to use the more accurate term bastion, because the structure lacks an interior room] where one of the terrace walls meets the city wall. To sum up the results briefly, the explored part of the city wall is of Roman date, and since the wall already existed when the structures inside the wall were built, it is most likely that the city wall stems from at least the 2nd century AD.

On the inside, a main square (Trench Q, sectors a to d) measuring approximately 7.0 by 5.0 meters was laid out, and was then extended with sector f (2.50 by 2.15 meters) towards the south (**Fig. 17**) [trench supervisor was Alessandra Esposito]. On the outside, a rectangular sondage (Trench Q, sector g) measuring 1.40 by 1.25 meters was placed in the northern corner between the wall and a bastion. South of this bastion, a trench 5.50 meters in width and 1.0 meter in length was excavated later (Trench Q sector h) [trench supervisor of the trial trenches outside the wall was Sören Pfeiffer]. While the stratigraphy inside the wall was found well preserved,



PNR	X	Y	Z
CP-Q-01	233872.1565	1187930.3386	625.379
CP-Q-02	233875.3804	1187931.5998	625.362
CP-Q-03	233869.0433	1187932.5782	621.918
CP-Q-04	233869.9083	1187931.6878	620.612
CP-Q-05	233867.456	1187931.2577	621.387
CP-Q-06	233872.7342	1187932.0781	622.762
CP-Q-07	233868.9059	1187932.6924	620.622
CP-Q-08	233875.5155	1187925.582	622.625
CP-Q-09	233874.7717	1187924.4479	622.315
CP-Q-10	233875.8472	1187924.9036	622.538
CP-Q-11	233878.861	1187922.9183	621.788
CP-Q-13	233875.9971	1187921.3762	621.675
CP-Q-14	233875.021	1187923.6351	622.326
CP-Q-15	233877.635	1187923.0589	619.766
CP-Q-16	233875.3704	1187923.2175	619.735
CP-Q-17	233873.2807	1187922.7857	622.996
CP-Q-18	233871.7109	1187926.3047	624.66
CP-Q-19	233874.4246	1187922.3538	621.848
CP-Q-20	233873.6663	1187927.3475	623.204
CP-Q-21	233872.0326	1187926.1892	623.524
CP-Q-22	233875.0368	1187928.9945	623.218
CP-Q-23	233877.252	1187926.6614	622.605

17. Trench Q, excavated structures.

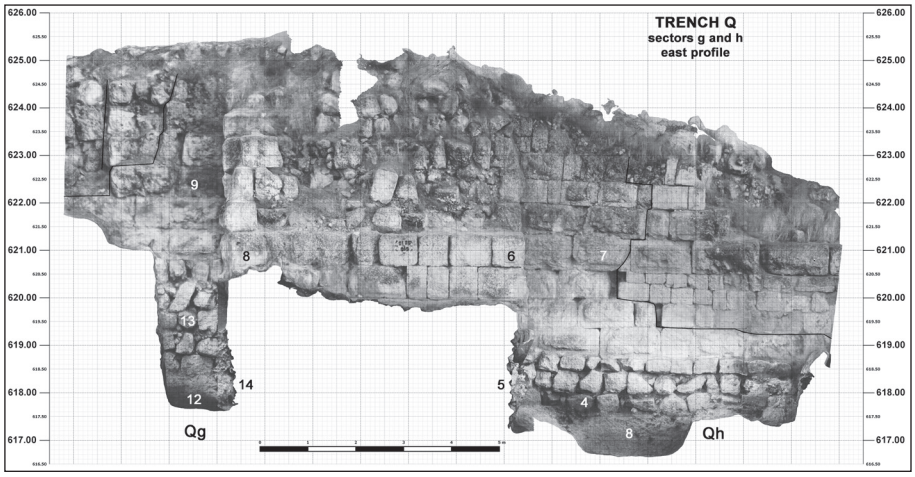
all layers above the outer wall fundament were eroded or deeply disturbed by modern activities [evidence 1 to 7 in sector g were mixed with modern waste, and the same applies to ev. 1 in sector h, which covered the shallow remains of the original fill (ev. 2)]. Therefore, no occupation deposits could be detected on the outside, and even the ancient fill south of the bastion, which formerly covered the foundations, was washed away by erosion for the most part [in sector h, the shallow remains of such an original fill (ev. 2 and ev. 3) were found covering the virgin soil]. Therefore, a dating of the city wall from the outside has to rely on finds and samples stemming solely from the foundation layers. This evidence has to be compared with the results from inside the city wall, where the inner wall face was not traceable; however, a wall set against it as well as structures in front of it were excavated.

To give an overview of the finds in general, they are not well preserved due to the fact that they stem mostly from fill layers. Sherds of pre-Roman date were not found, and the earliest finds date to the late 1st or 2nd century AD. Inside the wall, a sequence from the Late Roman until the end of the Byzantine period was found, ending with the earthquake destruction in Umayyad times.

Building Phase 1 (Roman)
Outside the City Wall (Sectors G and H)

The wall was built in stepped sections from south to north on relatively steep terrain, sloping in a southern and western direction (**Fig. 18**). On the outside, the stone foundations under the walls and bastion are between 1.65 and 2.50 meters high and were set only in some places on the solid limestone rock, which was leveled in sector g (ev. Qg-12). However, as such bedding was only rarely available, they were mainly set on the softer virgin soil (ev. Qh-8). The stepwise building process is easily seen from the levels of the wall bases. The base of the wall (ev. Qh-7) south of the bastion starts at a level between 618.60 to 618.95m. asl., whereas the bastion walls (ev. Qh-6 and Qg-8) start between 619.00 and 619.30m. asl., and the wall (ev. Qg-9) north of the bastion starts at 620.80m. asl. Although the terrain could have been prepared all at once, this stepwise construction required the completion of the preceding parts, which seems to argue against an organisation involving contracted teams working simultaneously. It is obvious in sectors Qg and Qh that the bastion could not have been built before the southern wall (ev. Qh-7) was built, and that the northern wall (ev. Qg-9) was not erected before the bastion foundation (ev. Qg-14) was laid and the bastion was built on top of it. In addition, the foundations and surrounding area must have been backfilled before the walls and bastion were raised.

The stone foundations on the outside consist of quarry stones of different size and shape with soil in the interstices and partial wide gaps. In sector g, only the lowest fill layers set against the stone foundation were found undisturbed. The lowest layer (ev. Qg-11) was a more clayish-reddish soil, which covered the bedrock and filled the interstices of the foundation. A few pottery sherds, but no diagnostics, occurred only in the upper parts of this layer. Above this, a quite different fill layer of loose grey-to-whitish soil (ev. Qg-10) was found with some more pottery



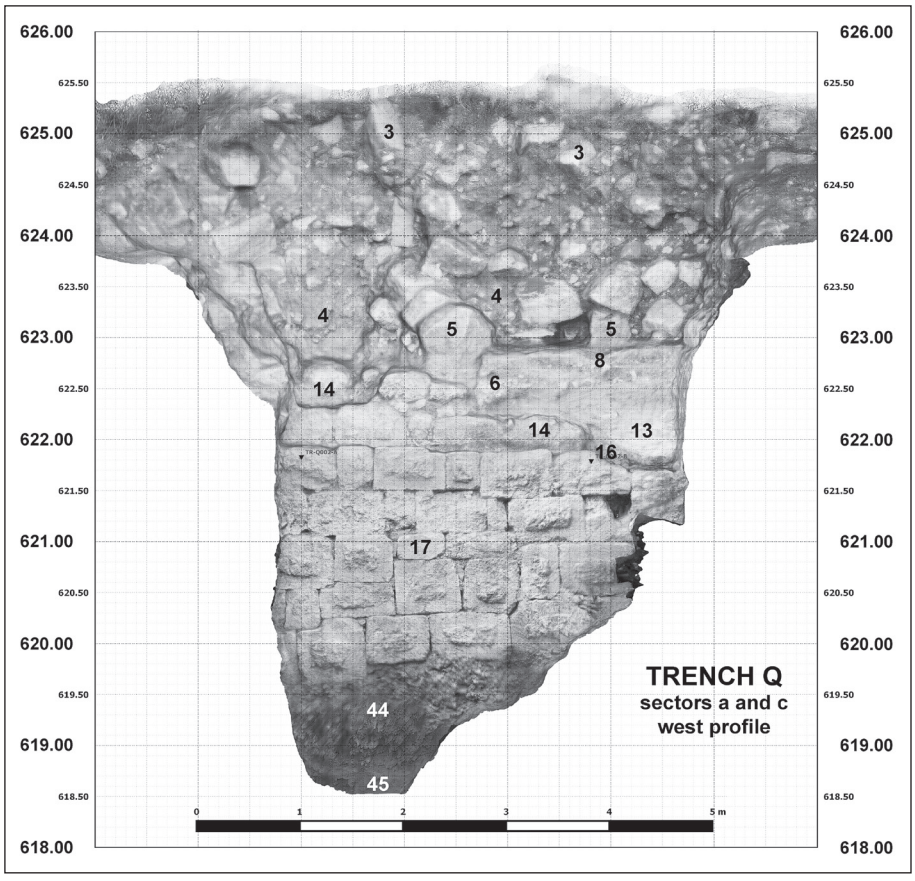
18. Trench Q, east profile of sectors g and h.

sherds, but again with hardly any diagnostic or datable material. In general, the sherds are quite small and worn. All layers above this contained modern waste. In sector h, the basal layer under the stone foundation consists of a very compact yellowish virgin soil (ev. Qh-8), without any anthropogenic residues. This was covered by a layer of clayish and reddish-to-brownish soil (ev. Qh-3), very similar to the lowest fill in sector g. Only the top of this layer held some small finds of Roman date. The most outstanding find was one fragment of a relief bowl of imported Gaulish tableware (pl. 5.37). In contrast to sector g, the next fill layer (ev. Qh-2) consisted of brownish soil with fist-sized stones and only few finds of Roman date, among them common ware, cookware and some tableware, mostly imported Eastern Sigillata A (ESA) of Early Roman date. A precise dating of these foundations is difficult due to the fact that most of the pottery sherds are undiagnostic and badly preserved. Nevertheless, the finds seem to be purely Roman. In addition, some samples were taken for both radiocarbon and optically stimulated luminescence (OSL) dating. The latter especially should yield a reliable date for the backfilling of the foundations. The results of the sample dating will be published soon in another report.

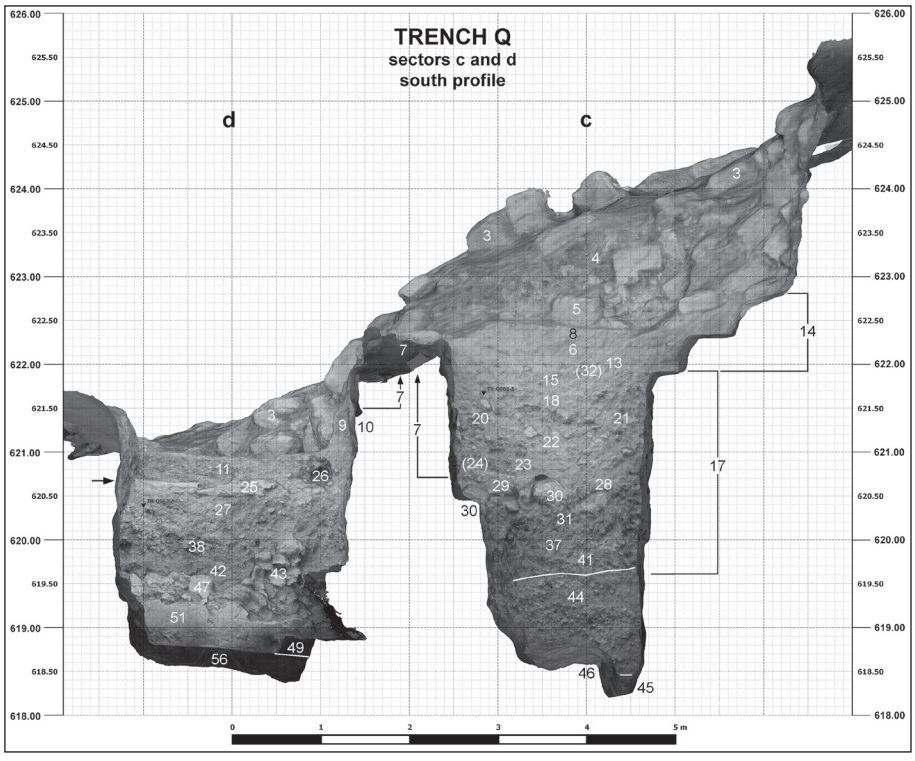
Since no undisturbed contexts were preserved of the time after the city wall was founded, later repairs and modifications are visible only on the wall faces. The wall (ev. Qh-7) south of the bastion shows signs of repair with smaller stones, and in the more southern part also modern restoration with cement. Only the stone fundament, as well as the first course of wall stones and the zone closer to the bastion, seem untouched by later alterations. On the outer face of the wall (ev. Qg-9) north of the tower, only an ancient repair is visible. A vertical line about 1 to 1.5 meters north of the tower indicates that parts of the upper courses seem to have been collapsed or removed, and that this part was filled later with smaller stones laid in irregular masonry. At the moment, it is not possible to date these ancient repairs.

Inside the City Wall (Sectors A-D and F)

Inside the wall in sectors a and c, a wall face (ev. 17) was unearthed with similar masonry - albeit of smaller stones - at a distance of about 1.4 meters in front of the reconstructed course of the inner wall face (see **Figs. 1, 19**) [The reconstruction of the wall course is based on the geodetic survey and the measured width of the wall]. It does not seem to be part of the city wall and could not be part of the bastion, since the wall face extends further north beyond the limits of the bastion. The parallel course and distance between the inner and outer wall faces seem to match best with a stairway leading up to the parapet walk, most probably from the north. Not only the masonry of the probable staircase is different, but also the foundation is not the same as that of the city wall. It was not built on the uneven bedrock surface (ev. 46) or the residual clay (ev. 45) in the depressions (**Figs. 19, 20**). Prior to construction, the area was covered with thick soil and gravel fill (ev. 44) to level the building ground, with the building stones being set directly onto this fill without a stone foundation. The lowest stone courses were protected by the fill layer (ev. 41), and this was covered by soil with a thick mortar layer (ev. 40) of a following phase, set from the east against the wall (ev. 17). As a result of the observation that the probable staircase was not founded on bedrock, and that it is neither part of the city wall nor of the bastion, and that it is not the oldest structure inside the city wall, contemporaneity cannot be deduced from the stratigraphy. A terminus post quem for construction in Roman times is assumed based on the pottery and C_{14} dating [Sample no. 23488 (J15-Qac-44-75), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1816±25BP, d13C (dual-inlet) -26.41±0.05, calibration curve IntCal13, 1σ 140-237AD, 2σ 128-314AD (128-254AD, 93,5%). Sample no. 23493 (J15-Qac-44-6), Institut for Fysik og Astronomi, Aarhus University (Denmark), C_{14} age 1819±26BP, d13C (dual-inlet) -22.83±0.05, calibration curve IntCal13, 1σ 140-235AD, 2σ 126-316AD (126-254AD, 93,4%). The wide range and similarity of both samples derives also from their position on a calibration plateau. The same goes for the sample no. 23492 (J15-Qd-11-37)] of the fill layer (ev. 44) and residual clay (ev. 45) between the second half of the 2nd and the first half of the 3rd century AD. The pottery mainly consists of local cooking- and tableware (pl. 3.21) and only a few items of



19. Trench Q, west profile of sector a and c.



20. Trench Q, south profile of sectors c and d.

imported tableware, exclusively Eastern Sigillata A (ESA) and an imported Roman lamp of unknown origin (pl. 17.99). The covering mortar layer (ev. 40) contained a small amount of similar Roman pottery (mainly tableware, also imported ESA, pl. 5.43). It is noteworthy that grey, worn body sherds occur in the same layers. This can be observed elsewhere in Roman

contexts of the same trench. Since the sherds are very small and differ in condition from others in the same contexts, they could be later intrusions; however, since they regularly occur, we also have to rethink the commonly accepted dating of the first occurrence of local grey ware and possibly shift the production date backwards into Late Roman times [since grey and orange ware consist of the same clay and temper, and colour is just based on different firing methods (see Merkel and Prange in this report), it is possible that a few kilns produced grey ware already in Late Roman times].

Similar to the situation outside the city wall, the southward-sloping terrain inside the wall is very steep and exposed to erosion. It therefore had to be protected by a retaining structure from the beginning, which seems to be the Roman period. The enormous soil body preserved in this place confirms that this structure is still intact or underwent reconstructions. This observation is important for the lowermost contexts unearthed in sectors d and f and for their relation to the long terrace wall.

Only 2 meters east of the staircase, the situation is different, because the lowermost structures unearthed in sector d [sector b was excavated only up to ev. 6 so as not to destabilise the wall (ev. 7)] are the remains of a podium-like structure and a built drain, and both rest on the worked bedrock surface (ev. 56, **Fig. 21**), and both are therefore older than the staircase. The rectangular pedestal (ev. 48) was made of boulders similar to the rustication masonry used for the city walls and the wall (ev. 17). Some of the smaller outer stones were set in mortar, as can be seen by the imprint of a missing block (ev. 55), and the outer face of the pedestal was coated with mortar (ev. 53). Only the lowest courses were preserved, and they were covered by a pile of similar boulders (ev. 42) and very loose soil (ev. 43). Above this, concentrations of smaller stones (ev. 39) and a large stone slab (ev. 34) were found. The more compact soil (ev. 52) east of the pedestal and under the stone fill was grey, deriving from disintegrating mortar coating. Since no traces of this pedestal were found in the neighbouring sector c, it was probably not longer than 2.5 meters and perhaps the same in width [because of safety concerns, it was not possible to follow this structure underneath the wall (ev. 7)]. Several interpretations are possible for a pedestal located east of the city wall but not fully parallel to it. Its non-exalted setting and its simple, bare construction seem to exclude prestigious functions. If one takes the position as well as the massive construction into consideration, an ephemeral constructional function cannot be ruled out. The trapezoidal stone slab (ev. 34) with two broad notches in its longer side, which was found above the pedestal - although not *in situ*, looks like the counterweight of perhaps a building crane. But this remains speculative.

After the pedestal was built, a drain (ev. 47) was constructed next to it (**Fig. 21**). A relative later construction date is attested by the fact that the north wall of the drain, consisting of small stones and soil, was set against the base of the pedestal. The drain leads from east to west towards the city wall, and its base was cut into the bedrock (ev. 56). The side walls consist of small- to medium-sized stones, set in soil, and the interior was coated with hydraulic mortar (ev. 51) and covered by flat stones. Because of the weakness of the side walls, the vicinity of the drain must have been backfilled and the

21. Trench Q, water drain (ev. 47) built against the pedestal (ev. 48), view from east.

drain itself covered to protect it. From this, it follows that the base of the pedestal (ev. 48) must also have been covered with a fill of at least 0.6 meters in thickness, corresponding to the thickness of the fill (ev. 44) below the wall (ev. 17) in sectors a and c. Although the drain could be traced only in sector d because of its course, it was possible to establish its straight continuation for about 3.5 meters in a westerly direction from the eastern edge of a covering slab in the southwest corner of the sector [this measurement was done with a laser rangefinder from inside the hollow space above the mud layer (ev. 49)]. At this point, the course of the drain turns downward or to the south. Although the measured distance is a little too short to reach the wall (ev. 17) and bends southwards, it would have run parallel to the wall. However, since the wall (ev. 17) rests on top of the surrounding fill (ev. 44), the drain was built prior to the wall. The absence of an outlet on the outside attests that the drain did not cross the city wall, arguing for a southern course alongside it. A thick mud layer (ev. 49) inside the drain and the skeleton of a rat document the last phase, before it fell out of use.

The dating of these structures, founded on bedrock and stratigraphically older than the wall (ev. 17), can be done based on radiocarbon dates and the pottery found in the fill layers (see above ev. 44 and ev. 45). The remains of the mortar coating (ev. 53) covering the pedestal (ev. 59) without any pottery finds is dated based on the radiocarbon date of a piece of charcoal, dating with greatest probability between 209 and 342AD [sample no. 23491 (J15-Qd-53), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1771±27BP, d13C (dual-inlet) -24.20±0.05, calibration curve IntCal13, 1σ 235-326AD, 2σ 142-342AD (209-342AD, 87,7%)]. Thus, an overlap of only 45 radiocarbon years is given with the older date for the fill (ev. 44) in the 2nd or 3rd century AD under the relatively younger wall (ev. 17). A piece of charcoal from the mortar lining (ev. 51) inside the drain (ev. 47), which was built after the pedestal, gives a remarkable earlier 14C date, namely one between 71 and 220AD [sample no. 23490 (J15-Qd-51-1), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1877±26BP, d13C (dual-inlet, extreme small) -23.96±0.05, calibration curve IntCal13, 1σ 77-208AD, 2σ 71-220AD]. The overlap with the pedestal mortar is only 11 radiocarbon years, and with the foundation fill of the wall (ev. 17), it is at least about 92 radiocarbon years. Although the data seem to contradict each other, they all meet in the first quarter of the 3rd century AD. The pottery finds, mainly tableware and common ware from the original fill (ev. 52) and destruction layer (ev. 42 and ev. 43) above it, do not contradict a Roman date in the 3rd century AD (pl. 6.53 and pl. 14.88). In sum, a date in the 3rd century AD is probable for all three structures - the pedestal, the drain and the staircase, although they were built one after the other. Since no direct connection exists, it is not yet clear if this date is valid also for the foundation of the city wall in sectors g and h.

Another structure built on bedrock is a retaining wall (ev. 57) in sector f, which seems to be the prolongation of the long east-to-west running terrace wall, visible on the surface (see **Fig. 1**). This sector had to be separated from the neighbouring sector d by a baulk under the younger clay water pipe (ev. 31, **Fig. 17**). The retaining wall (ev. 57) was built on top of a thin foundation of small stones (ev. 59) above a layer of compact clayish soil (ev. 61), which covered the bedrock (ev. 62). The bedrock in this place is unworked for the most part but shows traces of leveling next to and under the wall foundation. The upper part of the retaining wall (ev. 57) was badly eroded; hence, the upper fill layers and parts of the younger wall (ev. 7) are missing. The preserved part of the stratigraphy shows a simple sequence of successive fill layers. The lower fill, which was laid from the north against the retaining wall, was preserved. The lowest fill (ev. 61) runs under the wall foundation and the fill layer (ev. 60) against it, and both must be, if not the same, then at least contemporary with the backfill of the drain. The next layer is a thick fill (ev. 38) of brownish soil with flecks of disintegrated mortar, which runs against the retaining wall. This layer contains a medium-high quantity of pottery, mainly tableware, cookingware and few common ware items of Roman date, including an imported Kapitän II amphora.

In this fill, a 3-centimeter-thick, horizontal mortar band (ev. 58) was also found. Of this

layer, only the southern parts were encountered undisturbed in sector d, and there they cover the drain (see **Fig. 20**). This fill, therefore, belongs to filling activities after the construction of the pedestal and the drain, and is most probably contemporary with the lowest fill set against the Roman wall (ev. 17). Pottery finds were rare in the foundation (ev. 59) under the retaining wall and in the lowest fill layers (ev. 61 and ev. 60), but the sherds from ev. 60, consisting mainly of local table- and cookingwares, yield a Roman date. For this fill, a radiocarbon date is also available, and it ranges from 24 to 209AD [Sample no. 23489 (J15-Qf-60), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1907±28BP, d13C (dual-inlet) -23.38±0.05, calibration curve IntCal13, 1σ 71-126AD, 2σ 24-209AD (24-170AD, 93,6%)]. Although this date is somewhat earlier than the early charcoal from the mortar coating of the drain, there is still an overlap in the first quarter of the 3rd century AD. Since the foundation fill (ev. 60) of the wall (ev. 57) must run against the drain (ev. 47), both structures were connected. And since all other fills (ev. 41 and 38) are younger than the retaining wall (ev. 57), this simple structure must have been built in Roman times to retain the foundations and protect them from erosion. Taking into consideration that older and younger wood was used for the mortars, and that charcoal of similar diverse age found its way into the fill, it is possible that all structures described so far originate from the same construction process, which probably took place in the earlier 3rd century AD.

The results can be summed up as follows: First, the pedestal (ev. 48, ev. 53 and ev. 55) was built on the leveled and cut bedrock, and probably shortly after that, the water drain (ev. 47, ev. 51) was constructed next to it. These evidences did not contain any pottery. Immediately after that, the retaining structure (ev. 57, ev. 59) was set from the east against the city wall to retain not only the backfill of the drain (parts of ev. 38, parts of ev. 42 and ev. 52), but also the foundation fill (ev. 44) onto which the staircase (ev. 17) was built, as well as the fill (ev. 41) covered by the mortar (ev. 40). These fills had to protect the staircase foundation. All of these features display a logical sequence of building steps that can be related to the construction of the city wall in this area. But since the staircase (ev. 17) was set against the eastern face of the city wall and the connecting point of the city wall, and the retaining wall (ev. 57) could not be excavated, it is currently not possible to prove contemporaneity. Since the oldest structure, the pedestal (ev. 48) built on bedrock, seems to yield a radiocarbon date in the 3rd century AD, the other structures have to be contemporary or younger. This seems to be confirmed by the pottery of these contexts which consists mainly of local table- and cookingwares, and is not very well preserved. Although examples of the 1st and the 2nd centuries are present (ESA tablewares), pottery of the 3rd century AD (Kapitän II Amphora fragments) dominates.

Building Phase 2 (Late Roman)

Although the excavated part of the retaining wall (ev. 57) was most likely built in the 3rd century AD, the same wall seems also to be part of the retaining wall system which covers the southern slope of the Northwest Quarter, and which was built in Byzantine times as could be attested in the eastern trenches, L as well as N and O. It is therefore most probable that parts of the original backfill were disturbed by attaching new parts of the terrace walls. While the stratigraphic sequence in sectors a and c seems to be undisturbed, mirroring a detailed construction history, the stratigraphy in sectors d and f, but especially in sector d, seems to display such later disturbances apart from erosion (see **Fig. 20**). While only the upper fill layer (ev. 8) was washed away in sector b, about 1 meter of the upper stratigraphy is missing in sector d, and in the southernmost sector f, as much as about 2 meters are missing. In sectors a and c, the datable finds enable us to distinguish between seven successive building and filling phases, because the layers were protected from erosion by the wall (ev. 7) built in the second phase. In sector d, outside the protective wall, only the three earlier phases can be traced.

The second phase is one of the main building phases in this place, and the space between the walls (ev. 17 and ev. 57) was filled up to a high level, on which first a clay water pipe was constructed, and after that, a wall was built forming a room about 2.10 meters in width and more than 6 meters in length (see **Fig. 17**). For

the new building, the pedestal (ev. 48) was torn down in sector d, causing also the demolition of the eastern part of the water drain (ev. 47). The area was filled with the pedestal debris (ev. 42) and with soil layers (ev. 43, ev. 38 and ev. 27) of Roman date (see above). In sector f, the fill (ev. 38) was found running against the retaining wall (ev. 57) and was not clearly distinguishable from ev. 27 in its upper part. In sectors a and c, the fill (ev. 37 and ev. 31) above the former surface (ev. 40) corresponds with these filling activities, and it is most probable that both were also set against the retaining wall (ev. 57). On top of the corresponding fill in sector d (ev. 27, ev. 31 and the trapezoidal stone slab in ev. 34), the clay water pipe (ev. 33) was laid on a bed of compact mortar (ev. 25). A line of mortar spots and disintegrated mortar reached the wall (ev. 57). Since the clay water pipe is situated at the southern end of sector d and takes a northwest-to-southeast course, it could be traced only in sector d, but the curved stone cluster (ev. 30) in the southeast corner of sector c was found at the same level and could therefore belong to a more massive part of the water pipe foundation. Both the stone cluster (ev. 30) and the mortar bed (ev. 25) of the water pipe were covered by fills of varying thickness, onto which the wall (ev. 7) was founded. This wall was built against the retaining wall (ev. 57) and takes a northern course parallel to the older wall (ev. 17). Where the wall was unearthed, the bottom of its eastern wall face lies about 70 to 80 centimeters higher than the bottom of the western wall face and rests partly on a stone fill (ev. 10) [The foundation of the eastern wall is at an elevation of 621.40 to 621.50m. asl, and the western wall face at about 620.70m asl]. It is probable that the wall was constructed on diverse foundation levels in the vicinity of the water pipe with the aim of protecting it from pressure and minimising the filling effort by integrating the pedestal debris (ev. 42 and ev. 43).

The western face of the wall (ev. 7) rests only 5 centimeters above the top level of the stone slab (ev. 34) on top of the debris and the top of the mortar coating (ev. 25) of the water pipe [the top level of both is about 620.65m asl.]. Inside the new room, created by the walls (ev. 57, ev. 17 and ev. 7), two horizontal lenses of compact mortar (ev. 28) indicate a surface or floor level on top of the foundation fill (ev. 29), consisting of Roman pottery, mainly local tableware and cookware with traces of fire use. The surface outside the room must have been at a higher level, because the water pipe and wall foundation (ev. 10) must have been covered to be protected. Of this fill, only the lowest part remained undisturbed, because in the fill (ev. 11) some Late Byzantine sherds were found among mainly Roman pottery (pl. 6.50).

Outside the room, a Roman cooking pot with pinched handles (ev. 26; pl. 1.3) was found on top of the water-pipe mortar coating (ev. 25), lying on its side and embedded into the lowest part of the fill (ev. 11, **Fig. 20**). On top of the surface inside the new room, a very similar cooking pot, but with oval handles (ev. 24; pl. 1.1), was deposited in an upright position against the lowest stone course of the wall (ev. 7, **Fig. 22**). Both vessels are similar to the specimens discovered in 2012 in Trench A, and their surfaces were also charred. Since the newly found vessels were deposited in the same building process, and both were physically linked to specific structures, an interpretation as foundation deposits is most likely. Deposited cooking

22. Trench Q, cooking pot deposit (ev. 24) at the bottom of the wall (ev. 7), view from west.

pots have already been found in earlier excavations along the city wall (*cf.* Kehrberg and Manley 2003: 84) and have been discussed lately by Lichtenberger and Raja, with special reference to three finds in Trench A from 2012 (Lichtenberger and Raja 2015b).

A firm dating of this building phase is given by the Roman cooking-pot deposits, probably of the 3rd or 4th century AD (ev. 24 and ev. 26) on both sides of the wall (ev. 7). A charcoal sample from the undisturbed soil (ev. 11) which has been in contact with the cooking pot (ev. 26) yields a date between 86 and 240AD [Sample no. 23492 (J15-Qd-11-37), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1842±27BP, d13C (dual-inlet) -26.24±0.05, calibration curve IntCal13, 1σ 133-214AD, 2σ 86-240AD]. Although this date confirms a Roman age for this building process, it is too early compared with the charcoal from the foundation deposit (ev. 44) under the staircase (ev. 17), built in the first phase, and it can only be seen as a terminus post quem for the deposits. A charcoal sample taken from the mortar coating (ev. 25) of the pressure water pipe supports an early date (between 65 and 216AD) [sample no. 23926 (J15-Qd-25-PP3, B-sample), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1884±28BP, d13C (dual-inlet) -25.36±0.66, calibration curve IntCal13, 1σ 72-205AD, 2σ 65-216AD] and thus contradicts the dating of the first phase, since the fill layers (ev. 38 and ev. 27) underneath the water pipe contained purely Roman pottery [A Late Roman copper coin (J15-Qd-38-26) struck around 400AD or slightly earlier could be intrusive].

The dating evidence inside the new room is scarcer but seems to attest a Late Roman date for the second building phase. Among Late Roman pottery in the fill and foundation layers (ev. 37, ev. 31 and ev. 29) - mainly local table- and cookingwares, with the exception of one ESA body sherd and a small fragment of a Roman lamp - only one coin (J15-Qac-37-13) of probable Late Roman date was found, as well as an earring of copper alloy (pl. 25.159).

Building Phase 3 (Early Byzantine)

This and the next phases are attested only west of the wall (ev. 7). This space was filled (ev. 23 and ev. 22), and a new floor consisting of soil (ev. 10 and ev. 21) and mortar (ev. 19) was established on a higher level between the walls (ev. 17 and ev. 7). Joints between the pottery sherds in ev. 19 and ev. 20 prove that they belong together. The few finds are of Late Byzantine/Early Umayyad date, including an import of a Late Roman Amphora 1 (LRA 1) and a local Byzantine cooking pot, but they mainly consist of local tableware. The finds from the fill layers below (ev. 22 and ev. 23) enable us to date the foundation of the new floor to the Early Byzantine period. The Roman cooking pot (ev. 24, pl. 1.1) remained untouched but was backfilled, as is attested by small Early Byzantine sherds in the layer (ev. 23). The layer (ev. 22) under the new floor level contained Roman to Early Byzantine pottery, mainly tablewares, a noteworthy high amount of common ware, mainly basins and some cookingwares of local or regional production, but also some imported finds, such as a fragment of a Kapitän II Amphora. African Red Slip (ARS) tableware, type Hayes 91B, produced in the first half of the 5th century is the youngest find in the fill. A late Roman coin (J15Qc-22-2) was also part of the fill. In the floor, only few and worn fragments of probably Byzantine date were found. It seems that the raising of the floor level took place not too long after the second phase.

Building Phase 4 (Byzantine)

In this phase, the floor between the walls was raised again (ev. 17 and ev. 7). For this, the space was filled (ev. 18), and a new thin mortar surface (ev. 35) was laid. In the fill layer (ev. 18), Byzantine pottery of the 6th century AD was found, consisting of a high amount of tablewares, and a few cooking- and commonware items, all of local or regional production.

Building Phase 5 (Late Byzantine)

In the fifth phase, substantial alterations took place. The upper part of the staircase (ev. 17) was removed, and the stone foundation (ev. 16) was laid on top of the older wall (ev. 17) for a new wall (ev. 14), which was built further to the south, directly on top of the old wall (see **Fig. 19**). Above the floor of the fourth phase, a fill layer (ev. 15) was found between the old wall (ev. 7) and the new wall foundation (ev. 16). The new about 6-centimeters-thick floor (ev. 32)

was laid onto this fill between the old and the new walls (ev. 7 and ev. 14). In this floor, very few and worn sherds were found; worth mentioning is a piece of Late Roman C (LRC) tableware and a piece of common ware. According to these finds, the phase has to be dated in the Late Byzantine period. The foundation fill (ev. 15) contained larger amounts of pottery and a coin (minimus, J15-Qa-15-8) stemming from the 6th century AD at the latest. Outside the room, the layer (ev. 11) was covered by the thick fill layer (ev. 9) and the layer (ev. 6) with a high amount of pre-Umayyad pottery mixed in date from Roman to Late Byzantine times - mainly local tableware, however with an imported LRA 1 amphora (pl. 16.94). The same layer (ev. 6) was found in sectors a and c inside the room, where it belongs to the sixth building phase. It is therefore probable that the long terrace wall east of the trench was attached at some point between the fourth and the fifth building phases.

The Late Byzantine contexts in Trench Q contain mostly mixed and worn finds. Pottery of the 6th century AD dominates, although some earlier sherds are also present. Common ware is rare as are imports. The composition of functional groups in this and the preceding phase is very similar, as table- and cookingwares clearly dominate. The next phase, however, is characterised by having more common wares.

Building Phase 6 (Umayyad)

In this phase, the area in front of the city wall was completely altered. The space west of the wall (ev. 7) was backfilled again (ev. 13) up to the two lowermost courses of the wall (ev. 14). This wall, which was only built in the preceding phase, was broken down to the lowermost courses, as was the older wall (ev. 7). Part of the debris (ev. 12) of the younger wall (ev. 14) were integrated into the fill (ev. 13) or covered by the fill layer (ev. 6) (see **Fig. 19**). The debris of the wall was also embedded into the fill (ev. 6), but due to erosion, it is preserved only in sector c (see **Fig. 17**). This filled and leveled area east of the city wall and north of the retaining wall (ev. 57) was then covered with a simple clay surface (ev. 8), most probably to create an even space on top of the long terrace wall. Umayyad pottery found in the fill layer (ev. 13) proves that these alterations took place in Umayyad times. In accordance with characteristics of later fills, common wares occur in very high quantity, especially large basins used as table- and cookingwares. The shift from low to high quantity of grey-ware basins seems to be typical for Umayyad contexts (*cf.* Trench P).

Phase 7 (Umayyad, 749AD)

The last event that can be traced in Trench Q is the collapse of the city walls. The stones (ev. 5) and the core fill (ev. 4) of the city wall were found fallen on top of the Umayyad soil surface (ev. 8, **Fig. 19**). This kind of collapse seems to have been caused by a heavy destructive event. According to the dating of the surface (ev. 8), it is most probable that the devastating earthquake in the year 749AD caused the destruction. The upper sections of the wall debris (ev. 2 and ev. 3) were disturbed in modern times, and contaminating modern material was found in parts of the soil collapse (ev. 4).

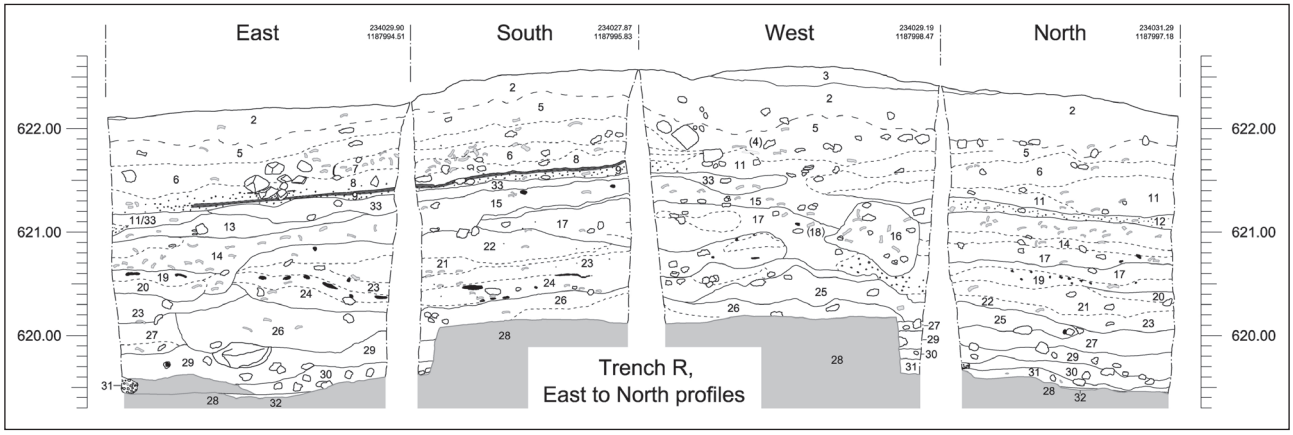
Trench R

For this trench, a square of 3.0 by 2.5 meters was opened just 1 meter east of Trench G, which was excavated in 2013 (see **Fig. 1**) [Trench supervisor was Sören Pfeiffer. For the results of Trench G, see the preliminary field report on the third season: Kalaitzoglou *et al.* 2018]. The main aim of working in this area again was to investigate a detailed soil stratigraphy for geochemical sampling, which provides insight into the environmental history and possible agricultural activities on the northern slope of the hill. In spite of the proximity to the area already excavated, the situation met in Trench R differs in some respect to the 2013 discoveries, and only a few of the known features appeared in the new trench, although a chronological composition of finds was found, with modern material in the top layers and Roman material in the lowest part of the stratigraphy. However, especially traces of human activities were sparse, and none of the short terrace walls were found.

Some structures and features can be assigned to human activities. Two succeeding mortar layers (ev. 9 and ev. 12) were unearthed, which are divided by a layer of brownish soil (ev. 11 and ev. 33). On top of the lower mortar surface (ev. 12), a heap of bigger stones (ev. 10) was intentionally deposited in crescent shape, against

which the upper mortar surface was set. As the mortar did not cover the heap completely, it seems to be a more accidental ensemble than a functional structure or part of a lane. Nevertheless, the upper mortar layer (ev. 9) can be linked with the compact mortar surface of a lane or a simple road, which was discovered in Trench G at a slightly higher level. The only additional feature that could be anthropogenic is a concentration of charcoal (ev. 18) found below the lower mortar layer. This round place contained fragments of bones and iron and was situated on top of a soil layer with bigger stones (ev. 19), and it was encircled by a compact soil layer (ev. 17), which contained pottery and more worn bone fragments, especially concentrated in the northeast corner of the trench (ev. 16). The charcoal indicates that this place is of Roman date (ev. 18, 86-240AD) [Sample no. 23934 (J15-Rac-18-2), Department of Physics and Astronomy, Aarhus University (Denmark), C_{14} age 1842±28BP, d13C (dual-inlet) -19.15±0.05, calibration curve IntCal13, 1σ 132-215AD, 2σ 86-240AD (115-240AD, 89,3%)], and it contained a bronze weight of Roman or Byzantine origin (pl. 24.151). Nevertheless, in the underlying layer (ev. 19), early Byzantine pottery was present. Even the bedrock, although situated only 1 meter east of Trench G, differs significantly from the soft and yellowish virgin soil found in 2013. The bedrock (ev. 28) in Trench R was reached about 2.5 meters under the surface and consists of a solid brownish variety of the limestone, which is fractured vertically into pieces of brick size with veins of softer yellowish lime in the interstices. Towards the northeast, the rock is limited by a vertical step of up to half a meter in depth (**Figs. 23, 24**). This natural depression is filled with a rather loose reddish-to-brownish residual clay (ev. 32), which contained no finds. Although this kind of soil is a natural weathering product of the lime rock, its loose consistency most probably derives from dislocation. The surface of the brownish rock is even and lies at an elevation between 620.13 and 620.16m asl. This is only up to 0.3 meters below the uneven surface of the virgin soil in Trench G (sectors b and d) and about 0.45 meters below the top of the solid rock in sector f of the same trench. Therefore, the main erosion direction in this place had to follow the bedrock surface from west to east. Consequently, the softer virgin soil, present in Trench G, was washed away in the same direction. This explains the channels and depressions cut into the surface of the virgin soil and leads to the conclusion that, since the virgin soil bears traces of erosion, original or older deposits had been washed away. Younger material accumulated above the bedrock only after the erosion had been stopped or decelerated east of the trench. Trench R, on the one hand, confirms the geological diversity of the northern slope beyond the rock cliff, a characteristic already noticed in Trenches G, I and M; on the other hand, it shows that the conjunction of soft and solid rock intensifies the effect of erosion.

The profiles (**Fig. 23**) clearly show that the erosion followed the bedrock surface. The thin layers (ev. 31 to ev. 27) accumulated beyond the rock step, since the depression functioned as a trap for stones as in ev. 30. After heavier erosion events, the direction of erosion shifted from time to time in a more northerly as well as in a southerly direction. Especially the layer (ev. 24), which is rich in botanical material, indicates that the main inclination has shifted at some point from east to south and later in an



23. Trench R, drawing of the profiles.

24. Trench R, bedrock and east profile, view from west.

easterly direction again (**Fig. 24**). In the west and east profiles, an irregular formation of the stratigraphic sequence and erosion unconformity is visible. This is rather typical for sections cut against the direction of the erosion. Similar limited lenses, filled flutes and gullies deriving from erosion events were already visible in Trench G. In contrast to this, the south and north profiles (**Fig. 23**), both nearly oriented in the direction of the erosion, show a slightly inclining and almost undisturbed sequence of mostly thin layers. This sequence of thin layers with well-defined limits starts underneath the mortar layers (ev. 9 and ev. 12) [In trench G a very similar sequence was met on almost the same level starting with evidence J13-G-22]. Plowing would have completely mixed up the soil body and destroyed the limits of the deposits. Therefore, it is unlikely that tillage took place in Trenches G and R underneath the mortar layer (ev. 9), although the accumulated soil could stem from agriculture. Above the mortar surface, the soil is mixed up, probably as a result of plowing in modern times.

The conclusion based on the 2013 season could thus be refined, in that the numerous strata found between the ground surface and the bedrock result in the upper parts being attributable to mostly anthropogenic effects, whereas the areas closer to bedrock seem to result from natural processes of erosion and aggradations. Since the youngest finds identified so far in the lowest layers of Trench G probably stem from Byzantine to Islamic times, the structures unearthed above them must be younger, and the finds of Roman date in Trench G as well as in Trench R could be later intrusions, even though there is no evidence of Islamic pottery in the lowest layers of Trench R. In Trench R, the rock depression seems to have functioned as a trap, not only for stones but also for old soil and finds. This suggests that pre-Islamic surfaces must have been washed away by erosion in an eastern direction. A possible source of the Late Roman material dominating the lower layers in Trench R and Trench G is the building structures of most probably Late Roman date visible in the magnetogram northwest of Trenches G and R (see Kalaitzoglou *et al.* 2012: fig. 2, fig. 3 and fig. 7).

The finds of Trench R in general are worn and not very well preserved, due to erosion events and accumulation processes. This clearly distinguishes them from the better-preserved finds in the other trenches. In general, only a few diagnostic sherds were found, mainly tableware, some cookingware fragments and amphorae of local production. Only some imported tableware (pl. 5.40-42, 44, Eastern Sigillata A) and amphorae of the types Kapitän II and Almagro 50 were found, as well as three coins and a few pieces of glass and metal.

The earliest pottery was found in the lowest layers and was of Early Roman date (pl. 3.19, goblet) but the majority originated from the 2nd and 3rd centuries AD. The youngest material can be dated to Late Byzantine/Early Umayyad times, and the uppermost layers (ev. 1-3) held some modern finds.

While the upper layers (ev. 4-12) are mixed with Roman and Byzantine-to-Umayyad material, containing fragments of a Byzantine/Late Roman amphora, as well as small sherds of Roman Kapitän II and Late Roman/Early Byzantine Almagro 50 amphorae. In the same layers, chronologically heterogeneous coins were found, such as a Nabataean example (J15-Ra-11-2, Aretas IV), a Byzantine minimus (J15-Ra-5-3) and also an iron fitting of Roman or later date (pl.24.148). From ev. 13 downwards, the Umayyad material disappears, and the layers consist mainly of Byzantine pottery mixed with Roman material (ev. 13-20). A small Roman or later bronze bell (pl. 25.158), as well as a small bronze weight (pl.24.151) of the same date, were found in the same layers. The lower layers (ev. 21-30) seem to have purely Roman material (cookingware: pl. 1.4 and 6; imported tableware: pl. 5.40-42, pl. 44; and local tableware: pl. 3.19, pl. 5.35-36, pl. 6.55). A Roman coin (J15-R-25-1, Caracalla or Elagabalus) and

a radiocarbon date from one of the lowest layers (ev. 30) confirm a Roman date [A charcoal sample from ev. 30 yields a very early date between 45BC and 66AD. Sample no. 23935 (J15-Rabd-30-4), Department of Physics and Astronomy, Aarhus University (Denmark), C^{14} age 1990±26BP, d13C (dual-inlet) -22.33±0.06, calibration curve IntCal13, 1σ 37BC-51AD, 2σ 45BC-66AD].

Archaeometric Analysis of Ceramics from Jarash

Stephen Merkel and Michael Prange

Introduction

The documentation of material characteristics of the pottery from Jarash is important to explore a variety of archaeological questions regarding production, technology and trade. A selection of sherds was sampled for ceramic petrography and for quantitative elemental analysis in order to characterise local types of ceramic and identify fabric types that may have been imported. The analysed sherds are listed in more detail in the catalogue. All sherds have also been drawn and are shown on the plates (**Table 1**). Additionally, a study of the firing properties of the ceramics was carried out to relate the range of colours (grey, orange and red) represented in the main fabric group.

Table 1: List of samples and plates.

Sample No.	Cat. No.	Type	Plate
1	J14-Je-77, 1037	GW	Pl. 8.60
2	J14-Je-77, 1017	GW	Pl. 10.69
3	J14-Je-77, 1030	GW	Pl. 9.67
4	J14-Je-77, 1088	OW	Pl. 2.17
5	J14-Je-77, 1087	OW	Pl. 2.16
6	J14-Je-61, 1112	OW	Pl 1.5
7	J14-Je-77, 1107	OW	Pl. 2.14
8	J14-Je-77, 1070	OW	Pl. 13.81
9	J14-Je-77, 1051	OW	Pl. 2.11
10	J14-Je-77, 1052	OW	Pl. 1.7
11	J14-Je-77, 1079	OW	Pl. 6.54
12	J14-Je-77, 1059	OW	Pl. 2.10
13	J14-Jc-68, 1000	OW	Pl. 13.83
14	J14-J-77-1	OW	Pl. 4.31
15	J14-Jc-61, 1130	RW	Pl. 6.51
16	J14-Jc-61, 1113	RW	Pl. 1.2
17	J14-Jc-61, 1123	F	Pl. 2.12
18	J14-Je-77, 1066	F	Pl. 13.80

1. Thin Section Analysis

In order to characterise the mineralogy of ceramic fabric, a total of 18 thin sections were prepared at the German Mining Museum, Bochum, for polarised light- and scanning electron microscopy. Reflected and transmitted light microscopy was performed on a Zeiss Galaxy Axiophot microscope with the capability of 2.5 to 40 times magnification. A Zeiss Gemini scanning electron microscope with a Thermo UltraDry Silicon Drift X-ray Detector (EDS) was used for imaging and for semi-quantitative elemental analysis with the purpose of mineral identification.

1.1 Ceramic Fabrics and Nonplastic Inclusions

Under the microscope, the base clays of all sherds appear to be non-micritic, though calcareous inclusions are often present, and the paste of sample 16 is notably reddish, due to the presence of substantial amounts of iron oxide. The ceramic fabric contained numerous inclusions of different types. The categories include quartz/feldspar, calcium carbonate, argillaceous inclusions, iron oxides, ferromagnesian silicates, and mica (**Table 2**). The inclusions were classified by their size, shape and frequency. For the classification of particle sizes of silt and sand, the USDA standard was used.

1.1.1 Quartz and Feldspars

Quartz is the most common inclusion type in all the ceramic fabric sampled from Jarash. For 17 of the 18 sherds, the particle sizes range from silt (0.005-0.05mm) up to coarse sand (0.6mm), and in sample 3, they can be up to 2mm, but in all sherds, the largest fraction by volume is between very fine sand to medium-sized sand (50µm-200 µm) (**Table 3**).

The grains typically have a low sphericity and are sub-angular to sub-rounded. In addition to quartz, feldspars were identified, which show similar characteristices in terms of size and morphology. Feldspars ranging from othoclase and microline to plagioclase could be found, but feldspars are infrequent in relation to quartz with a ratio of less than 1:10.

1.1.2 Calcium Carbonate

Calcium carbonate was identified in all samples, except for 16, 17 and 18. All sherds experienced some post-depositional effects, such as the crystallisation of calcium carbonate on the exterior surfaces and in the porosity, and an ef-

Table 2: Breakdown of types and frequency of inclusions in the ceramic samples identified by petrography. The estimation of the percentage of quartz and calcium carbonate was aided through ImageJ software using both SEM backscatter and cross polarized microscopy images.

	Quartz (vol.)	Calcium Carbonate (vol.)	Argill. (mm)	Iron Oxide (mm)	Ferro-Magnesian (mm)	Mica (mm)
1	22%	4%	<1	<0.2	Rare <0.05	Rare <0.05
2	26%	5%	<0.3	<0.05	Rare <0.05	Rare <0.05
3	19%	9%	<0.6	<0.05	n.d.	Rare <0.05
4	14%	2%	<0.3	<0.05	n.d.	Rare <0.05
5	11%	2%	<0.3	<0.05	n.d.	Rare <0.05
6	10%	2%	<0.2	<0.05	Rare <0.05	Uncommon <0.1
7	18%	2%	<0.2	<0.1	n.d.	Rare <0.05
8	12%	2%	<0.2	<0.05	n.d.	Rare <0.05
9	34%	2%	<0.2	<0.1	Rare <0.05	Rare <0.05
10	21%	2%	<0.4	<0.1	Rare <0.05	Rare <0.05
11	24%	2%	<0.3	<0.05	Rare <0.05	Rare <0.05
12	18%	2%	<0.3	<0.1	Rare <0.05	Rare <0.05
13	9%	5%	<0.4	<0.1	n.d.	Very Rare <0.05
14	16%	3%	<0.6	<0.1	Rare <0.05	Rare <0.05
15	26%	4%	<0.3	<0.05	Rare <0.05	Uncommon <0.05
16	24%	0%	<0.2	<0.05	Common <0.07	n.d.
17	29%	0%	<0.2	<0.05	Rare <0.05	Common <0.1
18	18%	0%	<0.2	<0.05	Rare <0.05	Uncommon <0.1

Key: Very Rare <4 instances per slide, Rare <15, Uncommon <30, Common – one visible in every 7mm^2 frame. N.D. is not detected.

Table 3: Particle size distribution of quartz inclusions in the ceramic samples. The values represent area percentages of a field of 7.4 mm^2. The distibutions show highest concentrations between 50µm and 200µm.

	5µm-20µm	20µm-50µm	50µm-100µm	100µm-200µm	200µm+
1	2.1	5.1	5.6	7.6	1.5
2	1.0	2.4	4.9	14.6	3.2
3	1.5	2.5	1.9	11.5	1.5
4	1.2	3.2	6.0	3.2	0.5
5	0.7	2.3	5.9	1.6	0.5
6	1.0	1.9	1.8	4.9	0.4
7	0.9	2.3	7.4	7.1	0.3
8	0.9	1.9	3.6	5.3	0.4
9	1.1	4.2	14.6	13.8	0.3
10	2.0	5.7	7.0	5.9	0.4
11	1.9	6.0	6.6	8.6	0.9
12	1.6	3.4	8.5	4.0	0.4
13	0.5	1.0	3.6	3.6	0.3
14	0.7	1.0	4.0	10.0	0.3
15	1.6	3.9	13.3	5.8	1.4
16	1.9	4.6	5.6	11.2	0.7
17	3.5	10.4	7.4	6.8	0.9
18	0.7	2.4	7.8	6.9	0.2

fort was made to distinguish this secondary calcium carbonate from the inclusions that appear to have originally been in the ceramic.

The calcium-carbonate inclusions are nearly always sub to well rounded and consist of micrite, but in sample 3**,** fragments of shell were found, in addition to the rounded inclusions. The shell fragments in sample 3 mostly consist of micrite, but aragonite is still preserved in some of them. The micrite inclusions tend to follow the particle-size distributions of quartz, with the highest frequency in the range of 50 µm to 200 µm; however, samples 1 and 3 have larger inclusions of up to 1mm. Silt- and sand-sized inclusions are particularly common in samples 3 and 13.

The majority of the calcium-carbonate inclusions are rounded micrite grains and are probably physically weathered limestone. Since they correspond to the quartz-silt and sand-sized grains, it can be assumed that they entered the clay together, but there is variability in the proportion of quartz to micrite. Some sherds, such as sample 9, have substantially more inclusions, while others have relatively few. In sample 3, seeing that the ceramic was fired under mildly, but not strongly, reducing conditions, the presence of aragonite shell fragments is an indication that the ceramic was not heated above ca. 850°C; otherwise, the original shell structure would have decomposed and recrystallised as micrite.

1.1.3 Argillaceous Inclusions

Argillaceous inclusions are common in the ceramic samples, and nearly all can be described as 'clay pellets' according to Whitbread's definition (Whitbread 1986). They are typically spherical and contain silt-sized inclusions of quartz and/or micrite. There are fissures and voids surrounding the argillaceous inclusions, indicating that a certain amount of shrinkage occurred. There are colour differences between the argillaceous inclusions and their surrounding ceramic matrix. In most sherds, they are darker than the matrix, due to their density, but in the sherds that witnessed highly oxidising firing conditions, the inclusions can be reddish-orange with a more intense colour than the matrix. A sampling of pellets from samples 3 and 16 show that there is variability in the composition, with some pellets displaying compositions very close to the ceramic matrix and others having higher alumina and lesser calcium oxide, like the inclusion in **Fig. 25**, indicating that it is richer in clay than the matrix. Others have higher iron-oxide contents with a silica to alumina ratio comparable to the ceramic matrix.

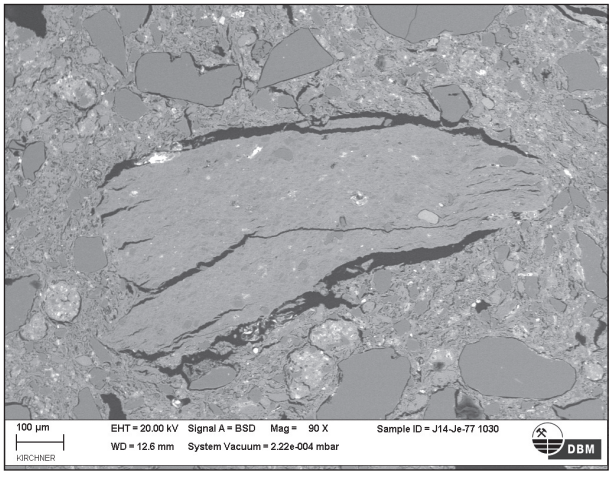
This type of inclusion also has a particle-size distribution like quartz, and most of the pellets are in the range of 50 µm to 200 µm, and larger inclusions are relatively common. Samples 1 and 3 tend to have larger inclusions and thus also have larger clay pellets. It can be argued that the clay pellets were naturally in the clay used for the ceramics.

1.1.4 Iron Oxides and Other Opaques

Iron oxides were easily visible, due to their high reflectivity under the reflected-light microscope. However, with the SEM, it was determined that not all the highly reflective inclusions were simple iron oxides; ilmenite (titanium iron oxide) inclusions were often encountered. Chromites containing iron oxide, magnesia and alumina were detected by the SEM in sample 16. Silt-sized opaque particles were detected in all sherds and are clearly of the same origin as the clay. Sand-sized opaques were less common, and they tend to not be larger than 100 µm. Sample 3 has a 0.5-mm fragment of iron oxide with the visual characteristics of hammer scale, a waste material from iron smithing.

1.1.5 Ferromagnesian Silicates

These types of minerals were detected by polarised-light microscopy and were confirmed with the SEM. Small, typically silt-sized inclusions of ferromagnesian minerals were identi-



25. Argillaceous rock fragment in sample 3. The rock fragment is dense with little porosity and contains silt-sized inclusions of quartz and iron-titanium oxides.

fied in about half of the slides. The most common minerals have a blue-green or green-brown pleochroism. Alumosilicates containing calcium, iron, and magnesium have similar compositions to hornblende. Ferromagnesian minerals are slightly more common in sample 16. The minerals either have a green-brown or green-pink pleochroism and may be hornblendes and orthopyroxenes, respectively.

1.1.6 Mica

Silt-sized grains of muscovite were found in all samples, except for sample 16. Muscovite could be easily identified, due to its sheet-like structure and its birefringence colours. It was only common in sample 17, which clearly differentiates this ceramic from the others.

2. Elemental Composition

The eighteen samples were analysed by inductively coupled plasma mass spectrometry, using Thermo Scientific Element XR to measure the major-, minor-, and trace-element concentrations. Analyses were performed with liquid solutions prepared from pulverised samples. Samples were crushed using steel implements and milled using an agate ball mill. The digestions of silica-bearing samples (ore, slag and crucibles) had been carried out with a μPREP-A™ microwave, using concentrated acids. The sample size was 100 mg of pulverised material. The sample material was digested in PTFE pressure vessels with a mixture of concentrated acids (6ml HCl: 1.75ml HF: 4.8ml HNO3) for forty minutes at 250°C. Finally, digestions had been diluted with ultra-pure water up to 100ml.

For main-element analysis, sample solutions had been diluted 1:100 and for traces 1:10 with 5 percent HNO_3 solution. The analyses were carried out with a FAST SC-system, ST 5532 PFA μ-FLOW nebulizer, a Peltier-cooled PFA spray chamber and a 1.8-mm sapphire injector in triple detector mode at all three mass resolutions (m / Δm), depending on the elements of interest. In all, the concentrations of 51 elements were measured, and 21 of the most important elements are listed in **Table 4**. The values are consistent with those presented by Uscatescu (Uscatescu 1996: 210), with the exception of higher values of strontium and lower cobalt contents in the samples from the Danish-German Northwest Quarter Project.

Table 4: ICP-MS results of ceramics from Jerash and four geologic samples.

Sample	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	MnO	SrO	P_2O_5
1	66.5	15.6	5.27	6.10	1.80	0.22	1.82	1.38	0.069	0.028	0.18
2	63.7	16.7	4.58	7.12	1.61	0.23	2.36	1.24	0.063	0.025	0.21
3	56.7	12.4	5.17	13.1	1.92	0.35	2.86	0.89	0.087	0.027	0.26
4	74.2	12.4	3.83	4.10	1.41	0.29	1.12	1.54	0.063	0.023	0.13
5	68.8	21.1	4.61	3.91	1.54	0.32	2.01	1.60	0.059	0.030	0.15
6	77.1	16.4	4.92	5.31	1.51	0.28	1.61	1.63	0.072	0.025	0.21
7	80.5	15.0	4.27	2.84	1.47	0.25	1.40	1.59	0.065	0.021	0.12
8	76.7	16.5	3.92	3.64	1.47	0.29	1.67	1.53	0.054	0.026	0.12
9	57.1	14.4	4.01	2.73	1.24	0.17	1.37	1.45	0.055	0.020	0.14
10	67.8	18.6	4.30	3.00	1.33	0.20	2.07	1.56	0.057	0.025	0.16
11	74.3	15.9	3.95	3.56	1.50	0.31	1.76	1.50	0.055	0.025	0.12
12	69.2	18.7	4.54	3.23	1.37	0.21	1.89	1.66	0.062	0.025	0.14
13	56.4	14.6	5.21	12.3	1.82	0.29	1.86	1.13	0.080	0.024	0.18
14	63.9	18.4	5.66	6.07	1.84	0.26	1.68	1.43	0.077	0.027	0.17
15	65.6	16.0	5.16	7.13	1.37	0.29	2.38	1.38	0.084	0.026	0.20
16	70.0	16.4	8.13	1.63	1.28	0.34	1.52	1.69	0.140	0.012	0.12
17	81.5	21.5	3.78	2.05	1.25	0.25	1.59	1.91	0.050	0.032	0.14
18	75.4	26.0	4.22	0.86	0.98	0.18	1.65	1.68	0.041	0.033	0.12
37	9.9	2.97	2.70	46.0	0.90	0.044	0.63	0.24	0.037	0.069	0.071
39	8.8	3.09	0.87	41.1	0.98	0.037	0.58	0.19	0.017	0.054	0.043
40	7.5	2.49	0.70	49.1	0.95	0.031	0.41	0.16	0.026	0.049	0.048
41	8.1	3.04	0.83	54.3	0.89	0.036	0.33	0.14	0.010	0.086	0.060
42	4.0	1.29	0.48	56.4	0.72	0.051	0.23	0.06	0.015	0.082	0.095
all amounts given in wt.%											

Sample	Co	Cr	Ni	V	Zn	Ce	Nd	Sm	Gd	Th	Zr
1	17	115	44	143	58	107	44	7.9	7.0	15	209
2	14	108	44	138	58	96	40	7.7	7.0	12	158
3	17	109	54	122	61	63	28	6.0	5.6	6.6	129
4	15	99	42	109	62	94	35	7.2	6.3	13	230
5	15	128	48	147	68	123	46	8.9	8.0	16	183
6	16	115	62	132	83	103	39	7.7	6.5	13	165
7	13	104	39	108	66	95	38	7.1	6.4	12	186
8	18	107	60	128	72	105	40	7.8	6.6	13	159
9	12	108	33	126	59	92	37	7.3	6.2	13	162
10	13	117	43	137	61	118	47	9.2	8.2	17	180
11	13	112	32	117	68	101	43	7.8	7.1	14	245
12	17	137	66	148	74	118	48	9.2	8.1	16	218
13	18	120	50	123	74	75	32	6.2	5.7	8.9	177
14	22	136	48	153	76	106	44	8.8	7.7	13	197
15	20	118	45	126	84	91	36	7.2	6.3	12	170
16	28	169	77	175	136	102	46	9.1	8.5	12	223
17	11	117	32	135	54	116	47	9.0	8.1	16	234
18	11	120	31	127	76	145	57	11	8.6	19	172
37	8.2	30	8	38	29	15	6.2	1.3	1.2	2.4	40
39	1.3	23	< 1	28	41	9.5	4.3	0.9	0.8	1.5	28
40	0.8	16	< 1	21	15	8.7	4.1	0.8	0.8	1.1	22
41	1.9	24	4	28	16	10	5.0	1.1	1.0	1.2	21
42	1.5	11	4	18	15	7.3	3.6	0.8	0.8	0.8	10
all amounts given in ppm											

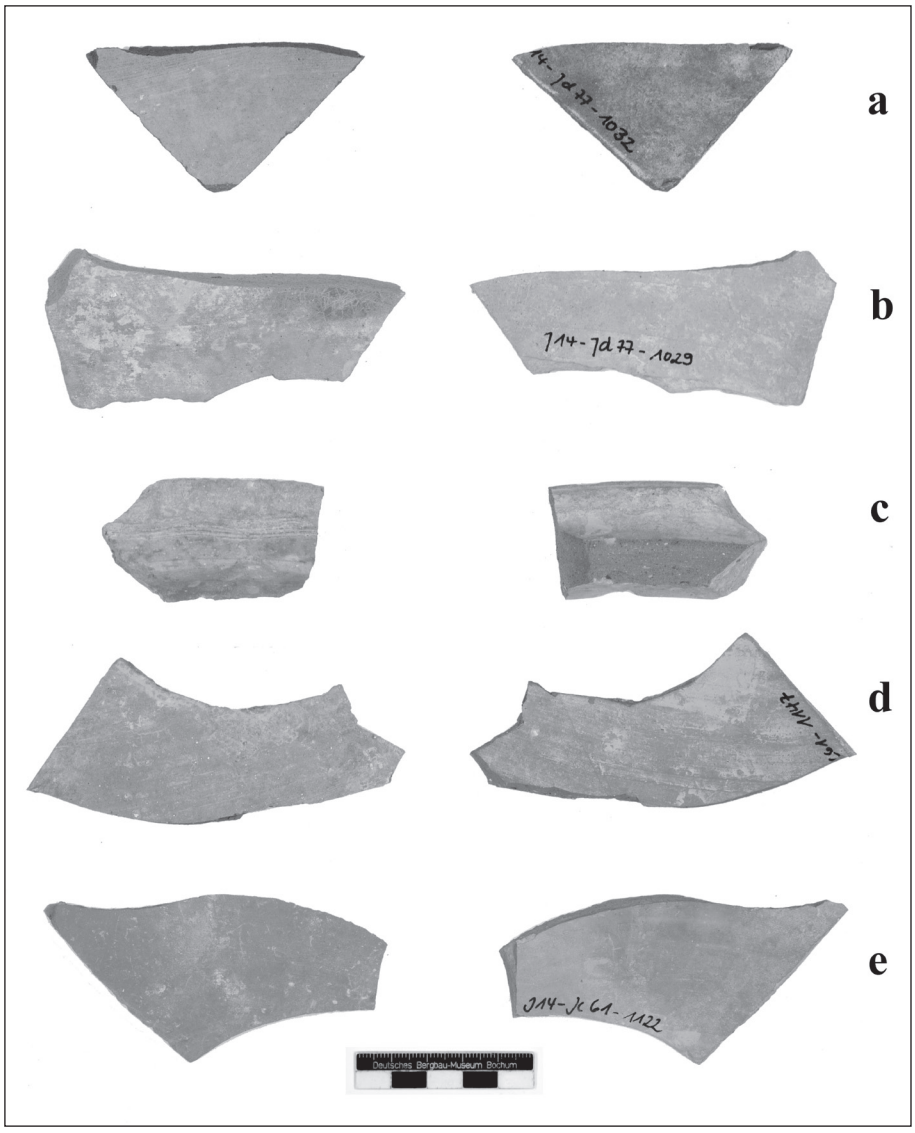
3. Firing Experiment

Five sherds were selected for refiring; three grey-ware items and two orange-ware items (**Table 5** and **Fig. 26**). They all belong to the main local fabric group [The sherd sections were analysed semi-quantitatively by portable X-ray fluorescence and were determined to be compositionally consistent with the majority of the samples from Jarash analysed thus far. Iron oxide, one of the most important compounds for the colour of the ceramic, varies very little among the sherds chosen for this experiment (*ca.* 4-5%)] and have been chosen in this category mainly by colour and secondarily by their functional group. To get a representative result, two grey-ware items of different pottery types were chosen, both belonging to the large group of basins with incised fingerprints (Sherd A is from a similar vessel type as pl. 9.67; Sherd C is from a similar vessel type as pl. 10.69-70). One more sample, Sherd B, was a mixture between orange and grey ware, belonging to the same family of basins (similar in type to pl. 10.71). Furthermore, two orange-ware sherds, D and E, were selected; both are cookingware items (similar to casseroles with lid, pl. 2.13-14). The experiment was designed to show how the ceramics changed as a function of temperature in an oxidising environment. Each sherd was sectioned into six parts. Five of the sections were heated in an electric oven in intervals of 75°C, starting at 750°C, *i.e.* 750° C, 825°C, 900°C, 975°C and 1050°C. At each 75°C-interval, a fragment of each sherd was removed from the oven to cool.

Table 5: The sherds of the refiring experiment.

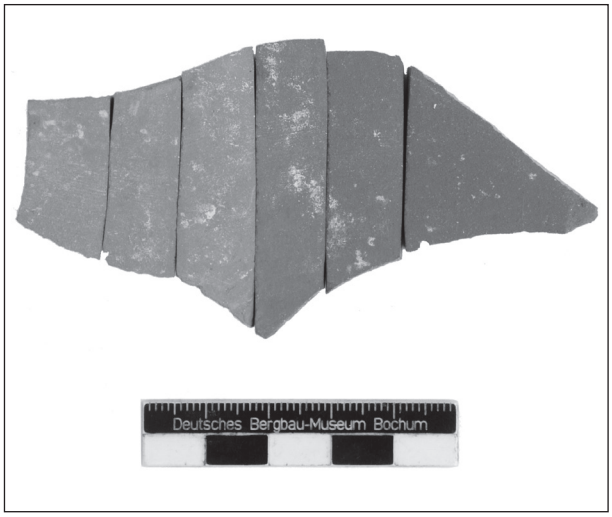
	Cat. No.	
a	J14-Je77-1032	Gray Ware
b	J14-Jd77-1029	Gray Ware
c	J14-Je77-1000	Gray Ware
d	J14-Jc61-1147	Orange Ware
e	J14-Jc-61-1122	Orange Ware

The grey wares showed a clear colour change; at 750°C, all three sherds became salmon coloured, but a pronounced shift to orange occurred between 900°C and 975°C. An intense orange colour developed at 1050°C. The orange ware also altered during the experiment. No effect could be seen on the exterior surfaces of sherd D, but the reduced core of the sherd gradually oxidised and disappeared between 975°C



26. Sherds used for refiring.

and 1050°C. Sherd E showed no changes, until it witnessed a colour change at 900°C, and this means that the original ceramic was fired below this temperature. The intensity of the orange colour of sherd E became stronger at 975°C and was a deep orangish-red at 1050°C (**Fig. 27**). Comparing the final products (**Fig. 28**), the same intense orangish-red colour can be found on sherds B and E. The same shade of pinkish orange developed in sherds A and D. Sherd C is a less intense orange but is closer to sherds B and E than A and D.

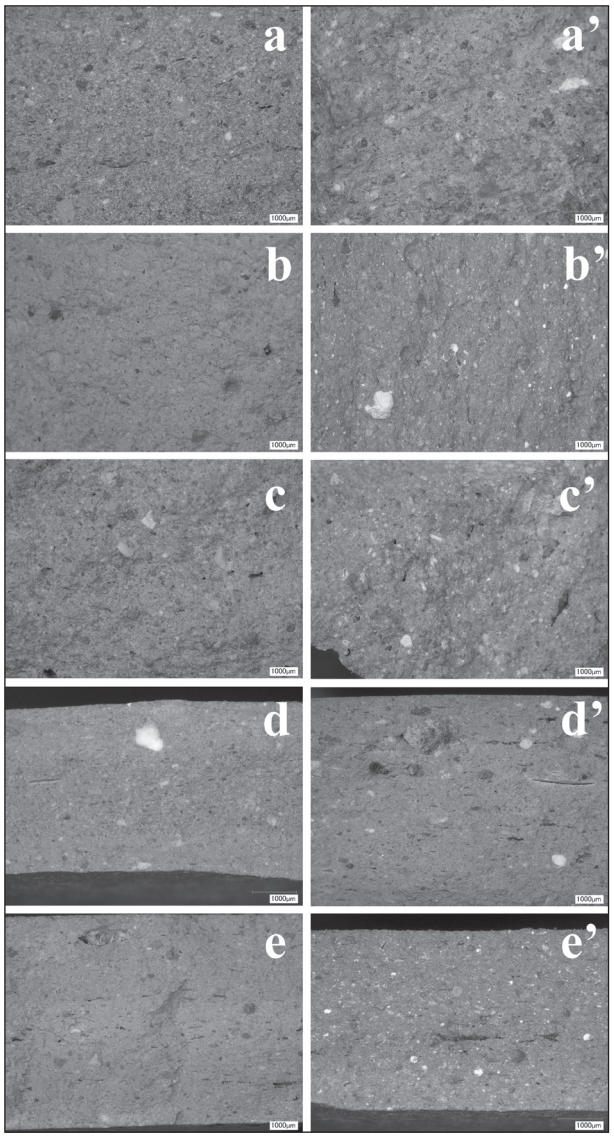


27. Refiring experiment of Sherd E (J14-Jc-61-1122) grading from non-refired on the left to 1050°C on the right. A clear color change is seen between 825°C and 900°C with subsequent darkening as the temperature increases.

4. Discussion and Conclusions

4.1 Clay Processing and Provenance

A close study of the ceramic fabric combined with elemental analysis forms a foundation for discussing technological aspects of production and the classification of ceramics, with the pos-



28. Microscope images of the ceramic fabrics taken in fresh breaks before refiring and after refiring to 1050°C.

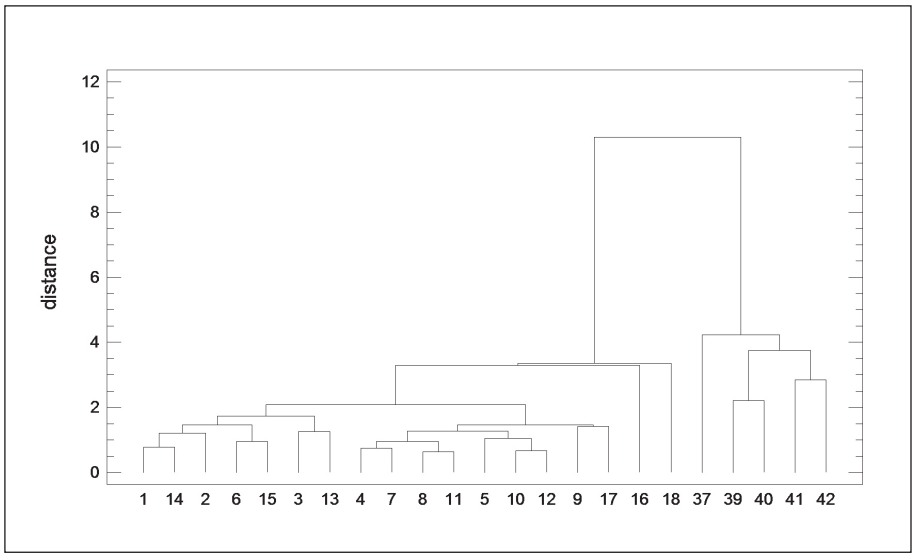
sibility of determining provenance. First, the mineralogy can be used to define groups that are compositionally similar or different. It is clear that samples 16 and 17 are mineralogically distinct from each other and the rest of the sherds sampled. It is evident that sample 16, due to its chromite inclusions and higher concentrations of ferromagnesian minerals, can be linked to the weathering of mafic igneous rock, and sample 17 is distinct, due to the presences of significant amounts of muscovite, such as silt- and sand-sized inclusions. The bulk of the sherds (1-15) have relatively similar characteristics, with silt- to sand-sized quartz and micrite inclusions with minor amounts of mica, ferromagnesian minerals, iron oxides and clay pellets. This bulk of samples could be called the local ceramic. Sample 18 does not fit into the large group, due to a lack of silt-sized micrite.

The bulk of the sherds are thus roughly similar but have differing quantities of non-plastic inclusions. The small size of the inclusions points to natural inclusions that were in the clay deposit, and the larger inclusions (>200 μm) in the ceramic are not sufficiently distributed to argue for an intentional tempering. There seem to be similarities in the sizes of clay pellets, which should be associated with the clay, and the calcium-carbonate and quartz inclusions. If intentional tempering did occur, it would have been with a fine-to-medium sand fraction, of the same types of natural sediment already found in the clay as silt, with varying amounts of quartz and calcium carbonate. One sample from this group stands out (sample 3) because of its shell fragments, which probably originate from the weathering of a fossiliferous limestone.

Sherd sample 2 is an unusual example, where intentional tempering seems to have occurred. The sherd exhibits a two-layered structure: the main layer is consistently 8-mm thick and represents the basic wheel-thrown form; however, a second layer was applied to the interior of the vessel, which has higher relief (3-6mm). A clear boundary at the joint of the two layers can be seen under the microscope, and the two kinds of fabrics are visually distinct. The main layer fits the description of the 'local' fabric thus far, but the added layer appears to be made with the same base clay but contains substantially more sand-sized (100-300 μm) rounded quartz and calcium-carbonate inclusions, though the size and frequency of the clay pellets appear to be constant between the two layers.

To prove levigation of the clay would require sampling of the local clay deposits to examine the natural distribution of particle sizes. Most of the quartz inclusions in the sherds show a normal distribution around fine-sand size (in terms of volume). Some fabrics have a higher fine to medium sand fraction, but interestingly the clay used for the amphora (sample 13) seems to be the same base clay but with substantially less silt and sand. One might consider whether this clay was levigated, but of course, it is also possible that a particularly clean part of a clay deposit could have been exploited for pottery with specific functions.

The elemental compositions help to confirm many of the groupings determined by micros-



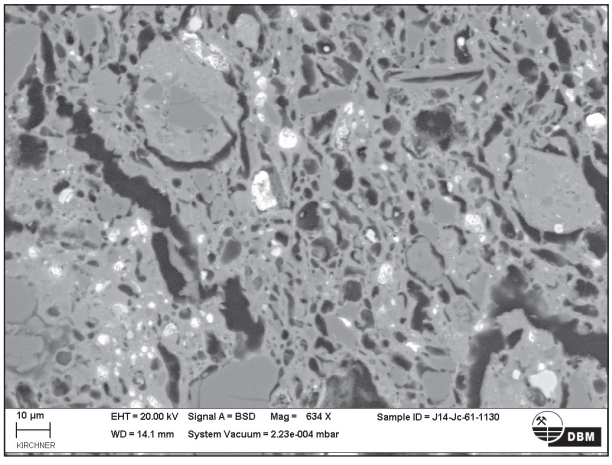
29. Cluster analysis of the elemental compositions of the 18 ceramic samples and the four geologic samples.

copy. A cluster-analysis was performed [statgraphics centurion and the algorithm "group average method" were used], using twenty major, minor and trace elements (see Ottoway 1974 and Ottoway 1982). The cluster analysis (**Fig. 29**) shows that three major ceramic groups were formed; the geological samples collected for comparison form their own group but are irrelevant, because they contain very little clay; sample 16 was analysed for its iron content and its trace elements and sample 18 was analysed for its alumina content. These two samples form distinct groups, and the rest form a large group of samples that are chemically similar. Sample 17**,** though similar elementally to samples 1 to 15**,** is mineralogically different and should therefore not be part of the group. This is an excellent example, showing the interdependence of elemental analysis and microscopy in studying archaeological ceramics.

4.2 Firing Temperature

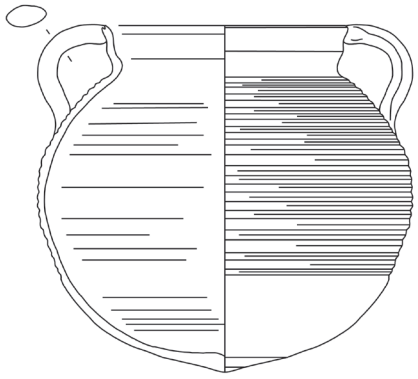
The data established through the refiring experiments and the analysis of thin-sections allow some conclusions can be drawn about the firing of the Jarash ceramics. Firstly, the greyware items become orange when fired in an oxidising atmosphere and closely resemble the orange wares when sufficiently fired. It is clear that the same clay can be used for both types of pottery. There are some mineralogical characteristics that help to estimate firing temperature, such as the aragonite shell fragments in sample 3, which point to temperatures below 850°C.

During the refiring experiment, two of the sherds became deep-reddish to orange at high temperatures, and this raises the question of whether a difference between orange ware and red ware may be related to firing temperature. Two red-ware sherds were sampled in this study, and it is clear from the elemental and mineralogical examination that sample 16 is not related to the 'local' ceramic, but sample 15 does appear to be made of the local clay type. Perhaps to imitate imported ware, or to follow a trend in fashion, an increase in the firing temperature could have caused the orange-ware ceramic to darken and become reddish. The microstructure of sample 15 shows significant levels of vitrification, marked by the rounded porosity (**Fig. 30**), which was not detected in the orange and grey ware examined under the SEM. This is evidence that this 'red ware' was likely fired in the range of 950°C to 1050°C to enhance the reddish appearance of ceramic.



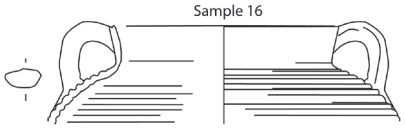
30. Microstructure of sample 15. The rounded porosity (black) indicates that vitrification was occurring at high temperatures (>950°C).

Pl. 1



1

Sample 16



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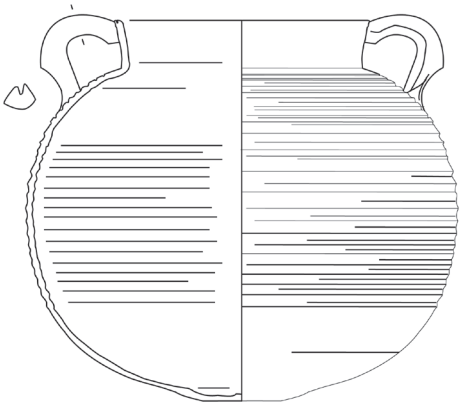

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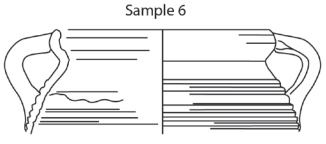
Sample 6



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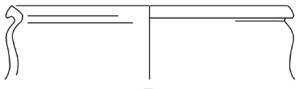
Sample 10



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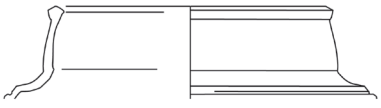

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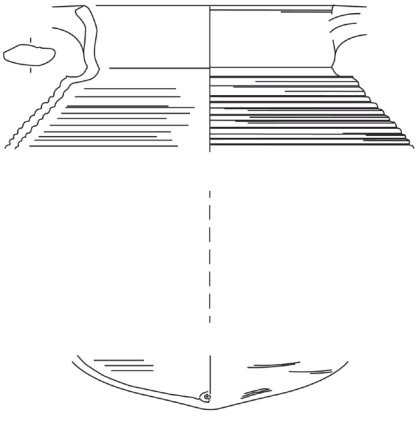


0 5cm

CATALOGUE

Chronology

Hellenistic	: 332 - 63BC
Roman	: 63BC - 250AD
Late Roman	: 250 - 400AD
Early Byzantine	: 400 - 450AD
Byzantine	: 450 - 550AD
Late Byzantine	: 550 - 640AD
Late Byzantine /Early Umayyad	: 600 - 700AD
Umayyad	: 640 - 749AD
Abbasid	: 700 - 10th century AD
Fatimid	: 11th - 12th century AD
Ayyubid	: 12th - mid 13th century AD
Mamluk	: mid 13th - 16th century AD
Ottoman	: 16th century - WWI.

Arrangement of the Catalogue
Catalogue number and plate
Inventory number
Short description
Measurements (in cm) [in general, only the diameter is given for the pottery. For other find groups, the size of the sherd is noted].
Fabric [the fabric of the wheel-thrown pottery is described through the use of a fabric code. As a point of departure, mould-made and handmade pottery, as well as other find group entries (*i.e.* terracotta), are described using using the Munsell Colour Charts as colour codex].
Context [the context is added if the sherds have not been excavated in season 2015].
Further description, if necessary.

References
Date [the date is given by references and context. Finds without references are dated by context].

Catalogue Abbreviations

AE	: copper-alloy 'bronze'.
D.	: depth.
Diam.	: diameter [the max. diam. is given].
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.

Catalogue Authors
Inked drawings by Heike Möller, Janek Sundahl and Mette Pedersen (lamps and terracotta).
Plate layout: Heike Möller.
Photos of catalogue finds: Philip Ebeling and Nicolai Thorning.
HM : Heike Möller (pottery).
AL : Achim Lichtenberger (terracotta, marble, limestone).
AP : Alex Peterson (Mamluk and later finds).
DC : Dorothea Csitneki (Jarash Bowls).
MP : Mette Pedersen (lamps).
PE : Philip Ebeling (tiles, wallplaster).
RR : Rubina Raja (terracotta, marble, limestone).
SK : Signe Krag (jewellery).

Introduction

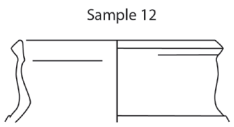
The catalogue aims to present a representative spectrum of finds from the Northwest Quarter, mainly from the 2015 campaign [Two Masters theses (working-titles): Doro Csitneki, *Gerasa: Untersuchungen zu den "Jarash Bowls"* and Signe Bruun Kristensen, *Defining shape and function in locally produced Reddish Ware* are under way. Preliminary registration reports for earlier campaigns include: Lichtenberger *et al.* 2013, 217 and 2018 with further studies by Peter Fink-Jensen and XRF analysis of selected artefacts found in the Northwest Quarter of the ancient city of Jarash. Some finds from the 2014 campaign are also included]. It will contribute to an established draft of typology and fabric to characterise the local/regional ware, on the one hand, and imported wares, on the other hand [Even though much pottery of Jarash, ancient Gerasa, is fairly well known, there are still large gaps to fill - the local Roman ceramic material for example is until now, except for some published finds, unknown to us typologically, stylistically and chronologically. The same can be said for imported finds which urgently need detailed analysis. The published work so far mainly focuses on Late Byzantine and Early Islamic finds on the one side (due to the high quantity of finds from these periods), whether locally or regionally produced, and - to a lesser extent - on Hellenistic and Early Roman pottery. Imported finds are rarely published: General overview *e.g.* Uscatescu 1996. Numerous articles in: Zayadine 1986 (Jarash Archaeological Project 1981-1983) including articles concerning the kiln sites of Byzantine and Umayyad date; Pierobon 1984; recently: Kehrberg 2009: 493-512 and Kehrberg 2011; Brizzi, Sepio and Baldoni 2011: 345-369].

The report aims at presenting an overview of finds from the trenches mentioned in the report. Another part of the catalogue discusses pottery samples from the Late Roman and Late Byzantine/Early Umayyad pottery fill in Trench J, excavated in 2014 and 2015 [*cf.* this report, see also Kalaitzoglou *et al.* 2018; Lichtenberger *et al.* 2018. The samples are marked by an additional field in the catalogue: context], which have been used for fabric and content analysis (*cf.* Merkel and Prange in this report).

Typology by Functional Groups

To maintain consistency throughout the find documentation, the pottery typology is arranged according to functional groups. The definition of groups, as well as the fixed terminology of each subgroup, simplifies and standardises the designation of pottery types and provides a basis for further ceramic studies. Five functional groups have been defined:
- **Cookingware**: all vessels that are used on fire to prepare food.
- **Tableware**: vessels that are used on the table.
- **Common ware**: all vessels that are not used on the table or for cooking - in Jarash mainly food preparation and storage jars.
- **Transport vessels**: all vessels used for transporting goods - in Jarash exclusively amphorae.
- **Domestic furnishing and other specialised vessels**: *e.g.* lamps and lanterns.

Pl. 2



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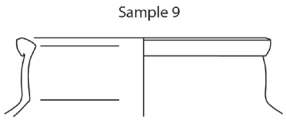

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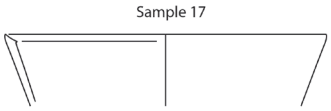

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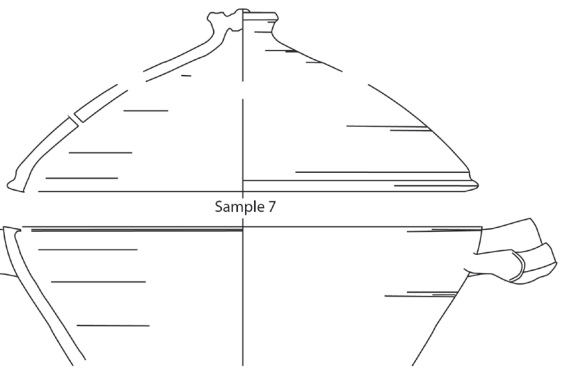

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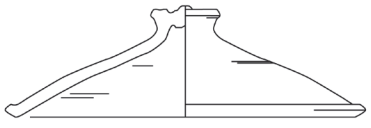

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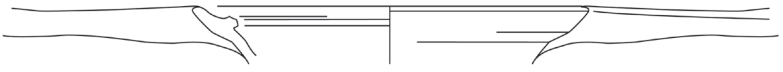

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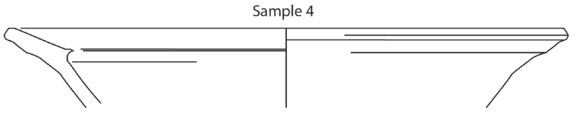

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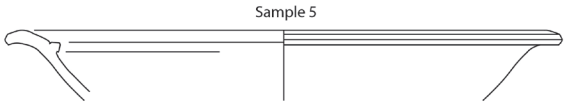

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The catalogue is arranged according to the functional groups, beginning with cookingwares, always starting with locally produced vessels, followed by imports. In general, all vessels presented in the catalogue are wheel thrown. One imported bowl (pl. 5) and all lamps (pl. 17) are mold-made. The only handmade pottery can be dated to the Middle Islamic period, *i.e.* the Ayyubid/Mamluk periods (pl. 18.107-110).

Fabrics

Microscopical analyses of all fragments have been made on the fresh break, using magnifying glasses with 10x and up to 20x magnification. This method allows an initial classification into one of the groups listed above (for the first classification of local/regional fabrics with a description, see Lichtenberger *et al.* 2013, 2017, 2018). A catalogue of all collected fabric is used as a reference during the campaign and is sorted by fabric types of 1) local/regional production: orange ware, grey ware with its subtypes, and 2) imported fabric [the codes are used in the catalogue. GW: grey ware; OW: orange ware. For descriptions of fabric, see Merkel and Prange in this report. These categories are very preliminary, and further studies have to be undertaken to clearly define subgroups, however, the vessels in the catalogue are generally made of the main fabric, only some cooking pots and tableware occur in a different reddish-brownish fabric noted as OW 10 fabric. Since the imported finds have not been analysed yet, a full description of the paste is given in the chapter's introduction, unless a standardised code can be used, as is the case for African Red Slip Ware, for example].

The 2015 campaign focused on intensive studies of the local/regional fabric in order to go beyond a simple description of fabric and preliminary grouping [preliminary fabric description and congruence to fabric codes of other excavated areas, *cf.* Lichtenberger *et al.* 2013: 14-15; Lichtenberger *et al.* 2017, 2018]. Representative samples of each local/regional fabric group have been selected for elemental mass spectrometry and petrographical analyses (*cf.* Merkel and Prange in this report), to get the chemical fingerprint of the productions and determine a definition of "local" wares in comparison to regional imports [earlier fabric studies concerning early pottery production in Jarash has been made by Braemer 1989, for later productions see: Watson 1989, concerning "Jarash Bowls" and Uscatescu 1996. Recent: Tarboush 2015].

In general, the main fabric occurs in two different colours: **orange ware (OW)** and **grey ware (GW)** - samples 1-15 (Merkel and Prange) [as described by Lichtenberger *et al.* 2013: 14-15. The orange ware is similar to the fabric described under fine ware, *cf.* Lichtenberger *et al.* 2017 "orange ware". The Munsell colour is not indicated in the catalogue, since it corresponds to the Munsell Colour Charts description given in the earlier reports]. Nevertheless, there are some fabric types that differ from these, not only in colour but more importantly by different inclusions (Merkel and Prange, sample 16-18). These fabric types require further analysis to clarify whether they have been regionally imported or are of a local origin but from a different clay deposit [This could be the case for Sample 16 and 17, *cf.* Merkel and Prange in this report].

Catalogue

Cookingware (HM)

Cooking Pots

Most of the closed cooking pots are Roman globular cooking pots (pl. 1.1-4) with a ribbed surface and vertical handles, oval or pinched in shape and a round, sometimes slightly knobbed, base. They often carry an incised groove on top of the rim, and sometimes the rim is slightly S-curved, probably to carry a lid. Often, they do not show any traces of burning; therefore, it is possible that they have also been used as simple storage jars. Some occur with a thin reddish slip.

Later examples, of Byzantine date, have an S-curved neck and often a thickened and sometimes recessed rim on the outside. Their surface is ribbed, and two vertical handles are oval in shape (pl. 1.7-9, pl. 2.7-11).

Five samples of cooking pots (sample 16; pl. 1.2; sample 6, pl. 1.5; sample 10, pl. 1.7; sample 12, pl. 2.10; sample 9, pl. 2.11) have been analysed by elemental mass spectrometry and petrography. Three cooking pots (sample 10, 12, 9) are part of the main local fabric group (*cf.* Merkel and Prange), and the same observation can be made regarding another smaller cooking pot of Roman or Late Roman date (sample 6). One Roman pot differs from this group of local fabric (sample 16) and was probably imported.

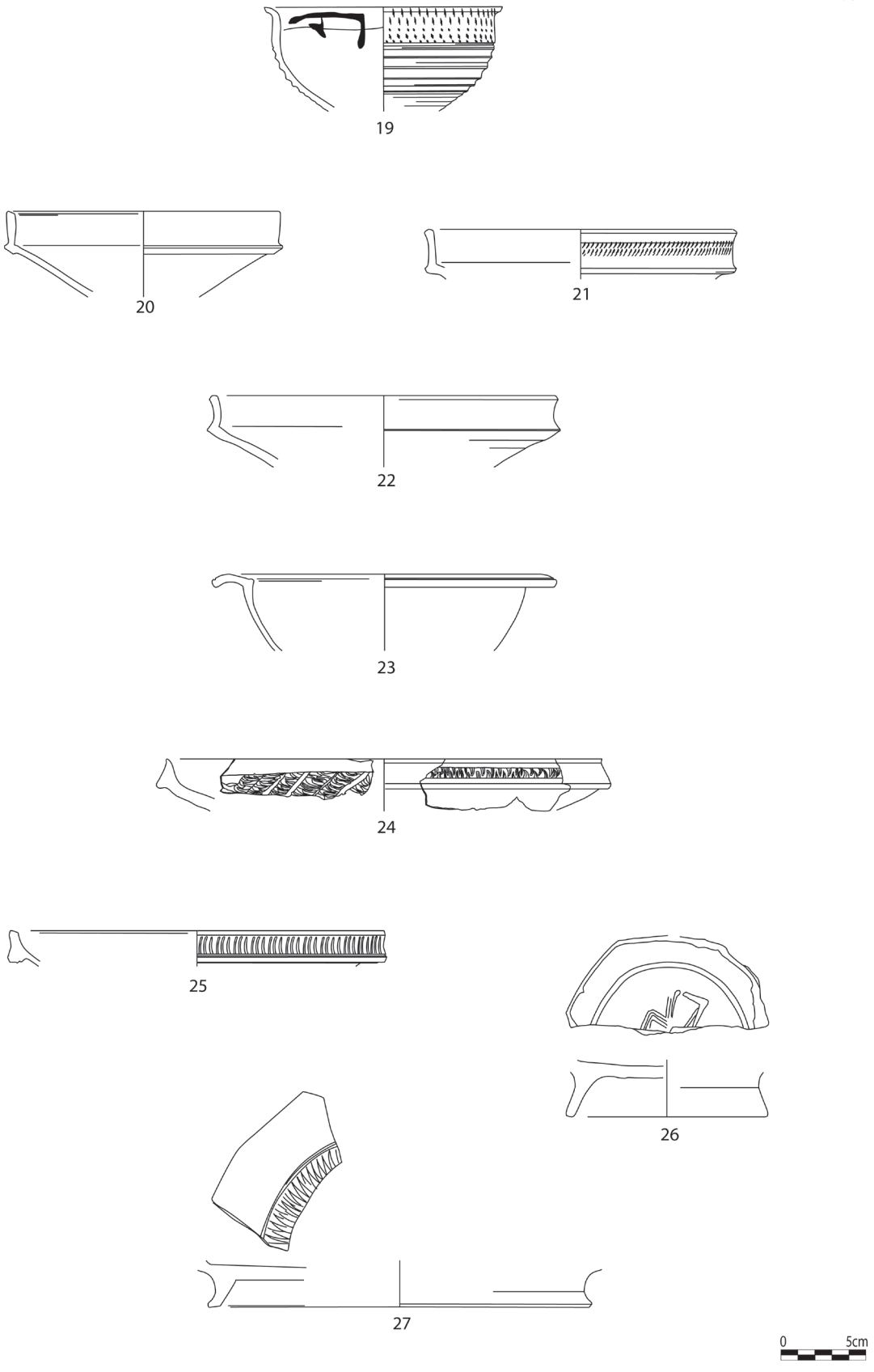
Cooking Pots

With Incised Groove on Top of the Rim

1.
Pl. 1.1
J15-Qac-24-1
Intact profile.
Diam.: 11.0.
Fabric: OW.
Two oval handles attached vertically at rim and shoulder. Round base.
References: Uscatescu 1996: 136 (Type XXXIV-5) and pl. 38.31-32 - with further references. Date: Late Roman; slightly earlier in date *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.7 from a context dating to the beginning of the 3rd century AD.
Date: Roman-Late Roman.

2.
Pl. 1.2
J15-Jc-61-1113
Rim.
Diam.: 10.4.
Fabric: OW **- sample 16** (*cf.* Merkel and Prange in this report).
Two oval handles attached vertically at rim and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Uscatescu 1996: 136 (Type XXXIV-5) and pl. 38.31-32 - with further references. Date: Late Roman; slightly earlier in date *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.7 from a context dating to the beginning of the 3rd century AD.
Date: Roman-Late Roman.

Pl. 3



3.
Pl. 1.3
J15-Qac-26-1
Intact profile.
Diam.: 11.6.
Fabric: OW 10.
Two pinched handles attached vertically at rim and shoulder. Round base.
References: Uscatescu 1996: 136 (Type XXXIV-5), pl. 38.31-32, p. 138 (Type XXXIV-11), pl. 39.33 - with further references. Date: Late Roman; slightly earlier in date *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.7 from a context dating to the beginning of the 3rd century AD.
Date: Roman-Late Roman.

With Small Groove on the Outside of the Rim
4.
Pl. 1.4
J15-R-22-15
Rim.
Diam.: 7.3.
Fabric: OW 10.
Two pinched handles attached vertically at rim and shoulder.
References: Lichtenberger *et al.* 2017: fig. 85 - with further references; Uscatescu 1996: 138 (Type XXXIV-11), pl. 39.33 - with further references.
Date: Late Roman.

With S-Curved Neck
5.
Pl. 1.5
J14-Jc-61-1112
Rim.
Diam.: 10.0.
Fabric: OW - sample 6 (*cf.* Merkel and Prange in this report).
Two pinched handles attached vertically at rim and shoulder.
Context: Late Roman pottery fill in Trench J.
References: -
Date: Late Roman.

With Thickened Rim on the Outside
6.
Pl. 1.6
J15-R-29-12
Rim.
Diam.: 6.7.
Fabric: OW.
References: possible related to Uscatescu 1996: 136 (Type XXXIV-5) and pl. 38.30 - with further references.
Date: Late Roman.

With Thickened and Sometimes Recessed Rim on the Outside and S-Curved Neck
7.
Pl. 1.7
J14-Je-77-1052
Rim.
Diam.: 13.1.
Fabric: OW - sample 10 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger *et al.* 2017: fig. 86-87 and fig. 95; Uscatescu 1996: 135-136 (Type XXXIV-3, subtype 3D-G) and pl. 83.509-516, pl. 84.517, 520 - with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

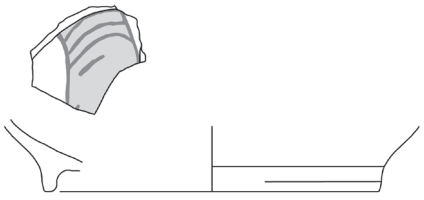
8.
Pl. 1.8
J14-Je-77-1054
Rim.
Diam.: 12.8
Fabric: OW.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger *et al.* 2017: fig. 86-87 and fig. 95; Uscatescu 1996: 135-136 (Type XXXIV-3, subtype 3D-G) and pl. 83.509-516, pl. 84.517, 520 - with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

9.
Pl. 1.9
J15-Qc-20-5-6
Cooking pot rim and base.
Diam.: 11.9.
Fabric: OW.
Two oval handles attached vertically at the rim.
References: Lichtenberger *et al.* 2017: fig. 86-87 and fig. 95; Uscatescu 1996: 135-136 (Type XXXIV-3, subtype 3D-G) and pl. 83.509-516, pl. 84.517, 520 - with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

10.
Pl. 2.10
J14-Je-77-1059
Rim.
Diam.: 9.4.
Fabric: OW - sample 12 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger *et al.* 2017: fig. 86-87 and fig. 95; Uscatescu 1996: 135-136 (Type XXXIV-3, subtype 3D-G) and pl. 83.509-516, pl. 84.517, 520 - with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

11.
Pl. 2.11
J14-Je-77-1051
Rim.
Diam.: 11.3.
Fabric: OW **- sample 9** (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger *et al.* 2017: fig. 86-87 and fig. 95- with further references; Uscatescu 1996: 135-136 (Type XXXIV-3, subtype 3D-G) and pl. 83.509-516, pl. 84.517, 520 - with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

Pl. 4



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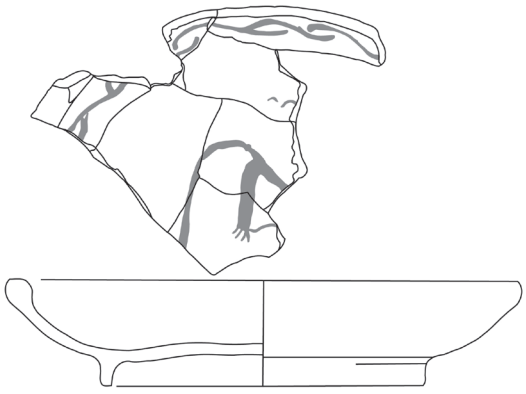

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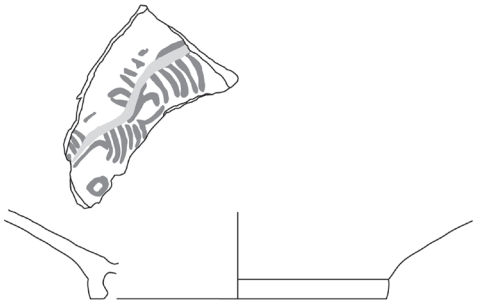

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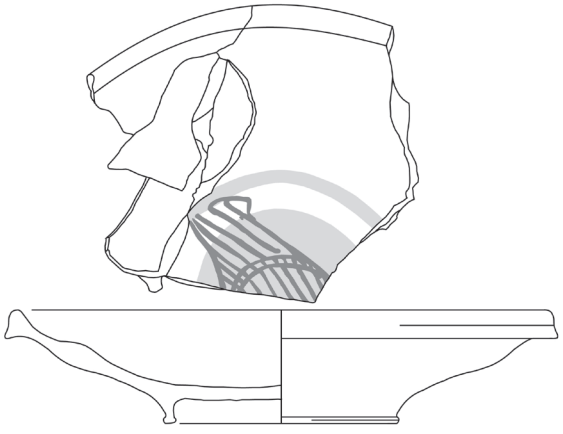

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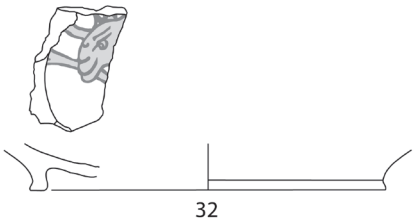
Sample 14



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Casserole/Pan

Most of the open cookingware items are casseroles with cut rim and horizontal handles attached to the rim or slightly below the rim. The handles are wide "double folded" handles, but some casseroles have smaller handles, folded in the same manner. The diameters vary between 14 and 21 cm. A lid with a cut rim and concise knob can be attributed to a casserole (pl. 2.12-14). They were probably made during one production process by simply cutting the upper from the lower part of the vessel (*cf.* Uscatescu 1996: 300, fig. 1-13). Often, one single hole was pierced in the lid just above the rim. This allowed steam to exit easily during cooking.

Other casseroles that have possibly also been used as frying pans are numerous and occur in many variations, mostly with an outward-directed rim and an internal ledge of different widths (pl. 2.16-18), possible for carrying a lid (pl. 2.15). Some examples have narrow and elongated handles directly attached to the rim; others show small horizontal looped handles (Lichtenberger *et al.* 2013: 34, fig. 93). Numerous vessels of this common type carry decorations that are irregular set and of white paint on the rim and handle, whereas others are covered only with a thin red slip.

Four casseroles have been analysed, using elemental mass spectrometry and petrography (sample 17, pl. 2.12; sample 7, pl. 2.14; sample 4, pl. 2.17; sample 5, pl. 2.18). They all belong to the same fabric group with one exception: sample 17 is mineralogically different (*cf.* Merkel and Prange in this report) and does not belong to the fabric type assumed to be local.

Casserole
With Cut Rim
12.
Pl. 2.12
J14-Jc-61-1123
Rim.
Diam.: 14.3.
Fabric: OW - sample 17 (*cf.* Merkel and Prange in this report).
Context: Late Roman pottery fill in Trench J.
References: Uscatescu 1996: 106-107 (Type XVI-1, subtype 1A-B), pl. 73.385 and 387; with further references. Lichtenberger, Raja and Sørensen 2013: 34-35, fig. 90.
Date: Byzantine/Late Byzantine-Early Umayyad (5th, but mainly 6th-7th century AD). Due to the good context in Trench J, the date of casserole production needs to be shifted to the Late Roman period; *cf.* Montlivault 1986: 71, pl. 19.2 referring to a Byzantine workshop in Jarash producing this type of pottery.
Date: Late Roman.

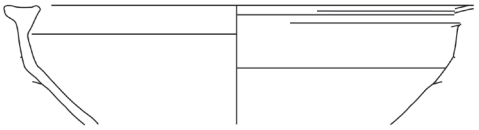
13.
Pl. 2.13
J14-Je-77-1107
Rim.
Diam.: 2.3.
Fabric: OW - sample 7 (*cf.* Merkel and Prange in this report).
Two horisontal "double"-handles are attached slightly below the rim.
References: Lichtenberger, Raja and Sørensen 2013: 34-35, fig. 91; Uscatescu 1996: 106-107 (Type XVI-1A), pl. 73.381 - with further references. Date: Late Byzantine (6th century AD); *cf.* Montlivault 1986: 71, pl. 19.2 referring to a Byzantine workshop in Jarash producing this type of pottery.
Date: Late Byzantine.

Lid
With Cut Rim
14.
Pl. 2.14
J15-Nb-57-227 and 28
Whole profile reconstructed.
Diam.: 21.3.
Fabric: OW.
A small hole was cut in the lower part of the lid.
References: Uscatescu 1996: 111 (Type XVI-1), pl. 73.386 and p. 111-112 (Type XVIII-1 and 2), pl. 74.407-409 and 411 - with further references. Date: Late Byzantine-Early Umayyad (6th-7th century AD). Lichtenberger *et al.* 2017: fig. 81; Kenkel 2012: Kat. LIV, pl. 22.KDe6.1 with further references. Date: Roman-Byzantine; *cf.* Montlivault 1986: 71, pl. 19.2 referring to a Byzantine workshop in Jarash producing this type of pottery.
Date: Late Byzantine.

15.
Pl. 2.15
J15-Nb-57-227
Intact profile.
Diam.: 16.1.
Fabric: OW.
A small hole was cut in the lower part of the lid.
References: Uscatescu 1996: 111 (Type XVI-1), pl. 73.386 and p. 111-112 (Type XVIII-1 and 2), pl. 74.407-409 and 411 - with further references. Date: Late Byzantine-Early Umayyad (6th-7th century AD). Lichtenberger *et al.* 2017: fig. 81; Kenkel 2012: Kat. LIV, pl. 22.KDe6.1 with further references.
Date: Roman-Byzantine; *cf.* Montlivault 1986: 71, pl. 19.2 referring to a Byzantine workshop in Jarash producing this type of pottery.
Date: Late Byzantine.

Casserole/Pan
With Outward-Turned Rim and Internal Ledge
16.
Pl. 2.16
J15-Nb-57-109
Rim.
Diam.: 18.0.
Fabric: OW.
The narrow and elongated oval handle is directly attached to the rim. White irregular stripes painted on the handle top and internal side of rim and body.
References: Lichtenberger, Raja and Sørensen 2013: 34-36, fig. 92 and 94 with further references. Uscatescu 1996: 109-110 (Type XVII-3A), pl. 75.396-397; deco. related to: Uscatescu 1996: 110 (Type XVII-3, subtype 3C and E) pl. 75.399 and 403 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

Pl. 5



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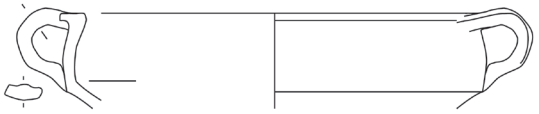

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17.
Pl. 2.17
J14-Je-77-1088
Rim.
Diam.: 25.0.
Fabric: OW - sample 4 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: 34-36, fig. 93-94 with further references. Uscatescu 1996: 110 (Type XVII-3, subtype 3C and 3D), pl. 75.400-401 with further references.
Date: Late Byzantine (6th century AD).

18.
Pl. 2.18
J14-Je-77-1087
Rim.
Diam.: 25.0.
Fabric: OW - sample 5 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: 34-36, fig. 93-94 with further references. Uscatescu 1996: 110 (Type XVII-3, subtype 3C and 3D), pl. 75.400-401 with further references.
Date: Late Byzantine (6th century AD).

Tableware (HM)
Bowls

Most common are small carinated bowls with vertical rims (pl. 3.20-22), sometimes decorated with a fine rouletting on the exterior rim. They are of Early Roman date. As their fabrics indicate, these types were probably locally produced, but their form clearly relates to some examples of Eastern Sigillata (ESA) [Regarding the local production of early Roman table wares, *cf.* Braemer 1989]. Some of them are covered with a thin slip that changes from orange to pinkish-beige. Unique, though probably locally produced, is the goblet (pl. 3.19) with traces of reddish and brownish painting on the interior and exterior, with small rouletting outside just below the rim (Braemer 1989).

One bowl with a small flaring, slightly convex rim, resembles African Red Slip Ware (ARS) of the 3rd and 4th century AD and is probably a local imitation (pl. 3.23). Bowls with carinated bodies and flat horizontal outturned rims are very common in Roman and Late Roman contexts (pl. 5.33-36). Vertical oval-to-flat handles are attached to rim and body. Intact vessels show that up to four, possibly even more, handles could have been attached to a vessel. The shape of the rim makes it possible to carry a lid. Some of the examples carried traces of burning, underlining their assumed use either as a casserole or a simple tableware bowl. The largest group of open-form table ware is the so-called Jarash Bowls (see below) of the Byzantine period. One bowl with a triangular hooked rim, covered with a thick white slip and zig-zag motif on the inside and outside, cannot be classified within that group, although it is related to Jarash Bowls due to its form (pl. 3.24).

Three other fragments can be categorised as Jarash Bowls with incised and stamped decorations. One fragment with overhanging rim shows rouletting decoration on the exterior (pl. 3.25) and finds its comparison in Late Roman C Ware (LRC). One base with a cross motif is related to African Red Slip Ware (ARS) (pl. 3.26). The zig-zag motif on another example is very common on local pottery in Byzantine and Umayyad times. It does not only occur on tableware but is also visible on common wares (especially later basins) (*cf.* pl. 12).

Goblet
With Slightly Out-Turned Rim
19.
Pl. 3.19
J15-Rbd-31-7
Rim.
Diam.: 13.4.
Fabric: OW.
Rouletting in five rows on the exterior just below the rim, interior traces of reddish and brownish paint visible.
References: Braemer 1989: 162, fig. 11.46.
Date: Early Roman.

Bowls
Carinated, with Vertical Rim
20.
Pl. 3.20
J15- Ok-47-5
Rim.
Diam.: 15.5.
Fabric: OW.
References: Type related to ESA-form, *cf.* Hayes 1985, Atlante Form 45 and 50; Lichtenberger *et al.* 2017: fig. 15; concerning a local production in Jarash, *cf.* Braemer 1989: 158-160 (Group b1), fig. 5-6. Date: Early Roman (2nd half 1st century AD); the production probably continued at least into the 2nd century AD, *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.2 with finds in an early 3rd century AD context.
Date: Roman.

21.
Pl. 3.21
J15- Qac-45-10
Rim.
Diam.: 17.7.
Fabric: OW.
Rouletting on the exterior rim.
References: Type related to ESA-form, *cf.* Hayes 1985, Atlante Form 45 and 50; Lichtenberger *et al.* 2017: fig. 15; concerning a local production in Jarash, *cf.* Braemer 1989: 158-160 (Group b1), fig. 5-6. Date: Early Roman (2nd half 1st century AD); the production probably continued at least into the 2nd century AD, *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.2 with finds in an early 3rd century AD context.
Date: Roman.

Pl. 6

45

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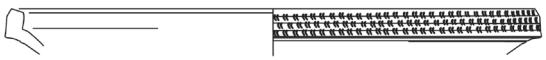

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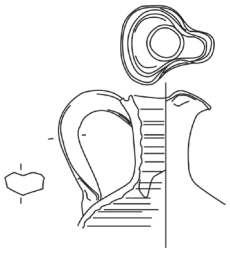

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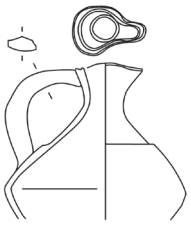

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Sample 15

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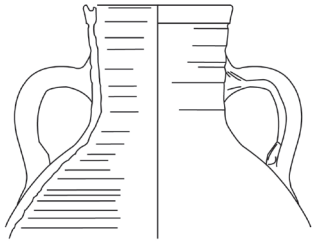

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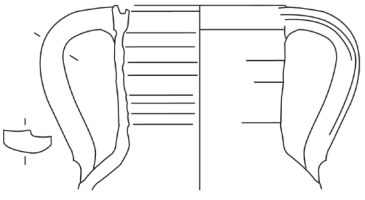

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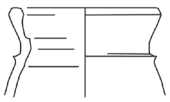
Sample 11



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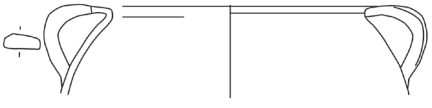

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0 5cm

22.
Pl. 3.22
J15- Nb-57-53A
Rim.
Diam.: 19.5.
Fabric: OW.
References: Type related to ESA-form, *cf.* Hayes 1985, Atlante Form 45 and 50; Lichtenberger *et al.* 2017: fig. 15; concerning a local production in Jarash, *cf.* Braemer 1989: 158-160 (Group b1), fig. 5-6. Date: Early Roman (2nd half 1st century AD); the production probably continued at least into the 2nd century AD, *cf.* Brizzi, Sepio and Baldoni 2011: 360-362, fig. 10.2 with finds in an early 3rd century AD context.
Date: Roman.

With Small Flaring Rim, Slightly Convex
23.
Pl. 3.23
J15- Jl-5-19
Rim.
Diam.: 19.5.
Fabric: OW.
Fine groove at lip.
References: Probably of local production, this type can be related to Hayes 1972, ARS Form 52B, *cf.* Hayes 2008: 222, fig. 31.1001-1003 and pl. 51 (late 3rd-4th century AD). Due to the context (a Late Roman pottery fill), a later production in Byzantine times can be excluded, even though the form also resembles the later type (Hayes 1972), ARS Form 94 (late 5th-early 6th century AD), *cf.* Jarash bowl: Watson 1989: 225-226, fig. 1.12a. Regarding the phenomenon that the type survives in Jarash from the 3rd century AD up to Late Byzantine/Early Umayyad times, *cf.* Brizzi, Sepio and Baldoni 2011: 362-363, fig. 11.12.
Date: Late Roman?

With Triangular Hooked Rim
24.
Pl. 3.24
J15-Og-57-21
Rim.
Diam.: 25.3.
Fabric: OW.
Incised (zig-zag) -band on the floor, irregular chiseling along the exterior rim. Whitish thin slip on surface.
References: Uscatescu 1996: 94 (Type XII-3, motif 8a), fig. 39.43 with further references.
Date: Byzantine.

Jarash Bowls with incised/stamped decoration
With Overhanging Rim and Flat Underside, Grooved
25.
Pl. 3.25
J15-Ok-30-25
Rim.
Diam.: 21.0.
Fabric: OW.
Rouletting on exterior rim.
References: Local production - "Jarash Bowl?", type related to Hayes 1972, LRC Form 3, subtype 3E, 3C/H; *cf.* Hayes 2008: 241, 243, fig. 39.1278, fig. 40.1294 (1st half of the 6th century AD); Uscatescu 1996: 60 (Type IV-Form Hayes 3F), pl. 45.1278 and 1295 with further references.
Date: Late Byzantine (6th century AD).

with medium-high ring base
26.
Pl. 3.26
J15-Nb-57-121
Base.
Diam.: 11.6.
Fabric: OW.
Stamped cross on floor.
References: Local production - "Jarash Bowl", stamped motif could relate to Hayes 1972, ARS style E(i), *cf.* Watson 1989: 241, fig. 2b.v.
Date: Late Byzantine (6th century AD).

With Ring Base
27.
Pl. 3.27
J14-Je-77-45
Base.
Diam.: 21.6.
Fabric: OW.
"Chisel" (zig-zag)-band in circle on the floor, framed by two finely grooved lines.
Context: Late Byzantine/Early Umayyad pottery fill.
References: Local production - "Jarash Bowl"; *cf.* Watson 1989: 232, fig. 3.3; Uscatescu 1996: 69-78 (Type X, motif 18c) fig. 29 and fig. 66.304 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

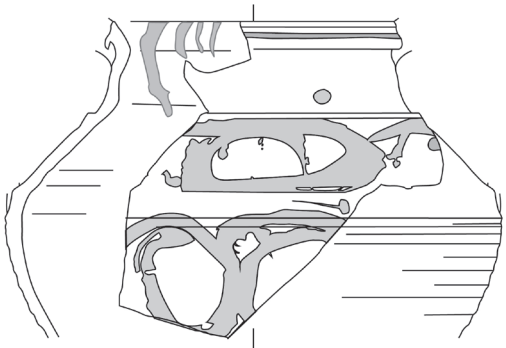
Jarash Bowls with painted decoration (DC)

The Jarash Bowls (pl. 4.28-32) show a selection of varying depictions on local tableware. These range from floral/ornamental motifs to animals and human figures. The ornamental motif can be seen as the main motif on all painted bowls. The inhabited grape motif is the most common one, but different ornaments are used and stylised for the patterns on this bowls. Animals and human figures are included in this framing motif. Better known is the fact that motifs originating either from mosaic art or pattern books are taken and placed on the bowls. This is apparent on the misfired piece, where the lower part of a basket is preserved. The motif is common on mosaic pavements and as an architectural element and is usually surrounded by peacocks or pigeons.

One misfired bowl (sample 14, pl. 4.31) was analysed using elemental mass spectrometry and petrography. Its fabric is part of the main local production in Jarash that also includes common and cookingwares (*cf.* Merkel and Prange in this report).

Jarash Bowls with painted decoration (DC)
With Hourglass-Shaped Ring Base
28.
Pl. 4.28
J15-Oi-100-3
Base.
Diam: 15.2.
Fabric: OW (Munsell: painted decoration: 10YR 5/1 and 2.5YR 3/6).
Bi-chrome painting on interior, reddish outlines with buff filling. Motif could be part of a tunic.
References: Local production - "Jarash Bowl", related to Hayes 1972, ARS Form 105.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

Pl. 7



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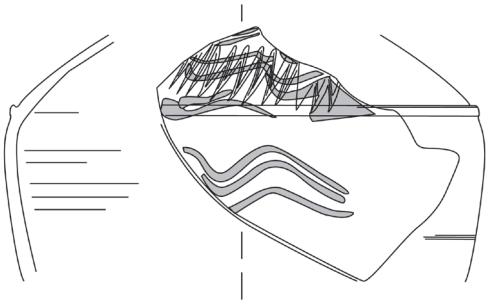

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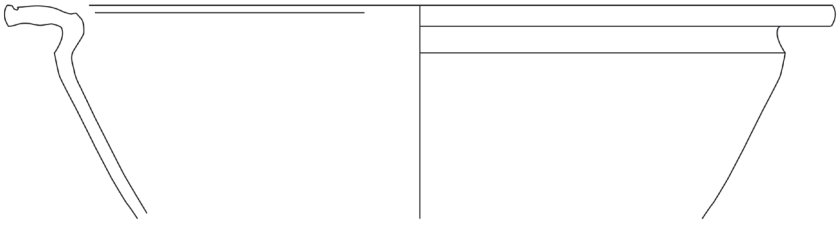

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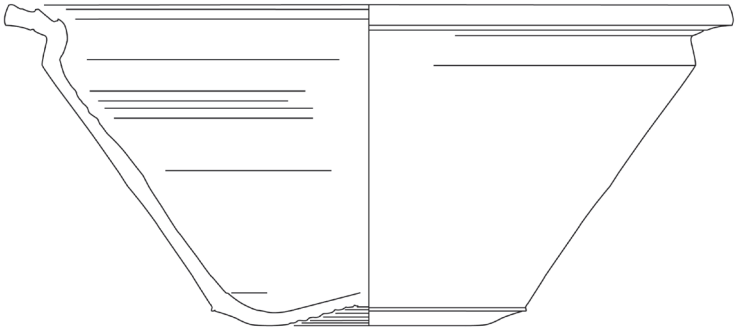


59

0 5cm

With Knobbed Rim and Ring Base
29.
Pl. 4.29
J15-Nb-57-231
Intact profile.
Diam: 23.5.
Fabric: OW (Munsell: wash: 10YR 8/2; painted decoration: 10R 4/4).
Bi-chrome painting on interior, thick matt buff/white wash covering the complete interior, reddish ornamental pattern (waveband) surrounding the upper interior body, in the centre an unidentifiable motif (stylised cross?).
References: Local production - "Jarash Bowl", related to Hayes 1972, ARS Form 105; Decoration: *cf.* Uscatescu 1996: pl. 59 (Type X), fig. 238-240.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Edgy Ring Base
30.
Pl. 4.30
J15-Nb-20-61
Base.
Diam: 13.4.
Fabric: OW (Munsell: painted decoration: not available).
Bi-chrome painting on interior, reddish, stylised floral motif, buff wavy line running across floral pattern.
References: Local production - "Jarash Bowl", decoration: *cf.* Uscatescu 1996: pl. 54 (Type X), fig. 196-197 and fig. 200.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Triangular Hooked Rim and Ring Base
31.
Pl. 4.31
J14-Li-80-10
Intact profile.
Diam: 24.7.
Fabric: OW (Munsell: painted decoration: not available) - sample 14 (*cf.* Merkel and Prange in this report).
Bi-chrome painting on interior, centred, two buff concentric circles compose background, reddish lines form a basket or container.
References: Local production - "Jarash Bowl", related to Hayes 1972, ARS Form 104A, 105; *cf.* Uscatescu 1996: pl. 50.166-169 (Type X-11A and 12A). Decoration: *cf.* Uscatescu 1996: pl. 59.238-240 (Type X).
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Ring Base, Pointed Outside
32.
Pl. 4.32
J15-Of-39-3
Base.
Diam: 16.1.
Fabric: OW (Munsell: painted decoration: 10R 4/4 and 7.5YR 8/1).
Bi-chrome painting on interior, reddish outlines with buff filling depicting the head of an animal, probably a camel or a gazelle.
References: Local production - "Jarash Bowl", *cf.* decoration: Uscatescu 1996: 85-86 (Motif 31-32), fig. 27.
Date: Late Byzantine-Early Umayyad.

Bowls (HM)
Carinated with Horisontal, Out-Turned Rim
33.
Pl. 5.33
J15- Qd-9-21
Rim.
Diam.: 21.0.
Fabric: OW.
Handle attachment just below the rim and on carination visible.
References: Lichtenberger *et al.* 2017: fig. 64; Uscatescu 1996: 108 (Type XVI-5), pl. 38.24 with further references.
Date: Roman (2nd-4th century AD).

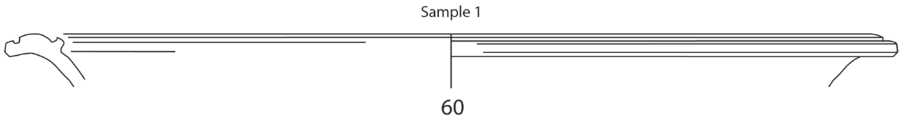
34.
Pl. 5.34
J15- Qac-40-6
Rim.
Diam.: 18.9.
Fabric: OW.
Handle attachment just below the rim and on carination visible.
References: Lichtenberger *et al.* 2017: fig. 56; Lichtenberger *et al.* 2018: fig. 46; Uscatescu 1996: 108 (Type XVI-5), pl. 38.23 with further references.
Date: Roman (2nd-4th century AD).

35.
Pl. 5.35
J15-R-29-9
Rim.
Diam.: 26.8.
Fabric: OW.
References: Related to Uscatescu 1996: 108 (Type XVI-5), pl. 38.23 with further references.
Date: Roman (2nd-4th century AD).

36.
Pl. 5.36
J15-R-29-10
Rim.
Diam.: 14.9.
Fabric: OW.
Handle attachment just below the rim and on carination visible.
References: Uscatescu 1996: 108 (Type XVI-5), pl. 38.23 with further references.
Date: Roman (2nd-4th century AD).

Tableware (HM)
Western-Mediterranean Imports
Western-Mediterranean tableware imports are rare. The body fragment of a Sigillata, probably of south-Gaulish origin was mould made and belongs to the bowl type Dragendorff 37. The fabric is well levigated, light orange-reddish in colour with very fine yellowish inclusions. The slip is thick, dark reddish-brown in colour. Finds of this type and origin are rare, not only in Jarash but in the whole Eastern Mediterranean [regarding Gaulish Sigillata and the scarcity of them in the Eastern Mediterranean, see *e.g.* Kenkel 2012: 131 with further references].

Pl. 8



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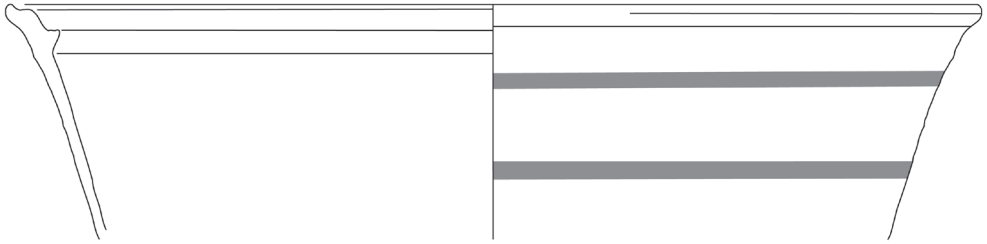

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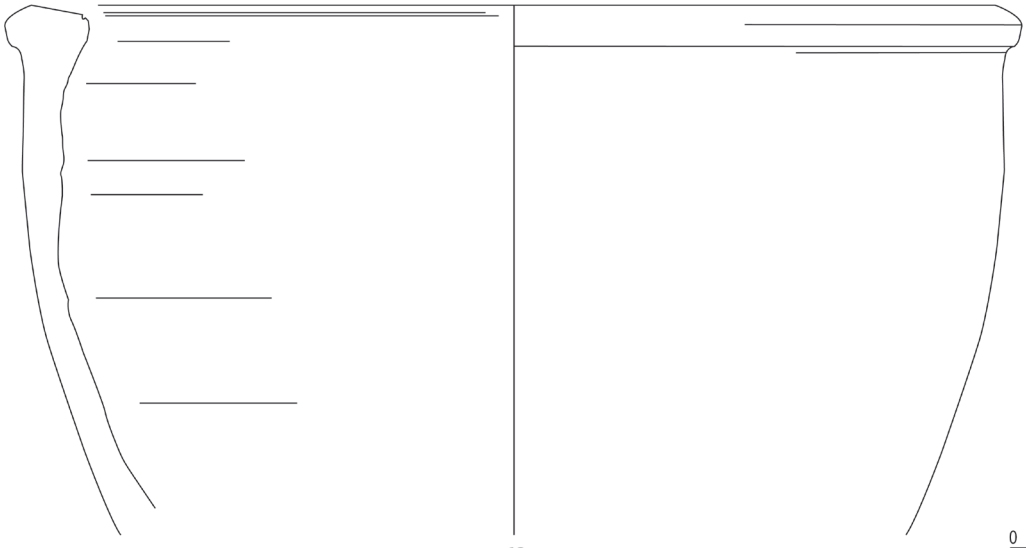


63

0 5cm

More common are imports of African Red Slip Ware (ARS). Their spectrum of types even influences the local pottery production in Jarash (*cf.* pl. 3.22) from Roman times onwards. Most common are bowls with a plain rim of ARS fabric group C, probably of central-Tunisian origin (*cf. e.g.* Bonifay 2004: 50-51). This type was found mainly in Trenches J and N and seems to be the most commonly imported type of ARS in the Northwest Quarter. The other example, with flange on the exterior below the rim and hooked at the edge, possibly belongs to ARS fabric group D. Production sites of this fabric group have been mainly discovered in the north of Tunisia (*cf. e.g.* Mackensen and Schneider 2002: 128).

South Gaulish
Bowl
Relief Decorated/Moulded
37.
Pl. 5.37
J15-Qh-3-7
Body.
Fabric: Gaulish Sigillata, see above.
Relief decoration: grapes and leaves.
References: Could refer to Hayes 2008: 195 (Type: Dragendorff Form 37), pl. 43.739-741.
Date: Roman (1st-2nd century AD).

African Red Slip Ware (ARS)
Bowl
With Flange on Exterior Below Rim, Hooked at Edge
38.
Pl. 5.38
J15-Nb-57-55
Rim.
Diam.: 33.2.
Fabric: ARS D2?
References: Uscatescu 1996: fig. 43.97 (Hayes ARS Form 91B); Bonifay 2004: 177 (Type 50), fig. 95.
Date: Byzantine (1st half of 5th century AD).

With Plain Rim
39.
Pl. 5.39
J14-Jc-67-1128
Rim.
Diam.: 21.3.
Fabric: ARS C2.
With tiny beveled foot.
Context: Late Roman pottery fill in Trench J.
References: Lichtenberger *et al.* 2018: fig. 2; Hayes 1972, ARS Form Hayes 50A; Uscatescu 1996: fig. 42.89 (Hayes Form 50B).
Date: Roman (late 3rd-early 4th century AD).

Tableware
Eastern-Mediterranean Imports

Among the Eastern-Mediterranean finds, Eastern Sigillata is the most common tableware import in Roman times (Hayes 2008: 20). Their shapes were even copied in the locally produced pottery shapes (*cf.* pl. 3.20-22). The original production centre of the ESA found in Gerasa remains uncertain [Regarding archeometrical analyses of ESA in general, see *e.g.* Schneider 2000: 532; Slane 1997: 394-406]. Further analysis is necessary. Typically, the fabric is whitish-yellowish in colour, high fired and well levigated with hardly any inclusions. They are covered by a thick, deep-reddish slip that sometimes turns out a bit flaky. The ESA productions found during the 2015 campaign all resemble productions of the 1st century AD.

While ESA dominated the imported tableware in early Roman times, Late Roman C Ware, also known as Phocaen Red Slip Ware, seems to be the most imported ware in the Byzantine period, even though its quantity compared to the local tableware is very low. Especially the type with overhanging rims (pl. 6.45-46) finds similarities in the contemporary local "Jarash-Bowl" production. The fabric, in general, is light red-reddish brown in colour and well levigated. Small yellowish-white inclusions are frequent. They are covered by a very thin colourless slip, and sometimes, dark discoloration occurs along the vessels' rim due to the firing process [Concerning the fabric of LRC Ware, *cf. e.g.* Ladstätter and Sauer 2005: 146]. Further petrographic analyses are necessary to characterise the fabric types found in Jarash more precisely and attribute them to production centres.

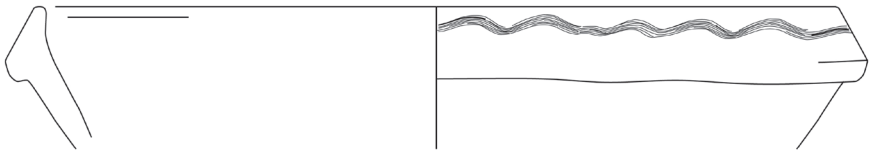
Eastern Sigillata A (ESA)
Bowl
With High Ring Base, Small in Diameter
40.
Pl. 5.40
J15-R-29-13
Base.
Diam.: 3.7.
Fabric: ESA, see above.
References: Hayes 2008: 140 (Type: Atlante II Form 51?), fig. 7.179.
Date: Early Roman (1st century AD).

With Ring Base, Carinated Body
41.
Pl. 5.41
J15-R-29-11
Base.
Diam.: 8.8.
Fabric: ESA, see above.
References: Hayes 2008: 128-129 (Type: Atlante II Form 29-30), fig. 3.45, 47 and 52.
Date: Early Roman (late 1st century BC-1st half 1 century AD).

Plate
With Ring Base
42.
Pl. 5.42
J15-R-25-6
Base.
Diam.: 12.5.
Fabric: ESA, see above.
References: -
Date: Early Roman.

With Vertical and High Ring Base
43.
Pl. 5.43
J15-Qac-40-7
Base.
Diam.: 12.8.
Fabric: ESA, see above.
References: Related to Hayes 2008: 137 (Type: Atlante II Form 29-37), fig. 6.144 and 147.
Date: Early Roman (late 1st century AD).

Pl. 9



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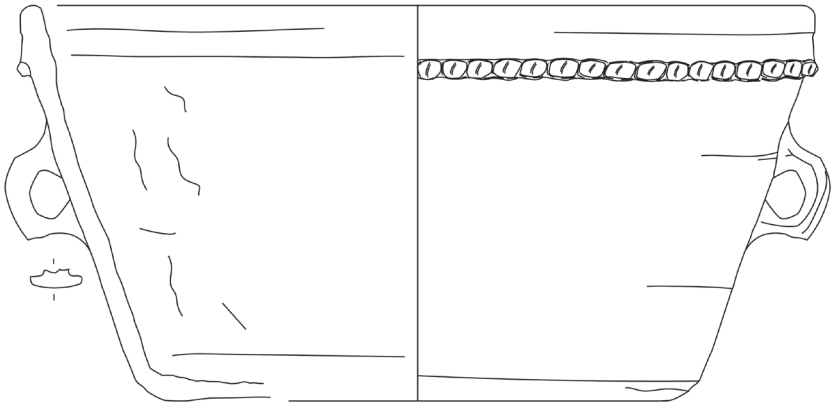

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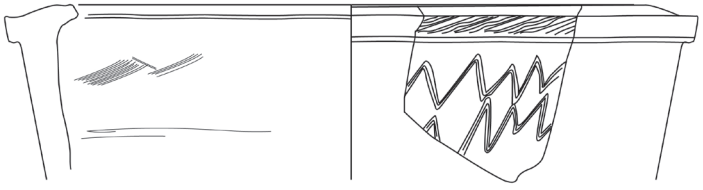

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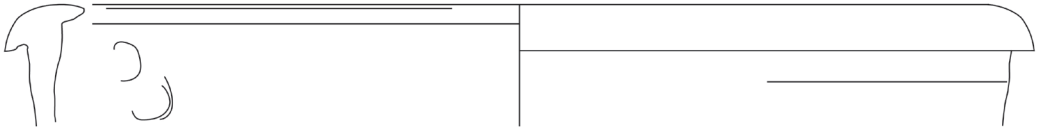
Sample 3



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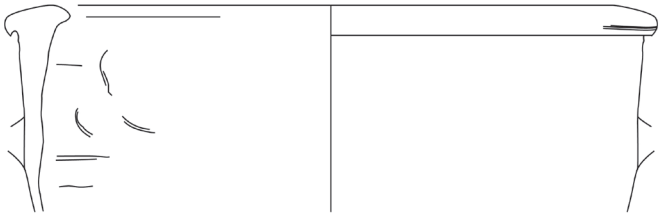


68

0 5cm

Jug
with ring-base
44.
Pl. 5.44
J15-R-25-7
Base.
Diam.: 6.7.
Fabric: ESA, see above.
Wheel-turn marks clearly visible on the inside.
References: Hayes 2008: 135, fig. 5.125 and 147.
Date: Early Roman (late 1st century BC-1st half of 1st century AD).

LATE ROMAN C Ware (LRC)
Bowl
With Overhanging Rim and Flat Underside, Grooved
45.
Pl 6.45
J15-Jk-1-3
Rim.
Diam.: 19.8.
Fabric: LRC, see above.
References: Hayes 1972, LRC Form 3; Uscatescu 1996: fig. 45.122-128 (Hayes Form 3E/F).
Date: Byzantine (5th century AD).

46.
Pl. 6.46
J15-Nb-57-57
Rim.
Diam.: R 21.0 cm.
Fabric: LRC, see above.
References: Hayes 1972, LRC Form 3; Uscatescu 1996: fig. 45.122-128 (Hayes Form 3E/F).
Date: Byzantine (5th century AD).

Stamped Cross
47.
Pl. 6.47
J15-Nb-57-233
Base.
Diam.: ?
Fabric: LRC, see above.
References: Hayes 1972, LRC Motif 71c; Ladstätter and Sauer 2005: cat. 110 (Stempelstil Gruppe III).
Date: Late Byzantine (6th century AD).

With Slightly Overhanging, Thickened Rim, Flattened on Top
48.
Pl. 6.48
J15-Nb-49-15
Rim.
Diam.: 24.1.
Fabric: LRC, see above.
References: Related to Hayes 1972, LRC Form 3 and Form 10C; *cf.* Hayes 2008: 243 (transitional form to 10), fig. 40.1298 and Hayes 2008: 246 (Form 3H), fig. 42.1332.
Date: Byzantine (late 5th-6th century AD).

Tableware
Jugs/Trifoiled Jugs

The closed shapes are dominated by jugs with trifoiled rim in different sizes (pl. 6.49-50). Sometimes, they are slipped with a thin reddish slip on the interior and exterior. Another type occurs in different variations with incised grooves on the rim and handles that are either attached to the rim or neck and end on the vessels shoulders (pl. 6.51-53). The shape of the rim suggests that it carried a lid.

Two Late Byzantine/Early Umayyad jars are decorated with white paint on the exterior and the interior rim. One of them (pl. 7.56) additionally carries uneven incised zig-zag lines on the vessel's shoulder. The combination of incised lines and white paint is very common on vessels of this kind. Two pieces have been analysed by elemental mass spectrometry and petrography (sample 15, pl. 6.51; sample 11, pl. 6.54). Both can be attributed to the main fabric group, which was locally produced (*cf.* Merkel and Prange in this report).

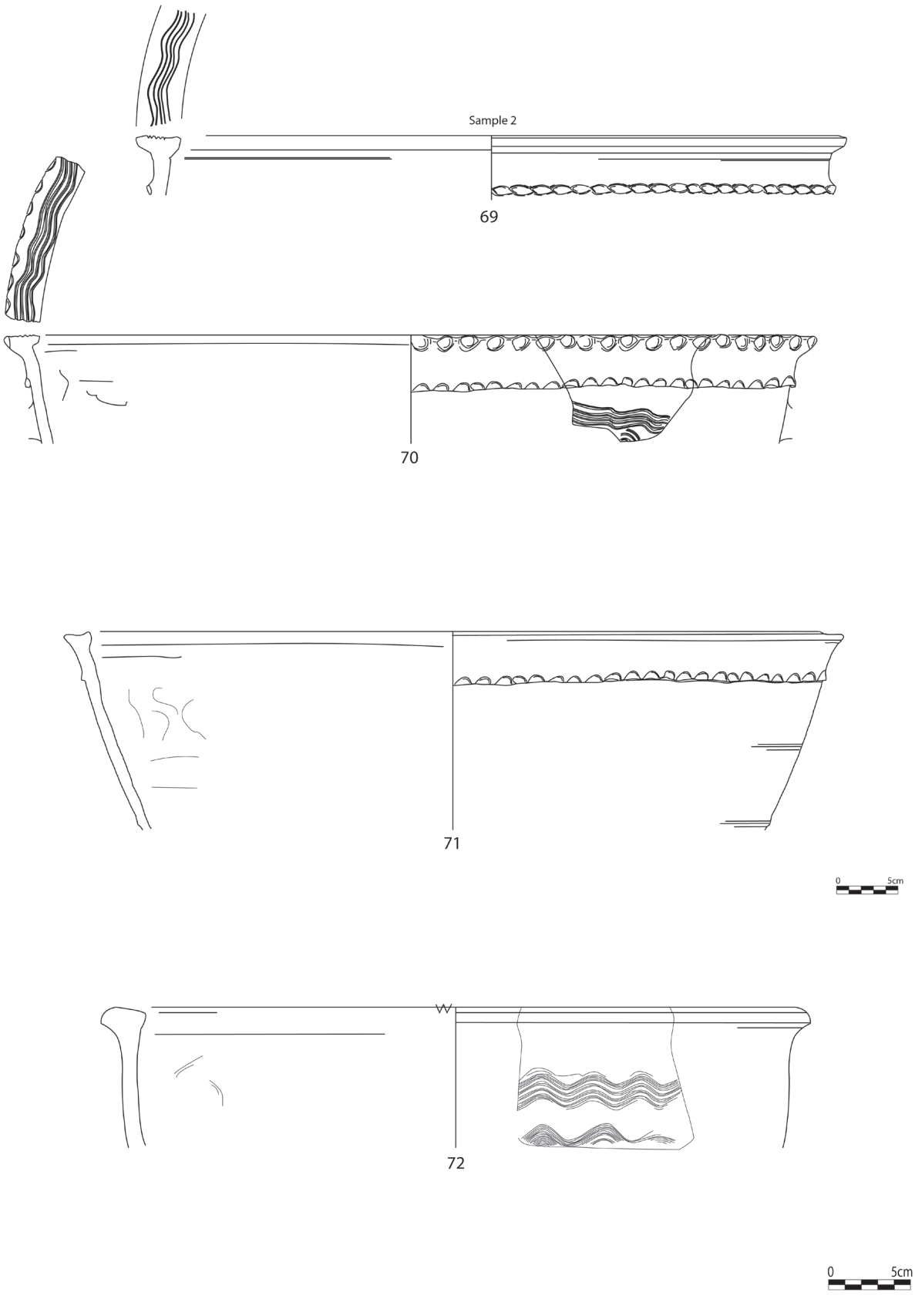
Jug
With Trifoiled Rim
49.
Pl. 6.49
J14-Jc-61-1145
Rim.
Diam.: 4.3 and 3.7.
Fabric: OW.
Oval handle is attached to the rim and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Related to Rasson 1986: 67-69, fig. 18.3.
Date: Late Roman.

50.
Pl. 6.50
J15-Qd-11-4
Rim
Diam.: 3.4 und 1.8
Fabric: OW
Oval handle is attached to rim and shoulder.
References: Lichtenberger *et al.* 2017: fig. 73; related to Rasson 1986: 67-69, fig. 18.3.
Date: Late Roman.

With Groove on Top of the Rim (Bifid)
51.
Pl. 6.51
J14-Jc-61-1130
Rim.
Diam.: 8.8.
Fabric: OW - sample 15 (*cf.* Merkel and Prange in this report).
Oval handle is attached to rim and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Rasson 1986: 67-68, fig. 18.3; Clark and Falkner 1986: 248-249, fig. 20.10; Brizzi, Sepio and Baldoni 2011, fig. 10.1.
Date: Roman (3rd century AD).

52.
Pl. 6.52
J14-Jc-61-1134
Rim.
Diam.: 6.7.
Fabric: OW.
Oval handle is attached to neck and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Rasson 1986: 67-68, fig. 18.3; Clark and Falkner 1986: 248-249, fig. 20.10; Brizzi, Sepio and Baldoni 2011, fig. 10.1.
Date: Roman (3rd century AD).

Pl. 10



53.
Pl. 6.53
J15-Qd-43-17
Rim.
Diam.: 7.9.
Fabric: OW.
Oval handle is attached to rim and shoulder.
References: Rasson 1986: 67-68, fig. 18.3; Clark and Falkner 1986: 248-249, fig. 20.10; Brizzi, Sepio and Baldoni 2011: fig. 10.1.
Date: Roman (3rd century AD).

Jar
With S-Curved Neck and Profiled Shoulder
54.
Pl. 6.54
J14-Je-77-1079
Rim.
Diam.: 7.0.
Fabric: OW - sample 11 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: -
Date: Late Byzantine/Early Umayyad.

With Outward-Folded, Horisontal Rim
55.
Pl. 6.55
J15-R-22-16
Rim.
Diam.: 12.5.
Fabric: OW.
Oval handles are attached at rim and upper body.
References: Uscatescu 1996: 131 (Type XXXII-2) and pl. 38.29 with further references.
Date: Roman (3rd century AD).

Jar?
With on-the-Outside Thickened, Overlapping Rim and Slightly S-Curved Neck
56.
Pl. 7.56
J14-Je-77-21/22 and 49
Rim.
Diam.: 13.1.
Fabric: GW/OW.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
Oval handle is attached to rim. Irregularly set whitish circular lines in two rows on shoulder and exterior body. Inside are traces of white paint.
References: Uscatescu 1996: 141-142 (Type XXXV-1, 2 and 6), pl. 86.539-542.
Date: Late Byzantine (6thcentury AD).

57.
Pl. 7.57
J15-Pc-16-75a
Body.
Diam.: 21.0.
Fabric: OW.
Traces of irregularly set whitish wavy lines on the exterior of shoulder and body. Traces of white paint also on the interior rim. Incised zig-zag pattern on shoulder just underneath the white paint.
References: Uscatescu 1996: pl. 80.479 (Type XXVIII) and pl. 85.530 (Type XXXIV-13).
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

Common ware (HM)
Food Preparation/Basins

Basins with flaring, slightly profiled rims and a reduced neck are very common from the Roman period onwards. One intact profile shows the concave-curved base of the vessel (pl. 7.56-57); later variants have a steeper rim, and some occur with white stripes on the outside (pl. 8.62).

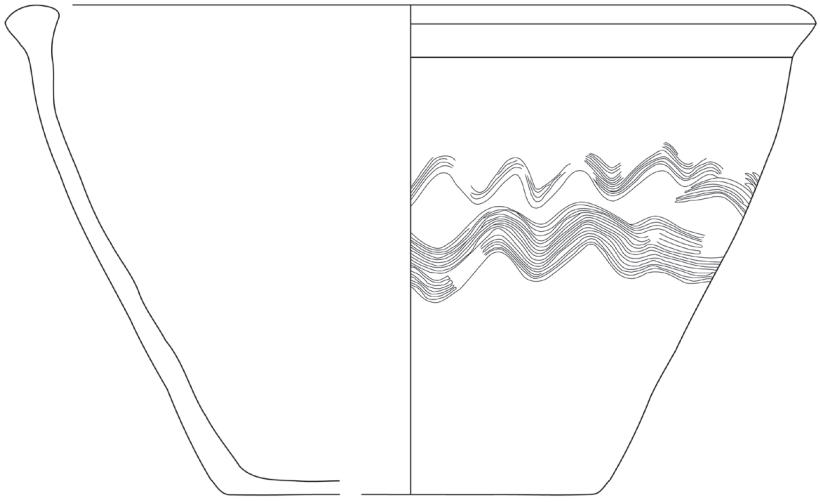
In Byzantine times, large wheel-made basins (pl. 9.65-pl. 12.75) are available, carrying a second layer of clay on the interior that is pressed against the interior wall and covers the whole inner surface [This became apparent when looking at the thin-section of a basin (sample 2, pl. 10.69) *cf.* Merkel and Prange in this report]. Fingerprints are visible on the interior, irregularly scattered along the wall and floor of the vessel [The visible fingerprints on the inside have often misleadingly led to a description of this type of vessel as hand-made, rather than wheel-thrown, *cf. e.g.* Brizzi, Sepio and Baldoni 2011: 362 and fig. 11.14-15]. This characteristic treatment occurs on numerous types, all of which are large basins from the Byzantine period onwards into Umayyad times. Vessels are made mainly of grey-ware fabric, but they also occur in orange ware. They are often comb-decorated, mostly with irregularly set wavy lines on the rim (pl. 10.69-70) or exterior (pl. 10.72-79). Particularly, one type with a horizontal rim, overlapping the interior and exterior, occurs very often with a pie-crust pattern. One vessel with a sieved bottom remains a unique find until now (pl. 11.74).

Three samples have been chosen for elemental mass spectrometry and petrography (sample 1, pl. 8.60; sample 3, pl. 9.67; sample 2, pl. 10.69). Two of them belong to the large basins with irregularly scattered fingerprints on the interior. They are all part of the main local fabric group (*cf.* Merkel and Prange in this report).

Basins
With Flaring, Slightly Profiled Rim and Reduced Neck
58.
Pl. 7.58
J15-Qd-52-11
Rim.
Diam.: 37.5.
Fabric: OW, misfired sherd.
References: Uscatescu 1996: 104 (Type XV-5B) and pl. 72.375 with further references. Late Byzantine (6thcentury AD); from earlier Late Roman to Byzantine contexts *cf.* Clark and Falkner 1986: 248-249, fig. 20.16. (4th-5th century AD). Due to the pure Roman context in Trench Q, it is most likely that this type was already produced in the 3rd century AD.
Date: Roman.

59.
Pl. 7.59
J14-Jc-67-11A
Intact profile.
Diam.: 32.9.
Fabric: OW.
Context: Late Roman pottery fill in Trench J.

Pl. 11



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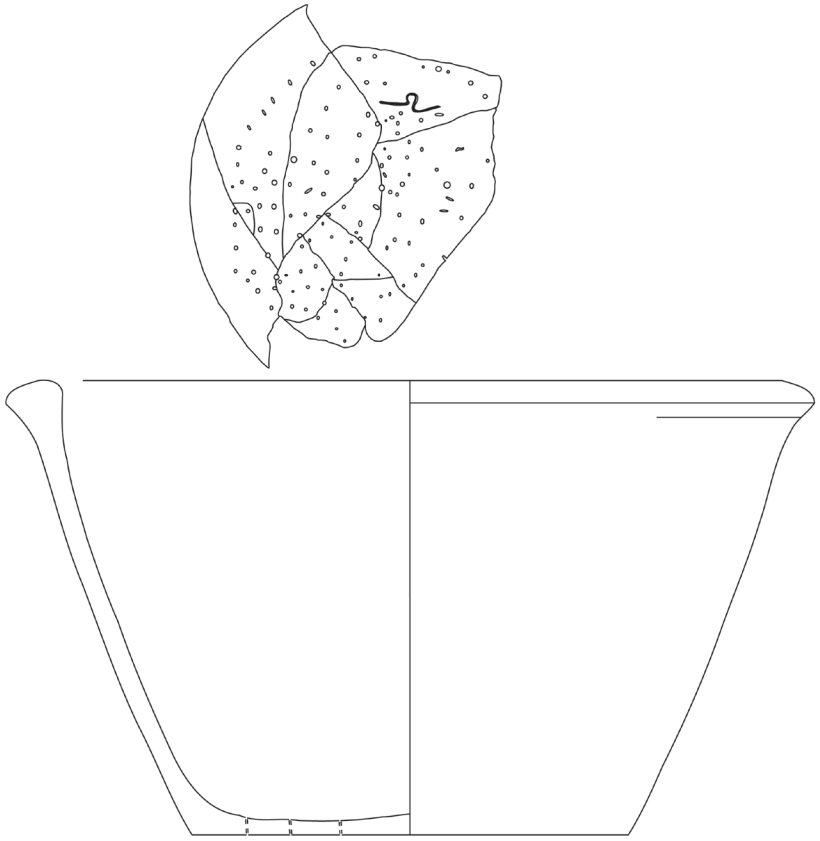


74

0 5cm

The concave base is slightly stepped.
References: Lichtenberger *et al.* 2017: fig. 107; Uscatescu 1996: 104 (Type XV-5A) and pl. 71.372 - with further references. Late Byzantine (6thcentury AD); from earlier Roman (3rd century AD) contexts, *cf.* Clark and Falkner 1986: 248-249, fig. 20.17. Due to the context (see above), the basin shown here was produced no later than Late Roman times.
Date: Roman.

With Flaring Rim and Internal Ledge
60.
Pl. 8.60
J14-Je-77-1037
Rim.
Diam.: 40.5.
Fabric: GW - sample 1 (*cf.* Merkel and Prange in this report).
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Uscatescu 1996: 105 (Type XV-8) and pl. 72.379 with further references.
Date: Late Byzantine (6th century AD).

61.
Pl. 8.61
J15-Oe-64-14
Rim.
Diam.: 34.7.
Fabric: GW.
References: Uscatescu 1996: 105 (Type XV, subtype 7A and 7B) and pl. 72.377-378 with further references. Late Byzantine, from earlier Late Roman-Early Byzantine context (4th-5th century AD), *cf.* Clark and Falkner 1986: 248-249, fig. 20.15.
Date: Late Byzantine.

62.
Pl. 8.62
J15-Nb-57-229
Rim.
Diam.: 44.2.
Fabric: GW.
With two white stripes on the exterior body.
References: Uscatescu 1996: 105 (Type XV-7B) and pl. 72.378 with further references.
Date: Late Byzantine.

With Thickend Rim
63.
Pl. 8.63
J15-Jl-32-1
Rim.
Diam.: 45.7.
Fabric: OW.
Small groove on the interior rim.
References: -
Date: Due to the context (Late Roman fill), the basins cannot have been produced later than in Late Roman times.

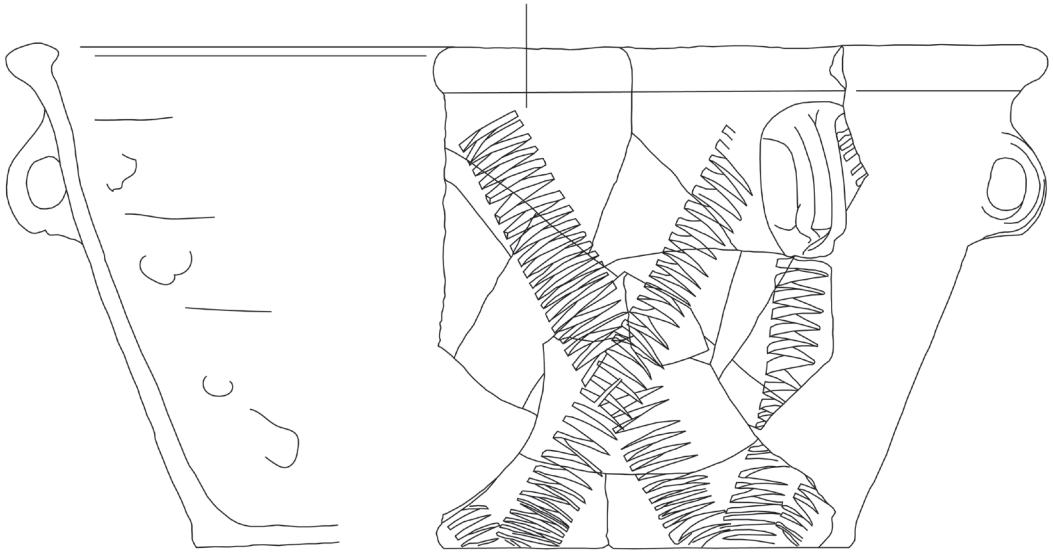
With Ledged Rim
64.
Pl. 9.64
J15-Oe-57-34
Rim.
Diam.: 38.1.
Fabric: OW.
Wavy incised lines are decorating the outer part of the rim.
References: Lichtenberger, Raja and Sørensen 2013: 39-40, fig. 110; Uscatescu 1996: 168 (Type XLII-7) and pl. 99.671. Date: Late Byzantine-Early Umayyad (6th-7th century AD); of earlier Byzantine date, *cf.* Winnet and Reed 1964: pl. 65.20.
Date: Byzantine-Early Umayyad.

Basins, wheel-thrown, but in a later production process hand molded on the inside
With Ledged Rim
65.
Pl. 9.65
J14-Je-77-6A
Intact profile.
Diam.: 35.0.
Fabric: GW.
The rim is decorated with a "pie-crust" pattern. Two vertical handles are attached to the vessel's body.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: 38-39, fig. 101; Lichtenberger *et al.* 2017: fig. 103; Lichtenberger *et al.* 2018: fig. 75; Uscatescu 1996: 146-147 (Type XXXVI-1, subtypes 1A and 1B, Type XXXVI-2A) and pl. 86.545-548, related also Type XXXVI-2, subtypes 2B-2D, Type XXXVI-3, subtypes 3A and 3B, pl. 87.549-554 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Incurved and Almost Horisontal Rim, on Exterior Slightly Out-Turned/Overlapping
66.
Pl. 9.66
J15-Qd-11-26
Rim.
Diam.: 30.8.
Fabric: OW.
The rim is cut carelessly on the interior and exterior. Two lines of incised irregularly set zig-zag pattern decorate the body just below the rim.
References: Decoration similar to Lichtenberger *et al.* 2018: fig. 77; Uscatescu 1996: 169 (Type XLII, subtypes 6A-6C), pl. 98.665-667 and pl. 99.668 with further references.
Date: Late Byzantine (6th century AD).

67.
Pl. 9.67
J14-Je-77-1030
Rim.
Diam.: 45.4.
Fabric: GW - sample 3 (*cf.* Merkel and Prange in this report).
The rim is almost pointed on the inside and outside.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Uscatescu 1996: 169 (Type XLII, subtypes 6A-6C), pl. 98.665-667 and pl. 99.668 with further references.
Date: Late Byzantine (6th century AD).

Pl. 12



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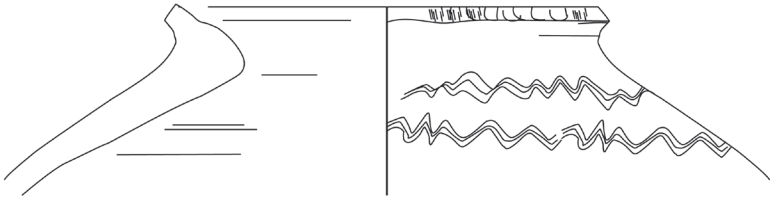
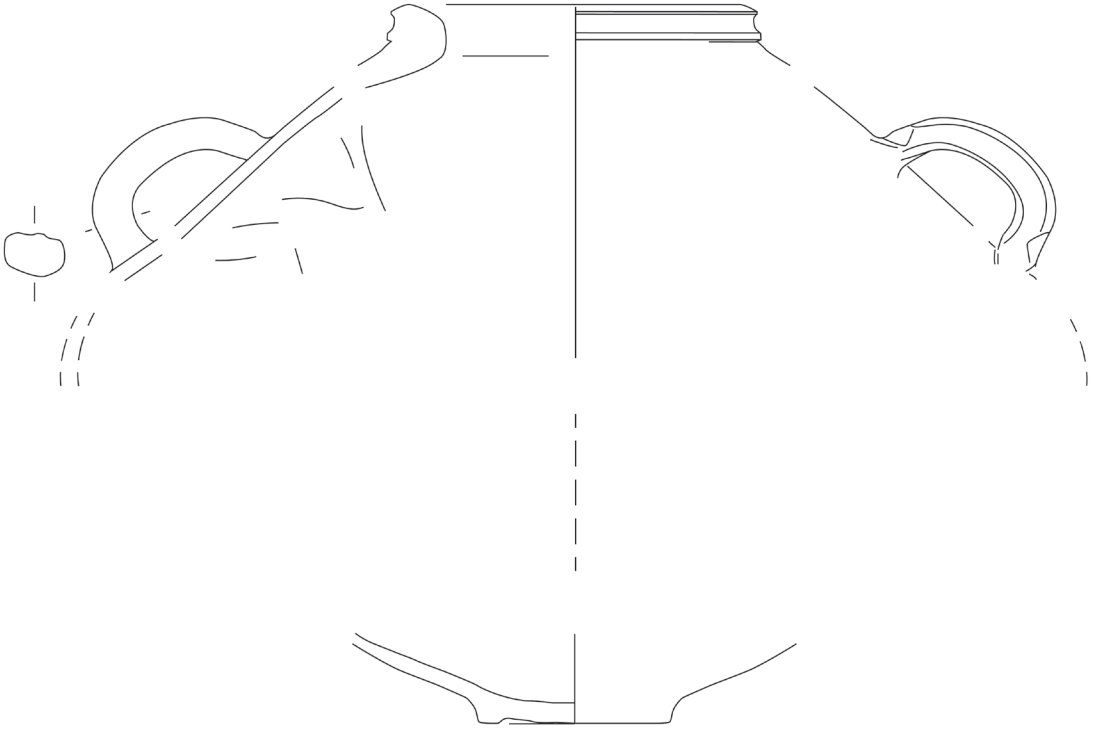


76

0 5cm

77



0 5cm

68.
Pl. 9.68
J15-Of-9-10
Rim.
Diam.: 28.9.
Fabric: GW.
The rim is rounded on the inside and outside, and on the outside, it is slightly overlapping. Handle attachment on the body is visible.
References: Uscatescu 1996: 105 (Type XV-8), pl. 72.380 with further references.
Date: Late Byzantine (6th century AD).

With Horizontal Rim, Overlapping the Inside and Outside
69.
Pl. 10.69
J14-Je-77-1017
Rim.
Diam.: 54.8.
Fabric: GW - sample 2 (*cf.* Merkel and Prange in this report).
Combed decoration on top of the rim. The ledge is decorated with a "pie-crust" pattern.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: 38-39, fig. 106; Uscatescu 1996: 150 (Type XXXVI-13), pl. 91.587 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

70.
Pl. 10.70
J15-Ob-13-19
Rim.
Diam.: 62.5.
Fabric: GW.
Combed decoration on top of the rim, "pie-crust" pattern on the outside. The ledge is decorated with a "pie-crust" pattern. The exterior body just underneath the ledge is comb decorated. Handle attachment on the body visible.
References: Lichtenberger, Raja and Sørensen 2013: 38-39, fig. 102; Lichtenberger *et al.* 2017: fig. 114; Uscatescu 1996: 150 (Type XXXVI-13), pl. 91.587; *cf.* also Uscatescu 1996: 148 (Type XXXVI-8), pl. 89.567 and p. 149 (Type XXXVI-11A), pl. 90.577 for the pattern with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

71.
Pl. 10.71
J15-Oe-57-44
Rim.
Diam.: 60.1.
Fabric: GW.
The rim is decorated with an incised wavy pattern on top as well as a "pie-crust" pattern on the outside. The ledge is decorated with a "pie-crust" pattern. The exterior body just underneath the ledge is comb decorated. The body just underneath the ledge is decorated with irregularly set wavy lines and other geometrical patterns. Handle attachment on the body visible.
References: Lichtenberger, Raja and Sørensen 2013: 39-40, fig. 105; Lichtenberger *et al.* 2017: fig. 111; Uscatescu 1996: 146-147 (related to Type XXXVI-2D), pl. 87.551. *Cf.* also Uscatescu 1996: 147 (Type XXXVI-3B and 4, subtype 4A and 4B), pl. 87.554-557 and p. 147 (Type XXXVI-4, subtype 4C and 4D), pl. 88.558-559 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Thickend Rim
72.
Pl. 10.72
J15-Ob-107-1
Rim.
Diam.: 41.1.
Fabric: GW.
Double line of combed decoration on exterior body.
References: Lichtenberger *et al.* 2018: fig 82; Uscatescu 1996: 152 (Type XXXVI-20), pl. 106.736 ("transitional") with further references.
Date: Early Umayyad (7th century AD).

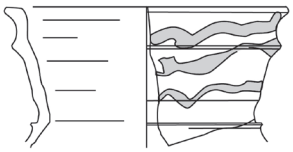
73.
Pl. 11.73
J15-Ob-111-1
Whole profile.
Diam.: 35.3.
Fabric: GW.
Double line of combed decoration on exterior body.
References: Uscatescu 1996: 151 (Type XXXVI-16, subtype 16A and 16B), pl. 110.779 and 781 with further references.
Date: Umayyad (7th - 8th century AD).

74.
Pl. 11.74
J15-Pd-16-6x
Whole profile.
Diam.: 35.3.
Fabric: GW.
The base is covered with both small and large holes, irregularly set. Sieve.
References: Type refers to Uscatescu 1996: 151 (Type XXXVI-16, subtype 16A and 16B), pl. 110.779 and 781 with further references.
Date: Umayyad (7th-8th century AD).

With Thickened Rim, Slightly Undercut Inside
75.
Pl. 12.75
J15-Nd-28-1
Intact profile.
Diam.: 46.3.
Fabric: GW.
Triangular diagonal tool used to create pattern; the decoration runs under the rim and on the exterior. Two vertical handles are attached to the vessel just below the rim.
References: Lichtenberger *et al.* 2018: fig. 80-81. For type, *cf.* Uscatescu 1996: 152-153 (Type XXXVI-24-25), pl. 107.746-750; for decoration itself, *cf.* Uscatescu 1996: 152 (Type XXXVI-21B), pl. 106.739 with further references.
Date: Late Byzantine-Umayyad (6th/7th century-first half of the 8th century AD).

Pl. 13

78



79

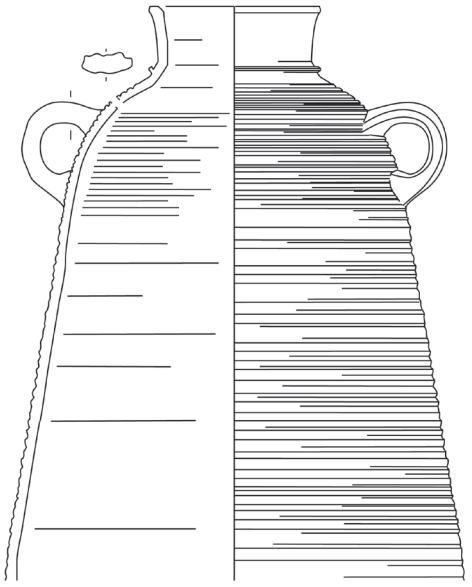
0 5cm

Sample 18

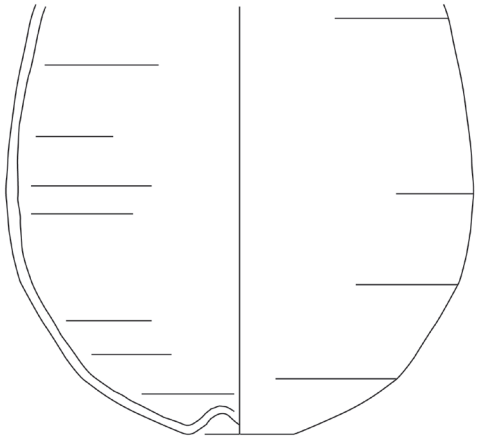
80

Sample 8

81

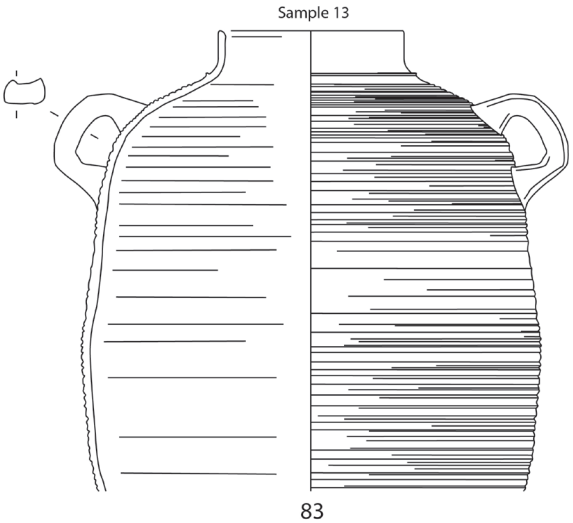


82



84

Sample 13



83

0 5cm

Common Ware/Transport Vessels (HM)
Storage Jars/Amphorae

In Byzantine and Umayyad contexts, numerous very large storage jars (pl. 12.76-77) of different types occur, often associated with large basins. Also earlier examples exist that were already produced in the Roman period. One vessel with two vertical, oval shaped handles can be reconstructed, due to the perfect find conditions (pl. 12.77). Some of the storage jars carry incised, irregularly set wavy lines on their neck. Smaller storage jars or bag-shaped amphorae were found in contexts not older than Late Roman times but mainly in Byzantine and Umayyad layers (pl. 13.80-84 and pl. 14.85). Their type resembles the bag-shaped amphora, which has a long tradition in the Levant, starting already in the Hellenistic period and continuing with slight variations up to the Umayyad period. Some types found in Jarash refer to the type of Late Roman Amphora 5/6 (LRA 5/6) [Concerning the typology of LRA 5/6, see *e.g.* Piéri 2005], an amphora that was produced in the Levant, but also in Egypt [Concerning the production sites in Egypt, *cf.* recently Dixneuf 2011] from Byzantine times onwards. Different to other places [*e.g.* Kenkel 2012: 231 remarks that, at Tall Zarʻā, not only does a large variety of types exist, but the same goes for fabrics and therefore productions], the fabric of these amphorae or storage jars is quite homogeneous, and first results of the elemental mass spectrometry and petrography showed that the fabric of these jars or amphorae fits into the main group of local production (sample 13, pl. 13.81 and sample 8, pl. 13.83). There is only one exception (sample 18, pl. 13.80) that differs slightly. These studies have to be further intensified, not only regarding the fabric analyses, but also in regard to the content analysis (*cf.* Springer and Polla in this report) and function of the vessels in general. Some of them have a hole pierced in after firing (*e.g.* pl. 13.82). These holes normally occur on amphorae carrying wine, since the holes are said to be necessary for the fermentation of wine.

Storage Jars
With Flaring, Inclined Rim
76.
Pl. 12.76
J15-Pb-16-161
Rim.
Diam.: 19.8.
Fabric: OW.
The rim is irregularly cut. Wavy irregularly incised patterns occur just below the rim.
References: Uscatescu 1996: 166-167 (Type XLI-9-11), pl. 97.650-653 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Flaring Rim, Profiled on the Outside
77.
Pl. 12.77
J15-Jk-58-24, 28-29
Profile partly reconstructed.
Diam.: 21.5.
Fabric: OW.
Vertical handles.
References: -
Date: Late Roman

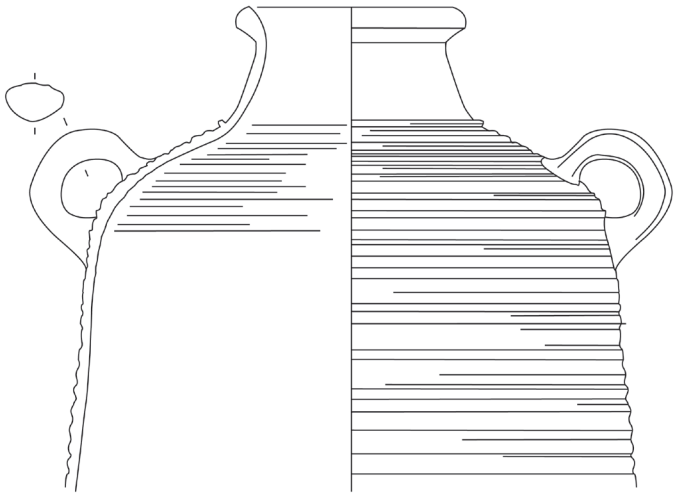
With Short Cylindrical Neck
78.
Pl. 13.78
J15-Pa-55-7
Rim.
Diam.: 9.4.
Fabric: GW/OW.
Traces of irregularly set wavy lines on the exterior neck, just below the rim. Traces of paint also on the interior of the rim, whitish in colour.
References: Uscatescu 1996: pl. 80.477 (Type XX-VIII-6); Ball *et al.* 1986: fig. 2.1.
Date: Late Byzantine-Umayyad (6th-8th century AD).

With Thickened Rim, Flattened on Top and Profiled Neck
79.
Pl. 13.79
J15-Pa-55-8
Rim.
Diam.: 12.5.
Fabric: GW/OW.
Surrounding ledge just underneath the rim. Three irregularly set horisontal wavy lines on neck just below the rim, whitish in colour.
References: Uscatescu 1996: 141-142 (Type XXXV-3, 5 and 10), pl. 105.725 and pl. 109.772, pl. 110.773; Ball *et al.* 1986: fig. 2.2.
Date: Umayyad-Abbasid (7th-9th century AD).

Storage Jars/Amphorae
With Short Cylindrical Neck
80.
Pl. 13.80
J14-Je-77-1066
Rim.
Diam.: 9.7.
Fabric: OW - sample 18 (*cf.* Merkel and Prange in this report).
Two oval-looped handles attached to the shoulder and upper body.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: fig. 123; Uscatescu 1996: 158-159 (Type XXXVII-1, subtypes 1A-1D), pl. 92.593-597 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

81.
Pl. 13.81
J14-Je-77-1070
Rim.
Diam.: 8.9.
Fabric: OW - sample 8 (*cf.* Merkel and Prange in this report).
Two oval-looped handles attached to shoulder and upper body.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: fig. 123; Uscatescu 1996: 158-159 (Type XXXVII-1, subtypes 1A-1D), pl. 92.593-597 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

Pl. 14



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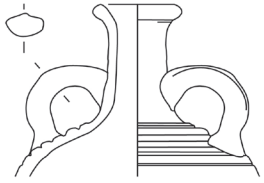

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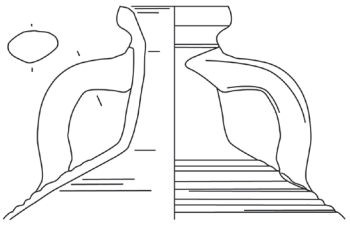

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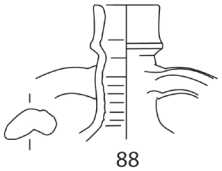
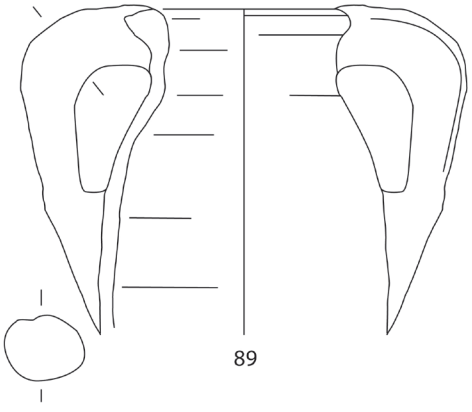
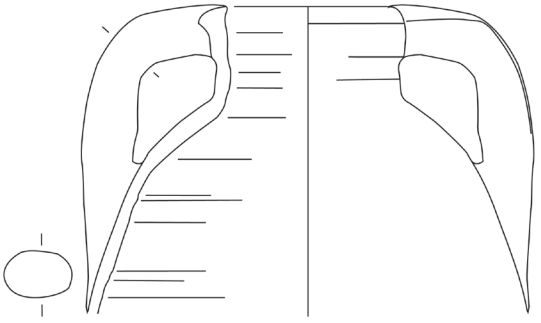


88

0 5cm



89



90

0 5cm

82.
Pl. 13.82
J14-Jh-95-7
Content of similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample 10006)
Rim.
Diam.: 9.7.
Fabric: OW.
Two oval-looped handles attached to the shoulder and upper body.
References: Lichtenberger, Raja and Sørensen 2013: fig. 123; Uscatescu 1996: 158 (Type XXXVII-1C), pl. 92.594 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

83.
Pl. 13.83
J14-Je-77-1
Rim.
Diam.: 11.0.
Fabric: OW - sample 13 (*cf.* Merkel and Prange in this report).
Two oval-looped handles attached to the shoulder and upper body.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: fig. 123; Uscatescu 1996: 158 (Type XXXVII-1A), pl. 92.593 with further references.
Date: Late Byzantine-Early Umayyad (6th-7th century AD).

With Concave S-Curved Base
84.
Pl. 13.84
J15-Ob-111-11
Base.
Diam.: 6.5.
Fabric: OW.
References: Uscatescu 1996: 161 (Type XXVII-9), pl. 94.617 with further references.
Date: Late Byzantine (6th century AD).

With Thickened Curved Rim, Slightly Out-Turned
85.
Pl. 14.85
J14-Jc-61-10003
Content of similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample 10003).
Rim.
Diam.: 10.4.
Fabric: OW.
Context: Late Roman pottery fill in Trench J.
References: Brizzi, Sepio and Baldoni 2011: fig. 10.6 (date: Roman, 3rd century AD) and fig. 11.13 (date: Late Byzantine-Early Umayyad, 6th-7th century AD). Same type continues from Roman to Late Byzantine/Early Umayyad period. Based on the context, the fragment belongs to the earlier production phase and was made no later than in Late Roman times.
Date: Late Roman.

With Slightly Out-Turned Rim
86.
Pl. 14.86
J14-Jc-61-10004
Rim.
Diam.: 4.0.
Fabric: OW.
Two oval handles attached to neck and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Lichtenberger, Raja and Sørensen 2013: fig. 2; Rasson 1986: 67-69, fig. 18.4.
Date: Roman (3rd century AD).

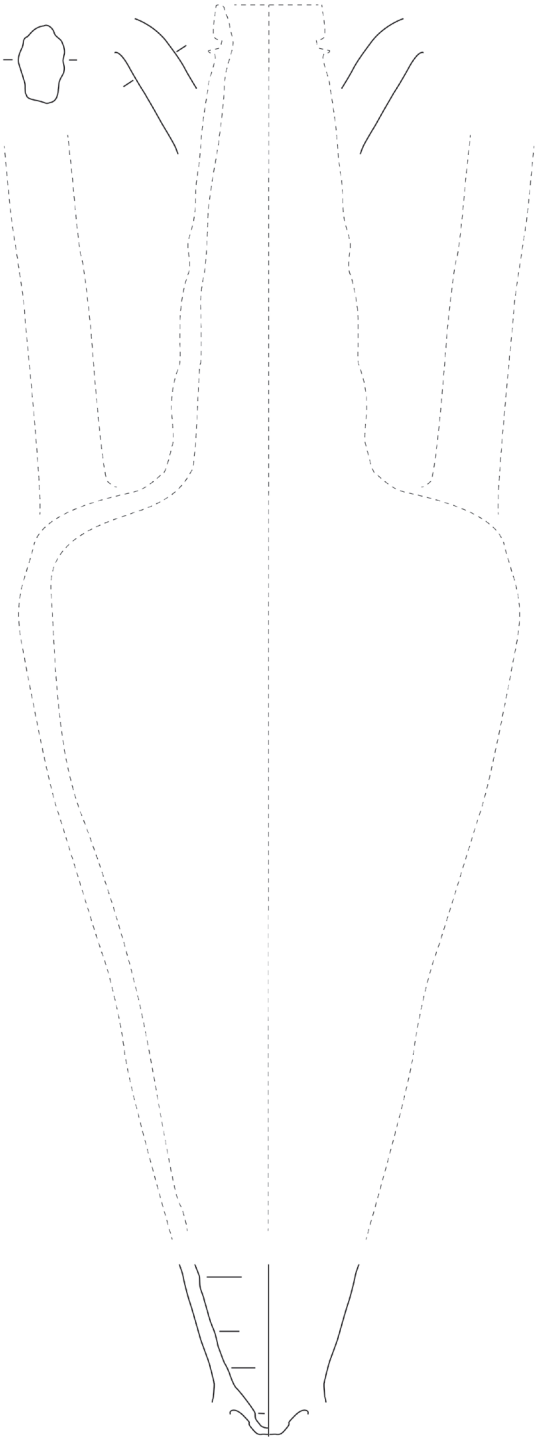
With Slightly Out-Turned, Thickened Rim, Profiled
87.
Pl. 14.87
J14-Jc-61-10005
Rim.
Diam.: 5.2.
Fabric: OW.
Two oval handles attached just below the rim and shoulder.
Context: Late Roman pottery fill in Trench J.
References: Could be an earlier type of Uscatescu 1996: 125, pl. 79.464-469 (Type XXVIII-1, subtype 1B and 1C) and p. 122, pl. 78.456 (Type XXVI-17); possibly related to Rasson 1986: 67-69, fig. 18.4.
Date: Roman (3rd century AD).

With High Vertical Rim, Exterior Slightly Undercut
88.
Pl. 14.88
J15-Qd-43-16
Rim.
Diam.: 3.0.
Fabric: OW.
Two oval handles attached just below the rim.
References: -
Date: Roman?

Transport Vessels (HM)
Amphorae
Western-Mediterranean Imports
Especially one large pottery fill found in Trenches J and N that can be dated to Late Roman times brought to light a high quantity of Almagro 50 (congruent with: Keay 22, Lusitana 6, Ostia 7, Peacock and Williams 22) Amphorae (pl. 14.89-90 and pl. 15.91). The vessels occur in two different types of fabric, one yellowish-brownish, sometimes slightly reddish in colour, hard and rough in fabric with some bigger quartz inclusions and some white and dark ones (AM50-1). Another production is yellowish-brown and much better levigated, with only a few very small brownish and whitish inclusions (AM50-2) [Regarding the fabric and kiln sites, *cf.* recently Bezeczky 2013: 179-180]. Kiln sites are known from the Iberian Peninsula, but further studies are needed to narrow down the production area of the examples found in Jarash. As for the contents of amphorae, fish and its derivates are generally suggested. However, content analyses (*cf.* Springer and Polla in this report) give further insights into this and will be studied in more detail (Bezeczky 2013: 180).

Pl. 15

91



92

0 5cm

Almagro 50
89.
Pl. 14.89
J15-Ji-5-2
The content of a similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample 10009).
Rim.
Diam.: 13.0.
Fabric: AM50-2, see above.
References: Lichtenberger *et al.* 2018: fig. 68; Arruda and Fabião 1990: 199-213; Benoit 1962: 147-176; Dias Diogo 1991: 179-191; Fabião and Arruda 1990: 215-224; Fabião and Carvalho 1990: 37-63; Keay 1984; Manacorda 1977: 117-254; Mayet, Schmitt and Silva 1996; Raposo *et al.* 2005; Silva, Coelho-Soares and Correia 1990: 225-246; *cf.* Bezeczky 2013: 179 (Type 66) with further references.
Date: Roman-Early Byzantine (late 3rd-5th century AD).

90.
Pl. 14.90
J15-Jj-14-19
The content of similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample 10010).
Rim.
Diam.: 12.2.
Fabric: AM50-1, see above.
References: Lichtenberger *et al.* 2018: fig. 68; Arruda and Fabião 1990: 199-213; Benoit 1962: 147-176; Dias Diogo 1991: 179-191; Fabião and Arruda 1990: 215-224; Fabião and Carvalho 1990: 37-63; Keay 1984; Manacorda 1977: 117-254; Mayet, Schmitt and Silva 1996; Raposo *et al.* 2005; Silva, Coelho-Soares and Correia 1990: 225-246; *cf.* Bezeczky 2013: 179 (Type 66) with further references.
Date: Roman-Early Byzantine (late 3rd-5th century AD).

91.
Pl. 15.91
J15-Jj-2-13; J15-Jj-26-14
Rim, handle and base.
Diam.: 13.0.
Fabric: AM50-1, see above.
References: Lichtenberger *et al.* 2018: fig. 68; Arruda and Fabião 1990: 199-213; Benoit 1962: 147-176; Dias Diogo 1991: 179-191; Fabião and Arruda 1990: 215-224; Fabião and Carvalho 1990: 37-63; Keay 1984; Manacorda 1977: 117-254; Mayet, Schmitt and Silva 1996; Raposo *et al.* 2005; Silva, Coelho-Soares and Correia 1990: 225-246; *cf.* Bezeczky 2013: 179 (Type 66) with further references.
Date: Roman-Early Byzantine (late 3rd-5th century AD).

Amphorae
Eastern-Mediterranean Imports

Several fragments of Kapitän II (congruent with: Benghazi Mid Roman Amphora 7, Hollow Foot Amphora, Kuzmanov 7, Niederbieber 77, Ostia 6, Peacock and Williams 47, Zeest 79) amphorae (pl. 15.91) were found in the Northwest Quarter of Gerasa. They all have the same fabric, red in colour with large, very clearly visible inclusions, and they were possibly produced in the Black Sea area. They are considered as wine amphorae (*cf. e.g.* Keay 1984: 137). Content analyses (*cf.* Springer and Polla in this report) could confirm this observation.

In Byzantine times, imports of Late Roman Amphorae 1 (LRA; congruent with: Ballana 6, Benghazi Late Roman Amphora 1, British B2, Carthage Late Roman Amphora 1, Keay 53, Kuzmanov 13, Peacock and Williams 44, Scorpan 8B) can be identified in few contexts. These amphorae, in different variations, are very common and distributed in the Western and Eastern Mediterranean, and different variations also occur in Gerasa. The fabric of the samples listed in the catalogue is hard and sandy, with quartz and a lot of larger opaque inclusions of different colour, visible by naked eye. The production centres were located in Cyprus or Cilicia [Regarding the kiln sites, see: Bezeczky 2013: 158-160]. Some samples carry a red dipinto on their shoulders (pl. 16.95-96) [Research on dipinti has been done by *e.g.* Fournet and Pieri 2008]. Content analysis (*cf.* Springer and Polla in this report) was undertaken for one of the samples (pl. 16.93).

Kapitän II
92.
Pl. 15.92
J14-Jc-61-8A; J15-Jl-33-21
Content of similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample Kapitän II),
Handle and base, profile reconstructed.
Diam.: 8.1.
Fabric: Kapitän II.
References: Keay 1984; Bezeczky 2013: 149 (Type 44).
Date: Roman (3rd-4th century AD).

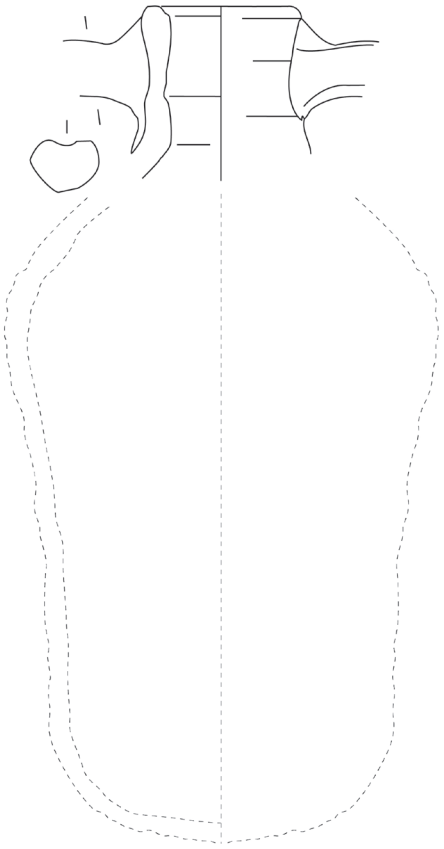
Late Roman Amphora 1
93.
Pl. 16.93
J14-Jc-84-24
Content of similar vessel type was analysed (*cf.* Springer and Polla in this report, Sample 10000).
Rim, profile reconstructed.
Diam.: 6.4.
Fabric: LRA 1.
References: Lichtenberger *et al.* 2018: fig. 69; Uscatescu 1996: 177 (Type XL-5B, LRA 1), pl. 96.637; Pieri 1998: 98-99 (Type LRA 1B1); Reynolds 2005: 591, fig. 31.
Date: Late Byzantine-Early Umayyad (late 5th?/6th-7th century AD).

94.
Pl. 16.94
J15-Qd-6-14
Rim.
Diam.: 9.1.
Fabric: LRA 1.
References: Lichtenberger *et al.* 2018: fig. 69; Uscatescu 1996: 177 (Type XL-5B, LRA 1), pl. 96.637; Pieri 1998: 98-99 (Type LRA 1B1); Reynolds 2005: 591, fig. 31.
Date: Late Byzantine-Early Umayyad (late 5th?/6th-7th century AD).

95.
Pl. 16.95
J15-Oe-64-26
Bodyfragment with dipinto.
Fabric: LRA 1.

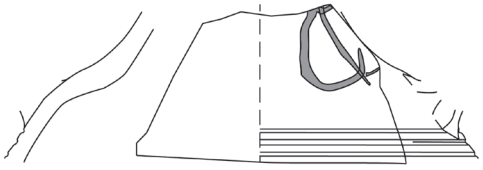
Pl. 16

93



94

95



96

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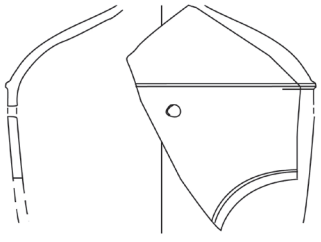
98



0 5cm

References: Lichtenberger, Raja and Sørensen 2014 (in press): fig. 74; could refer to Pieri 1998: 98-99 (Type LRA 1B1); Reynolds 2005: 591, fig. 31. Dipinto: Fournet and Pieri 2008: especially 185, fig. 3-5 with further references.
Date: Late Byzantine-Early Umayyad (late 5th?/6th-7th century AD).

96.
Pl. 16.96
J15-Nb-57-56
Bodyfragment with dipinto.
Fabric: LRA 1**.**
References: Lichtenberger *et al.* 2018: fig. 74; could refer to Pieri 1998: 98-99 (Type LRA 1B1); Reynolds 2005: 591, fig. 31. Dipinto: Fournet and Pieri 2008: especially 185, fig. 3-5 with further references.
Date: Late Byzantine-Early Umayyad (late 5th?/6th-7th century AD).

Domestic Furnishing and other Specialised Vessels (HM)
Pilgrim Flask
97.
Pl. 16.97
J15-Nb-57-113
Diam.: ?
Fabric: OW?
References: Lichtenberger, Raja and Sørensen 2013: 44-45, fig. 138 with further references.
Date: Byzantine?

Lantern

In Trench J, some fragments of lanterns were found in a purely Late Roman pottery fill (ev. 58). Therefore, the production phase, usually assumed to be restricted to the Byzantine period, has to be modified to begin already in Late Roman times.

98.
Pl. 16.98
J15-Jk-58-14
Diam.: ?
Fabric: OW.
References: Lichtenberger, Raja and Sørensen 2013: 29-31, fig. 57-63 with further references; Uscatescu 1996: 117-118 (Type XXIII), pl. 101.702. Date: Byzantine-Early Umayyad (5th-7th century AD). Due to the context, a Late Roman pottery fill, the local production of the lantern already have taken place in Late Roman times.
Date: Late Roman.

Lamps (HM, MP)
Broneer XXV - Import?
99.
Pl. 17.99
J15-Q-44-88
Discus and shoulder, fragmented.
Fabric: Munsell: ext. surface: 10R 4/7. Import? Hard-fired, dense, break-reddish in colour with some small whitish inclusions, visible by naked eye. Reddish-brownish slipped.
Relief decorated discus with depiction of dwarf or pygmy. Shoulder is ornamented with impressed ovolo pattern, almost circles (double line).
References: Type Broneer XXV; *cf.* Rosenthal-Heginbottom 2012: 312 and fig. 2 with further references.
Date: Roman (late 1st-3rd century AD).

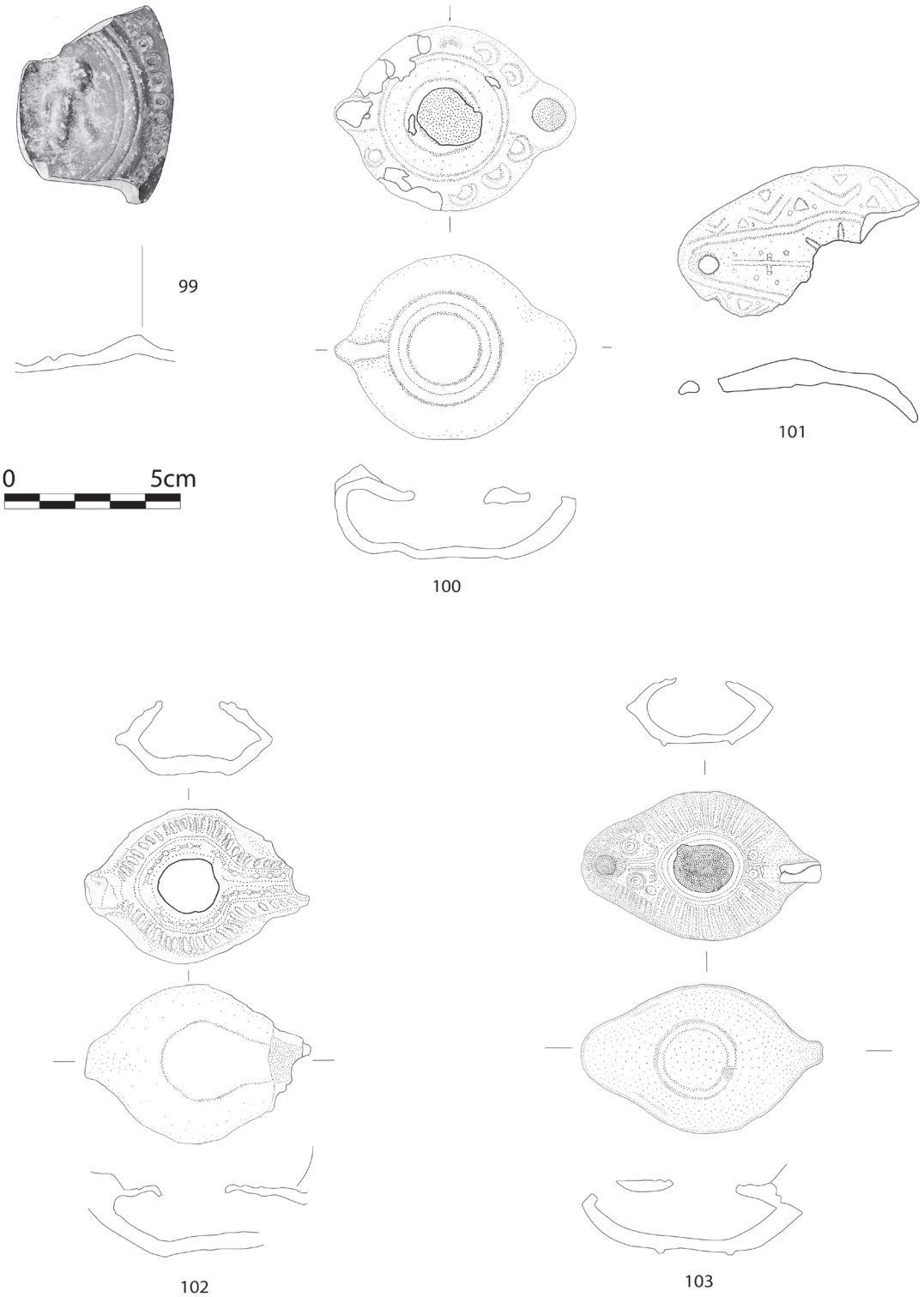
Jarash Lamps
100.
Pl. 17.100
J14-Jc-61-2
Intact.
Diam: Base: 3.8.
Fabric: Local production. Munsell: break: 10R 6/8; ext. surface: 2.5YR 7/8.
Mould made with intact wick hole and slightly oval/uneven fillinghole; burned areas and traces of soot on the exterior surface. Decoration consists of small semicircles on the sides of the body.
Context: Late Roman pottery fill in Trench J.
References: Local production - "Roman Jarash Lamp, Type JUTZ". Lichtenberger *et al.* 2018: fig. 32. Kehrberg 2011: 131-133 (Type JUTZ), fig. 2.18, with a typology of the locally produced Late Roman lamps in Jarash. This type was probably produced near the "Jarash Upper Tempel of Zeus"-Complex, Kehrberg 2011: 132.
Date: Roman (late 2nd-3rd century AD).

101.
Pl. 17.101
J15-Of-24-1
Discus and shoulder, fragmented.
Fabric: Local production. Munsell: break: 2,5YR 6/6.; ext. surface: 2.5YR 6/6.
Mould made, channel-nozzle lamp; decoration: geometrically lined pattern with triangles along the edge of the body. Above wick hole, a vertical line is flanked with six small dots.
References: Related to Lichtenberger, Raja and Sørensen 2013: 27, fig. 49; Lichtenberger *et al.* 2018: fig. 40-41.
Date: Late Byzantine?-Umayyad (6th?/7th-8th century AD).

102.
Pl. 17.102
J15-Pe-15-1x
Almost intact.
Fabric: Local production. Munsell: break: 2.5YR 2.5/1-5/1; ext. surface: 2.5YR 6/4-5/4.
Mould made with intact uneven filling hole; wick hole not preserved. Decoration consists of vertical lines along the sides and small circles around the filling hole and down the middle in the direction of the wick hole.
References: Local production - "Jarash Lamp". Kehrberg 2009: fig. 7.JH480e; see also Kehrberg 2011: 135-136, fig. 4.54, produced in Jarash, Hippodrome workshops.
Date: Late Byzantine-Early Umayyad (6th-early 7th century AD).

103.
Pl. 17.103
J14-Je-77-28
Almost intact, handle is not preserved.
Fabric: Local production. Munsell: ext. surface: 2.5YR 7/6-6/6.

Pl. 17



Intact mould-made lamp with exception of the handle; only the beginning of the handle is preserved. Incised decoration; vertical lines along the sides of the body, two small circles by the handle and circular decorations by the wick hole.
Context: Late Byzantine/Early Umayyad pottery fill in Trench J.
References: Local production - "Jarash Lamp" Lichtenberger *et al.* 2013: 27, fig. 53; Lichtenberger *et al.* 2017: fig. 48; Lichtenberger *et al.* 2018: fig. 38; Kehrberg 2009: fig. 7.JH7; see also Kehrberg 2011: 135-136, fig. 4.65, produced in Jarash, Hippodrome workshops.
Date: Late Byzantine-Early Umayyad (6th-early 7th century AD).

Ottoman Pipe (HM, AP)
104.
Pl. 18.104
J15-Nh-3-21
Ottoman Pipe.
Diam. pipe bowl: 2.4.
Fabric: Munsell: break inner core: 2.5YR 6/8; break outer core: 5YR 5/11; Int. surface: 5YR 5/11; ext. slip: 2.5YR 3/4.
Ottoman mould-made pipe. Incised decoration on exterior. Decoration: incised circular and vertical lines.
References: -
Date: Ottoman.

Vessels containing Pigments (HM)
105.
Pl. 18.105
J15-Oc-104-1
Vessel containing green pigment.
Diam.: -
Fabric: OW.
References: -
Date: Roman.

106.
Pl. 18.106
J15-Jk-57-5
Vessel containing orange pigment.
Diam.: -
Fabric: OW.
References: -
Date: Late Roman.

Handmade Vessels (AP)
Handmade Geometrically Painted Ware (HMGPW)

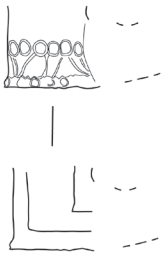
In comparison with previous campaigns, very little handmade geometric painted ware of the Ayyubid-Mamluk period was found during the 2015 campaign, as only a few sherds appeared in Trench P (pl. 18.107-110). HMGP ware is difficult to date but is commonly viewed as originating from the late 11th century and remaining in use throughout at least the 15th century [For more HMGP chronology, see Stern 2014; Milwright 2010: 155-156; Johns 1998: 65-93], and possibly as late as the early half of the 20th century (see Walker 2011: 214-215 and Walker 2014: 194). HMGP finds in Jarash are characterised as a hard-medium-fired coarse ware of rather sandy clay with many lime inclusions and tiny pebbles as well as quartz and reddish-brown inclusions. Decorated with paint that is thick, matte and flaking, the paint on HMGP vessels is often monochrome (sometimes bichrome), depicting intricate geometric designs in red, brown or black paint (Walker 2014: 200; Johns 1998: 66). Painted designs are applied to the exterior surface, and open forms may be painted on both surfaces. The shapes are many open bowls and closed jugs and jars. One notable characteristic found on sherds this year and in previous years is traces of textile impressions visible on the interior, revealing that many of the vessels were formed on sacks filled with wet sand or a bowl covered in fabric, a phenomenon observed by scholars researching HMGP in the past (see Franken and Karlsbeek 1975: 167; Walker 2014: 197-198). The material collected during the 2015 campaign did not present any significant diagnostic sherds. The sherds recovered (pl. 18.107-110) [Deco.: Franken and Karlsbeek 1975: fig. 67, no. 14] were painted with triangular geometric designs and grid patterns.

HMGPW
107.
Pl. 18.107
J15-Pe-5-37
Body.
Fabric: Munsell: break: 7.5YR 7/6; int. surface: 7.5YR 7/6; ext. slip: 10YR 8/3; deco.: 2.5YR 4/4.
8 joining handmade body sherds with buff slip and geometrically painted decoration on exterior, shape is hard to tell but seems to be part of large closed vessel; deco.: painted: ext.: linier, triangles, dots, net patterns, repeating.
References: Deco.: Franken and Klarbeek 1975: 74, fig. 53,5; shape: Tholbecq 1998: 162, fig. 6.
Date: Middle Islamic: (13th-15th century AD).

108.
Pl. 18.108
J15-Pe-5-35
Body.
Diam.: 9.6?
Fabric: Munsell: break: 7.5YR 7/6; int. surface: 7.5YR 7/6; ext. slip: 10YR 8/3; deco.: 2.5YR 4/4.
Body sherd likely part of the neck of a closed jug due to its small max. diameter, handmade and painted on exterior surface over a buff slip; deco.: painted: ext.: repeating triangles and net pattern.
References: Deco.: Franken and Klarbeek 1975: 74, fig. 53,5.
Date: Middle Islamic (13th-15th century AD).

109.
Pl. 18.109
J15-Pe-5-19
Body.
Diam.: 12?
Fabric: Munsell: break: 7.5YR 7/8; int. surface: 7.5YR 7/6; ext. slip: 2.5YR 3/4; deco.: 10YR 8/4.
Handmade body sherd, unknown form, with painted geometric pattern over a slip on exterior; deco.: painted: ext.: linier stripes, repeating triangles.
References: Franken and Klarbeek 1975: 170, fig. 51 A. 1.
Date: Middle Islamic (13th-15th century AD).

Pl. 18



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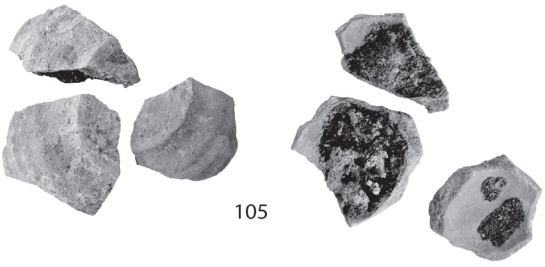

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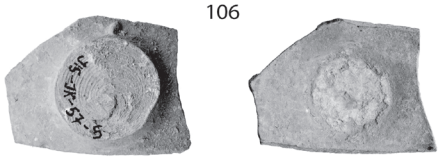
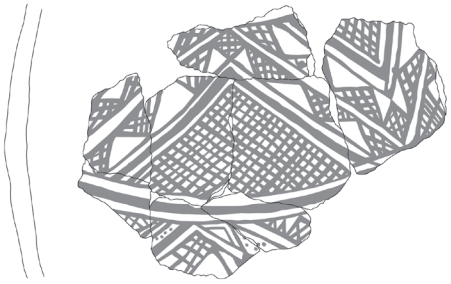


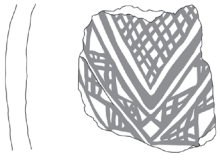
106

0 5cm

0 5cm

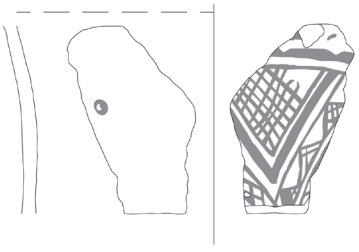


107



108

109



110

0 5cm

110.
Pl. 18.110
J15-Pe-5-23
Body.
Fabric: Munsell: break inner core: 2.5YR 6/8; break outer core: 10YR 7/3; int. surface: 2.5YR 6/8; ext. slip: 10YR 8/2; deco.: 10R 4/2.
Possibly closed shape and part of a neck, fragmented handmade body sherd with painted decoration on exterior and what is presumably an unintentional paint drop on interior; deco.: painted: ext.: linier, net pattern, repeating triangles; int: small circle.
References: Deco.: Walker 2014: 198, fig. 3; Franken and Klarbeek 1975: 170-171, fig. 51 A.36.
Date: Middle Islamic (13th-15th century AD).

Architectural Elements (PE)
Tiles

Most of the tiles excavated in the Northwest Quarter are of diverse style and technique. No context provided sufficient evidence to reconstruct a tiled roof. The tiles found within closed destruction contexts in Trenches P, K (*cf.* Lichtenberger *et al.* 2018) and E (*cf.* Lichtenberger *et al.* 2017) point to the reuse of tile fragments within walls and pavement foundations. Since these tiles were of diverse style and technique, it can be concluded that the tiles did not stem from a single roofed building but were cut to fit a special purpose.

In contexts of closed fillings, the variation and small amount of tiles point to a similar conclusion. Within the filling material, there were tile fragments from different buildings, which were moved around or scattered across the urban landscape, rather than from a single roof of a demolished house.

There is so far no tile group or fabric that can be clearly ascribed to one roofed building, such as the case of the Church of Bishop Isaiah (for the tiles, see: Clark 1986: 332 no. 19, 336 no. 28, 337 no. 29), where roof tiles have been found in stacks inside the church (Clark 1986: 313-315).

Roof Tiles - Tegulae
111.
Pl. 19.111
J15- Qc-8-1
Tegula, fragmented.
H.: 3.8; L.: 14.2; W.: 6.5; D.: 1.2.
Fabric: Munsell: break: 2.5YR 5/1; ext./int. surface: 2.5YR 5/1.
Tegula flange; part of the flange is handmade, overlapping the end of the other rim part on the inner face; finely smeared together and made curving on the outer rim face, narrowing the one end of the tile. Perhaps a discharge at the end of the line of tegulae on top of a roof.
References: Schneider 1950: fig. 15, no. 15 (much thicker, but the 90° angle from flange to body finds a comparison here).
Date: ?

112.
Pl. 19.112
J15-Ob-108-11
Tegula, fragmented.
H.: 5.7; L.: 15.2; W.: 16.7; D.: 2.5.
Fabric: Munsell not available. Hard-fired and rather finely levigated clay, including air pockets and lime, of which some is erupted.
Tegula flange: Flattened 'support' on the inner face of the flange. The 'support' is not as high as the flange but formed as part of it, not secondarily smeared against the flange.
References: -
Date: Early Umayyad.

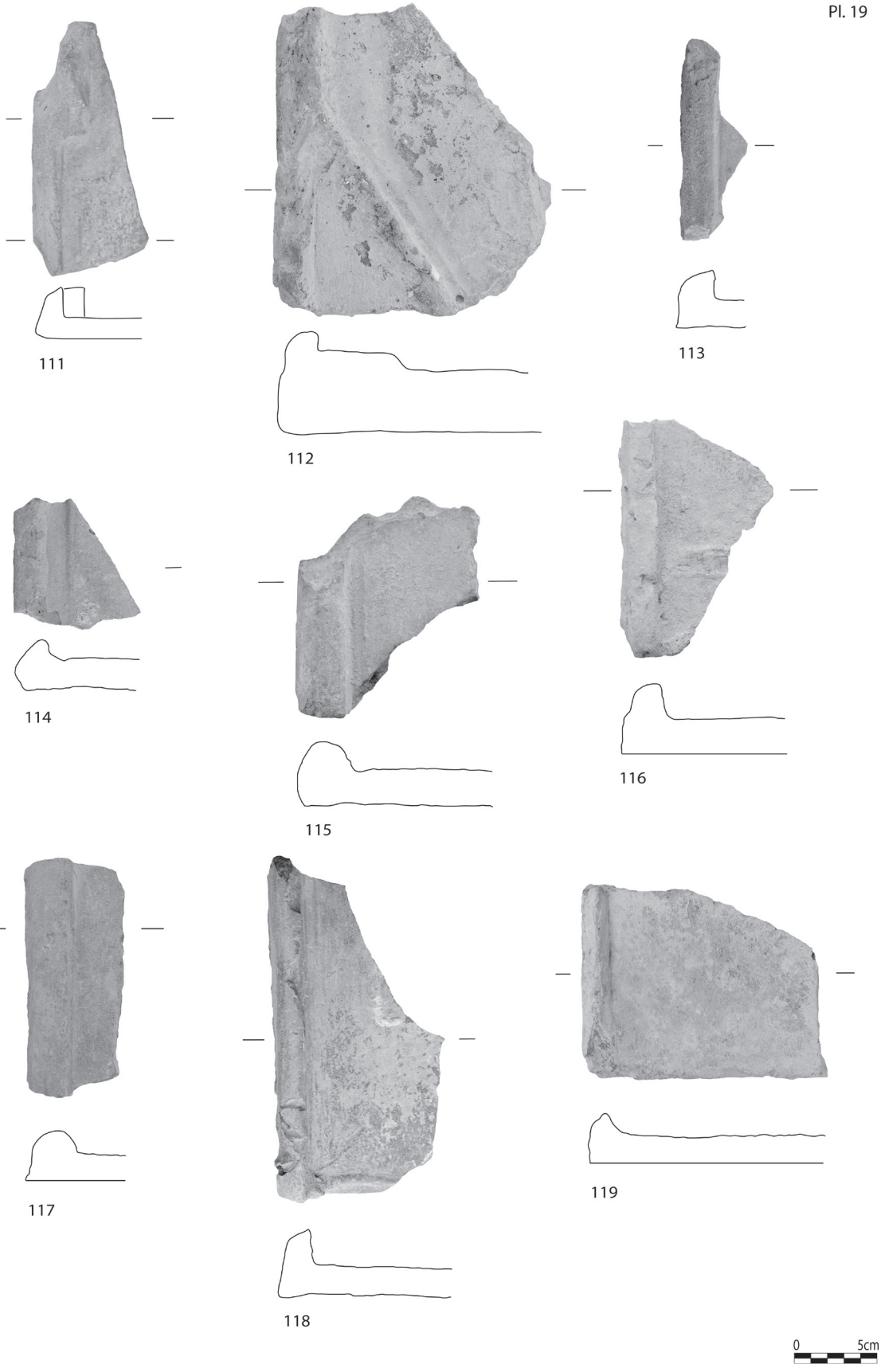
113.
Pl. 19.113
J15-Pb-15-15
Tegula, fragmented.
H.: 4.3; L.: 12.8; W.: 2.3; D.: 3.2.
Fabric: Munsell: break: 7.5YR 5/1; int./ext. surface: 7.5YR 8/3.Hard-fired and medium finely levigated clay, including a few lime and black spots.
Tegula flange: Flattened flange top, still sloping slightly outwards; deep channel running along inner flange face, not pressed into the body but into the sides of the flange.
References: Lichtenberger *et al.* 2018: fig. 87; Schneider 1950: fig. 15, no. 13; Vriezen and Mulder 1997: fig. 8:17 (Ware Types I-II).
Date: Late Byzantine-Umayyad.

114.
Pl. 19.114
J15-Pb-15-16
Tegula, fragmented.
H.: 7.8; L.: 8.1; W.: 3.9; D.: 3.1.
Fabric: Munsell: break: 5YR 6/4 - 7.5YR 8/2. Hard-fired and rather finely levigated, including some air pockets and a few lime spots.
Tegula flange: Similar to the tegula flange J15-Pb-15-15, but channel partly pressed into the body, and the sloping of the flattened flange top is steeper. Before reaching the bottom, the flange sharply curves inwards.
*References:AD*an-Bayewitz 1980: fig. 4, no. 5 (for an example with a flange jumping back towards the inner face of the tile bottom on the lower side of the flange).
Date: Late Byzantine-Umayyad.

115.
Pl. 19.115
J15-Pa-15-26
Tegula, fragmented.
H.: 3.3; L.: 13.9; W.: 11.4; D.: 2.1.
Fabric: Munsell: break: 2.5YR 5/6; int. surface: 2.5YR 6/6; ext. surface: 2.5YR 6/4. Hard-fired and medium fine levigated clay, including a few chaff, reddish brown and black spots, quartz, pebbles and lime, a few erupted.
Tegula flange: channel runs alongside the hand-formed flange. No plaster stains.
Reference: Briend and Humbert 1980: fig. 27, no. 14.
Date: Late Byzantine-Umayyad.

116.
Pl. 19.116
J15-Pc-16-7
Tegula, fragmented.
H.: 4.2; L.: 9.9; W.: 14.7; D.: 2.2.
Fabric: Munsell: break: 5YR 7/6; int. surface: 2.5YR 5/4. Hard fired and coarsely levigated clay, including some air pockets.
Tegula flange: Tool marks on lower surface; lime encrusted. Flange irregularly slopes on the outer face; inner

Pl. 19



face is regular and steep.
References: Schneider 1950: fig. 15, no. 15.
Date: Late Byzantine-Umayyad.

117.
Pl. 19.117
J15-Pc-16-8
Tegula, fragmented.
H.: 3.3; L.: 14.1; W.: 6; D.: 1.5.
Fabric: Munsell: break inner core: 7.5YR 7/6; break outer core: 7.5YR 6/1. Hard-fired and finely levigated clay with only some chaff and lime inclusions.
Tegula flange: carefully and regularly formed; no tool marks, finger impressions or plaster stains. Small ledge at bottom side. Lime encrusted. Whole flange is smoothly and regularly curved from the outer to the inner face.
References: Briend and Humbert 1980: fig. 27, no. 13; Schneider 1950: fig. 15, no. 6.
Date: Late Byzantine-Umayyad.

118.
Pl. 19.118
J15-Pc-16-80
Tegula, fragmented.
H.: 4.1; L.: 20.8; W.: 10.4; D.: 1.5.
Fabric: Munsell: break: 5Y 4/1; int. surface: 10YR 4/1; ext. surface: 10YR5/1. Hard-fired and rather coarsely levigated, including a few pockets of air, black spots, some pebbles and occasional lime.
Tegula flange: Outer flange face slopes softly downwards and becomes very steep after a sharp curve.
References: Schneider 1950: fig. 15, no. 16.
Date: Late Byzantine-Umayyad.

119.
Pl. 19.119
J15-Pbd-25-1
Tegula, fragmented.
H.: 3; L.: 14.1; W.: 11.5; D.: 1.5.
Fabric: Munsell: break inner core: 2.5Y 5/2; break outer core: 2.5YR 6/8. Hard-fired and coarsely levigated clay. Tool marks on bottom surface.
Tegula flange: covered in lime. Flange outside almost horizontal, tipped on top and softly concavely curved towards the bottom.
References: Alliata 1987: fig. 4, no. 6; Briend and Humbert 1980: fig. 27, no. 5a.
Date: Umayyad?

120.
Pl. 20.120
J15-Pa-51-1
Tegula, fragmented.
H.: 3.6; L.: 14.6; W.: 14.8; D.: 1.2.
Fabric: Munsell: break inner core: GLEY1 5/104; break outer core: 2.5Y 6/2; int. suface: GLEY1 4/1; ext. surface: GLEY1 5/104.
Tegula: flange on two sides. Narrow flange with steep wall on inside face of the rim. Wider, elongated rim sloping softly to the outside. Many finger-imprints from remodeling by hand.
References: Bass and van Doorninck 1982: 97-98 (Type 1), fig. 5-4 and fig. 5-5, nos. PT1-PT6; Konrad 2001: 120, pl. 80: 6, 136, pl. 80: 3, 5.
Date: ?

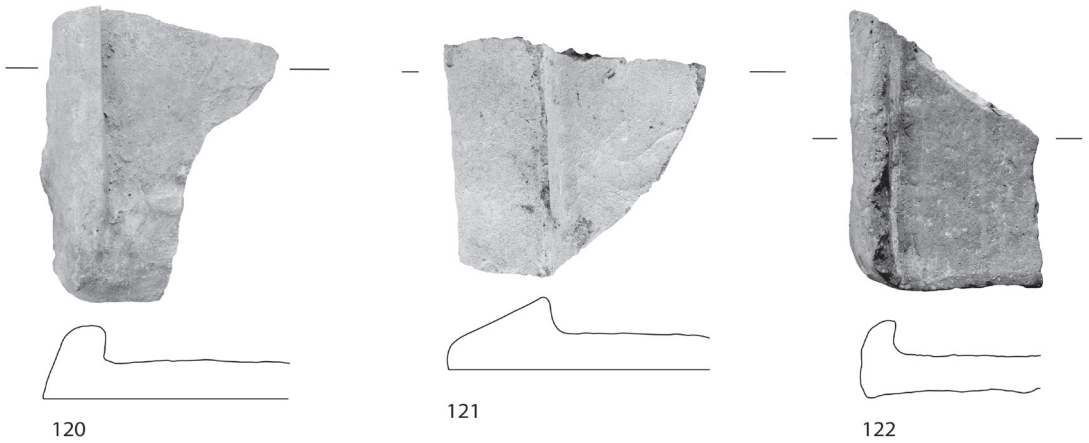
121.
Pl. 20.121
J15-Pa-51-5
Tegula, fragmented.
H.: 3.5; L.: 12.4; W.: 11; D.: 1.8.
Fabric: Munsell: break: 7.5YR 5/1; int. surface: 7.5YR 4/1; ext. surface: 5Y 5/1. Hard-fired and rather coarsely levigated, including a few air pockets, lime and some pebbles.
Tegula flange: wide and elongated rim slowly sloping towards a sharp edge. Tool marks on bottom side. The form of the surviving flange allows the reconstruction as a tile type with 3 flanges. Well and regularly produced.
References: Bass and van Doorninck 1982: 97-98 (Type 1), fig. 5-4 and fig. 5-5, nos. PT1-PT6; Briend and Humbert 1980: 86, fig. 27, no. 5, no. 5a-b; Konrad 2001: 120, pl. 80: 6, 136, pl. 80:3 and 5 (from Umayyad destruction layer).
Date: Umayyad?

122.
Pl. 20.122
J15-Nh-37-6
Tegula, fragmented.
H.: 3.6; L.: 13; W.: 8.7; D. (min): 1.5; (max.): 2.5.
Fabric: Munsell: break inner core: 10YR 6/4; break outer core: 2.5YR 6/6; int./ext. surface: 2.5YR 6/6; wash: 2YR 7/4. Medium-hard-fired and medium-finely levigated clay, including some air pockets, an abundant amount of lime and black spots as well as a few pebbles.
Tegula flange: a thin, matt and worn wash on surface; tool marks on bottom side.
References: Barnes *et al.* 2006: fig. 17, no. 4 (with inscription and from Umayyad context); Schneider 1950: fig. 15, no. 13.
Date: ?

123.
Pl. 20.123
J15-Nh-37-8
Tegula, fragmented.
H.: 3.7; L.: 13.9; W.: 9.3; D. (max.): 2.9; (min.) 1.7.
Fabric: Munsell: break: 5YR 5/4; int./ext. surface: 10YR 9/8. Medium-hard-fired and medium-finely levigated clay, including a few air pockets, lime, pebbles and some black spots.
Tegula flange: Tool marks on bottom surface. Straight ridge running away from flange at a 90° angle, on top of upper surface.
References: Adan-Bayewitz 1980: 25 (Type 1a), fig. 4, no. 2; Bass and van Doorninck 1982: 98 (Type 2), fig. 5-4 and fig. 5-5, nos. PT8, PT10, PT11, PT13, PT15, PT16.
Date: ?

124.
Pl. 20.124
J15-Nb-57-42
Tegula, fragmented.
H.: 3.4; L.: 18.6; W.: 16.1; D. (min.): 1.1; (max.): 2.9.
Fabric: Munsell: break: 10YR 5/1; int. surface: 10YR 6/2; ext. surface: 2.5Y 7/2.
Two joining tegula pieces; flanges on two sides, forming a corner with a narrow gap in between the two, one of which is flanged and leaning strongly inwards; the other is plain at top. Tegular body not straight but softly bended upwards.

Pl. 20



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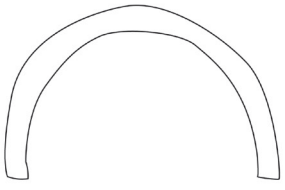
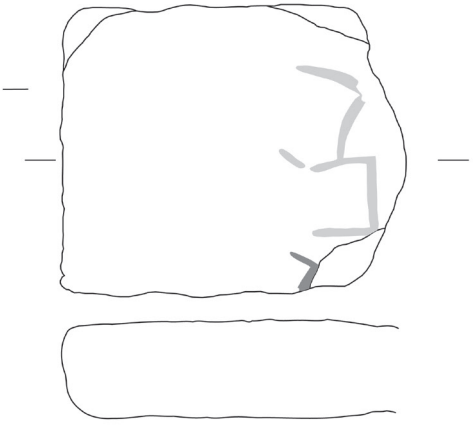
122

123

124



125



127

126

0 5cm

References: Briend and Humbert 1980: fig. 27, no. 5, no. 5a, no. 5b (for a comparison of a corner-flange tile with two different flange styles; gap in between is missing in this example); (none of the following pieces show any gaps between the two flanges or two different flange styles on the same tile): Bass and van Doorninck 1982: 97-98 (Type 1), fig. 5-4 and fig. 5-5, nos. PT1-PT6; Konrad 2001: 120, pl. 80:6, 136, pl. 80:3,5 (from Umayyad destruction layer); for an example of a flanged rim leaning inwards, *cf.* Schneider 1950: 123, fig. 15, no. 7.
Date: Late Byzantine.

Tubulus
125.
Pl. 20.125
J15-Nb-20-24
Tubulus, fragmented.
H.: 7.1; L.: 10.4; W.: 12.1; D.: 1.7.
Fabric: Munsell: break: 5YR 6/6. Hard-fired, coarsely leviagted clay, including some airpockets and lime.
Tubulus rim. A stick of bronze pushed into the clay on top of the outer edge; lime-encrusted. Rim on top flattened, curved outwards without a sharp break. In the inner edge of the two remaining tubulus walls, towards the inside regularly curved buldge.
References: Vriezen and Mulder 1997: fig. 12 (for technique and style).
Date: Roman-Byzantine.

Imbrex
126.
Pl. 20.126
J15-Ni-40-13
Imbrex, fragmented.
H.: 6; L.: 15.3; W.: 12.8; D.: 0.9.
Fabric: Munsell: break: 10YR 5/3. Hard-fired and rather coarsely leviagted clay, including air pockets, some lime and a fewblack and reddish brown spots.
Imbrex rim; marks visible on top. Coverd with lime on the inside. Varying body thickness; flat bottom rim, front-facing rim curved inwards and shaped by hand. Plaster spots on the outside.
References: Hirschfeld 2000: 45, fig. 72, 116 pl. XII: 101 (from a Byzantine layer); Lichtenberger *et al.* 2018: fig. 89 (for a comparison of the bottom rim, not the curving one); Vriezen and Mulder 1997: fig. 7:12 (for technique and style).
Date: Roman-Umayyad.

Brick
127.
Pl. 20.127
J15-Ob-108-10
Body, fragmented.
L.: 15.7; W.: 13.7; D.: 4.8.
Fabric: Munsell not available. Hard-fired but coarsly levigated clay, including many air pockets, some lime (some erupted).
Brick. On one surface incised inscription, maybe Arabic (see appendix by John Møller Larsen) or some sort of decoration ,made before firing.
Reference: -
Date: Early Umayyad.

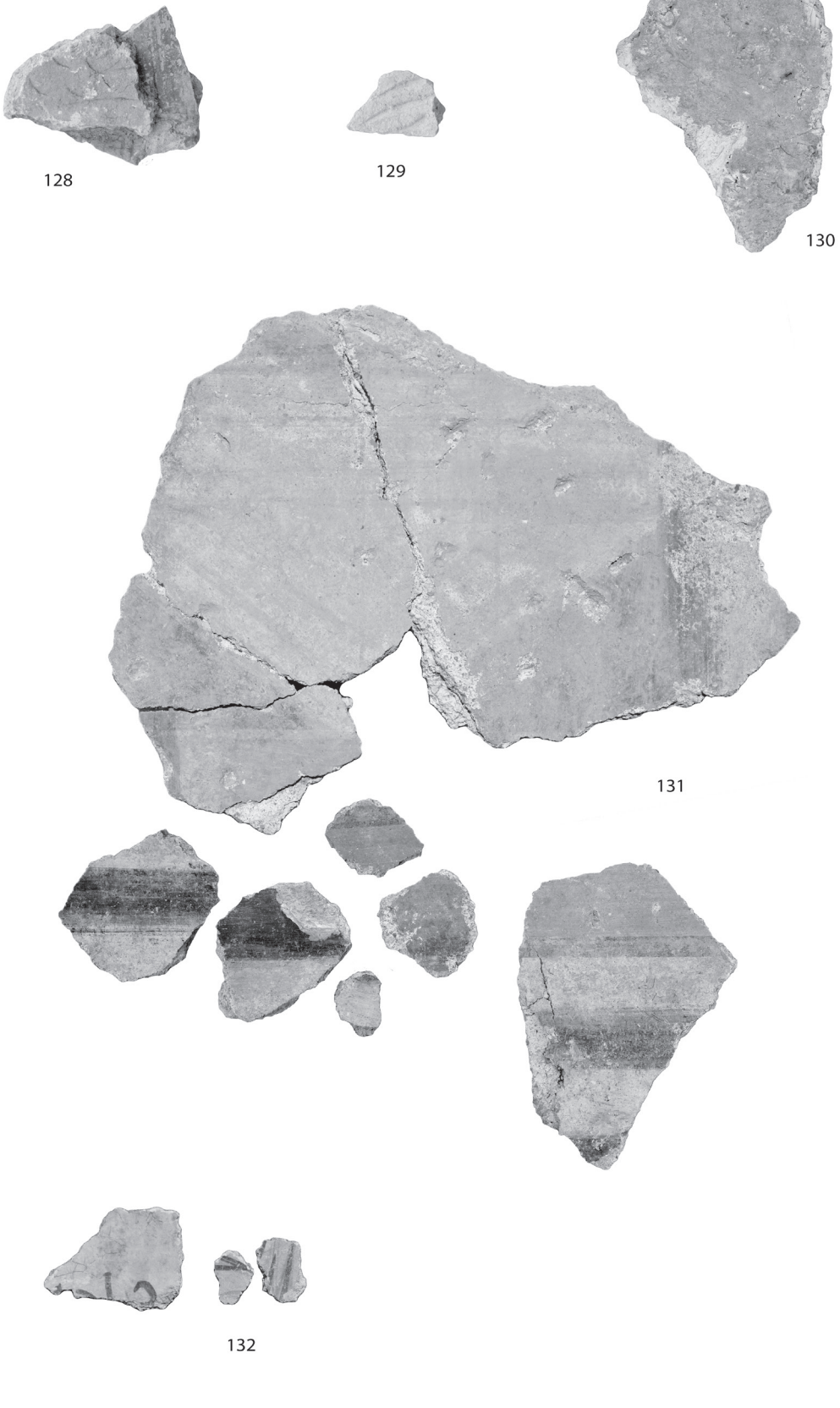
Wallplaster (PE)
128.
Pl. 21.128
J15-Pd-16-14
Plaster, fragmented. Colour: white.
L.: 10 and 11.5.
2 pieces of unpainted wall plaster. Pottery sherd stuck in one piece. Same piece shows small, linear, curving impressions on the surface in irregular intervals or a fish-scale pattern.
References: Daviau 2010: 114; Bisheh 1979: pl. LIV:4; Mhaisen 1976: pl. 1.
Date: Umayyad.

129.
Pl. 21.129
J15-Pc-15-33
Plaster, fragmented. Colour: white.
L.: 6 and 8.
2 pieces of wall plaster. One flat piece showing linear, curving impressions at irregular intervals.
References: Daviau 2010: 114; Bisheh 1979: pl. LIV:4; Mhaisen 1976: pl. 1.
Date: Umayyad.

With Painted Decoration
130.-131.
Pl. 21.130 and 131
J15-Pa-35
Plaster, fragmented. Colours: red, white and yellow.
Size range from 4 to 25.
9 pieces of painted plaster fragments of considerable size. 4 big fragments could be put together in a sequence. The pieces consist of two layers of plaster: a rough, yellowish one, with many inclusions (chaff, clay and pebbles) and a finer, lighter one, spread upon the rough one. The fine layer was then smoothened and coloured in stripes or geometrical patterns in at least 4 different colours.
References: Concerning colours and patterns: Daviau 2010: 107, 113, fig. 5.10, fig. 5.11-13; 112-113; for a description of different layers of 'under-plaster': Daviau 2010: 108, 110, fig. 5.3, 113, fig. 5.9.
Date: ?

132.
Pl. 21.132
J15-Pb-54-1
Plaster, fragmented. Colours: white, yellow, orange, dark green and red.
Size range from 1 to 12.
Many pieces of wall plaster, some of considerable size, decorated mainly in bright red and yellow, probably in geometrical patterns, broad stripes or coloured fields. A few pieces are coloured in orange and dark green. Some smaller pieces show traces of what looks like cursive script in red on a light white background (see appendix by John Møller Larsen). Since there are no hints to floral or even more complex paintings in Ummayyad domestic contexts known so far, this must be excluded. Also, some pieces show just bi-coloured lines in red and yellow on a whitish background.
References: Concerning painted graffiti in red on white walls in Umayyad contexts: Daviau 2010: 107, 110, fig. 5.4, 112, 114, fig. 5.14, and discussion on p. 116-117.
Date: Umayyad.

Pl. 21



Terracotta (AL and RR)

133.
Pl. 22.133
J15-Jl-33-14
Fragment of an abdomen and lower part of an abdomen of a female.
H.: 4.81; L.: 3.82; D.: 0.59-0.72.
Fabric: Munsell: break: 2.5YR 7/6; int. surface: 2.5YR 7/6; ext. surface: 2.5YR 7/6. Rather finely levigated clay. On the backside/inside, fingerprints from smoothing are visible.
The mould-made fragment is broken on all sides. It depicts parts of an abdomen and lower part of an abdomen clothed in draped textile, which is depicted lying smooth on the body. The abdomen is visible through the depicted cloth, including the navel which is clearly visible. The drapery falls in a triangle towards the not visible genitals. The drapery below the abdomen falls in heavy folds.
References: -
Date: Roman (2nd/3rd century AD).

134.
Pl. 22.134a-c
The below numbers J15-Oc-104-13a-c belong together and consist of a total of four pieces of an Aphrodite figurine of the Anadyomene type. Figurines with the same motif were found in Jarash (Iliffe 1945: pl. III.29), but they were not made in the form of a plaque but fully three-dimensional. Even more similar to the one found in 2015 are three figurines from Hippos in the Decapolis (Erlich 2009: fig. 12).

Pl. 22.134a
J15-Oc-104-13 a
Fragment of lifted and bent left arm and shoulder of female figurine.
H.: 4; L.: 5.4; W.: 3.2; D.: 1.5.
Fabric: Munsell: break: GLEY 1 5/N; int. surface: 5YR 7/6; ext. surface: 5YR 7/6. Finely levigated clay.
The mould-made fragment depicts a left lifted and bent arm, which grasped the hair of the figure. A few hair strands are visible above the left shoulder of the figure, supporting this interpretation. In the middle of the arm, a piece of jewellery (arm ring) is visible on the inside.
Date: Roman (2nd-4th century AD).

Pl. 22.134b
J15-Oc-104-13 b
Two adjoining pieces belonging to a leg.
L.: 7.5; W.: 2; D.: 0.5.
Fabric: Munsell: break: GLEY 1 5/N; int. surface: 5YR 7/6; ext. surface: 5YR 7/6. Finely levigated clay.
The two mould-made pieces join together and represent part of a leg.
Date: Roman (2nd-4th century AD).

Pl. 22.134c
J15-Oc-104-13 c
Terracotta fragment of top of head.
H.: 2.2; L.: 2; W.: 2, D.: 1.
Fabric: Munsell: break: GLEY1 5/N; int. surface: 5YR7/6; ext. surface: 5YR7/6. Finely levigated clay.
This mould-made fragment depicts the top of a head. The hair is incised with lines running to the right and left from the central parting.
Date: Roman (2nd-4th century AD).

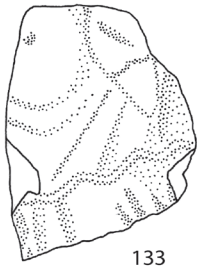
135.
Pl. 22.135
J15-Q-4-20
Terracotta fragment with hand.
H.: 3; L.: 2.2; D.: 0.5-0.7.
Fabric: Munsell: break: 2.5YR 7/6; int. surface: 2.5YR 7/6; ext. surface: 2.5YR 7/6.
Rather finely levigated clay. This mould-made fragment depicts a human right hand in high relief. The hand is broken off above the wrist. The parting between the fingers is incised with a tool after the moulding. The inside of the terracotta fragment is smoothed and rounded.
References: -
Date: Roman (2nd-4th century AD).

136.
Pl. 22.136
J15-Qd-11-2
Fragment with female legs.
H.: 6.3; L.: 4.6; D.: 0.7.
Fabric: Munsell: break: 5YR 7/6; int. surface: 5YR 7/6; ext. surface: 2.5YR 7/6. Rather finely levigated clay.
The front side of the mould-made fragment depicts a set of fragmented lower legs. A small fragment is left of the figure's right leg. Almost the entire left lower leg until the ankle is visible. There is a slightly thicker band visible right above the ankles, perhaps indicating some kind of rings worn around these. On the back side of the terracotta fragment, there are clear marks from fingerprints from the smoothing process.
References: Baramki 1936: pl. II.3, pl. IX.13 and 18.
Date: Roman (3rd/4th century AD).

137.
Pl. 22.137
J15-R-19-12
Fragment of a human face.
H.: 3.8; L.: 3.58; W.: 1.96; D.: 0.54-0.97.
Fabric: Munsell: break: 2.5YR 7/4; int. surface: 2.5YR 7/4; ext. suface: 2.5YR 7/6. Rather finely levigated clay.
Fragment of a human head seen frontally of which the top part is not preserved. Mould-made head of a human figure in relief with the head turned slightly to the left. The chin is chubby, and the neck is strong. The mouth is small and the nose fairly broad. What is visible of the eyes are slight depressions. Due to the fragmented state of the piece, it is not possible to say whether the figure had hair or not. The style is reminiscent of the figurines from Beit Nattif.
References: Baramki 1936.
Date: Roman (3rd/4th century AD).

138.
Pl. 22.138
J14-Jc-48-4
Fragment of terracotta relief with a female figure.
L.: 5.8; W.: 4.7; D.: 0.3-1.2.
Fabric: Munsell: break inner core: 5YR 6/1; break outer core: 2.5YR 6/6; int. surface: 2.5YR 6/6; ext. surface: 2.5YR 6/6. Rather finely levigated clay with some inclusions.
This mould-made fragment depicts a female figure, of which the head, face and parts of the upper torso are visible. The head is turned left, and the face is seen in profile. The hair is pulled back and collected in a knot at the back of the head. The head and face are turned slightly

Pl. 22



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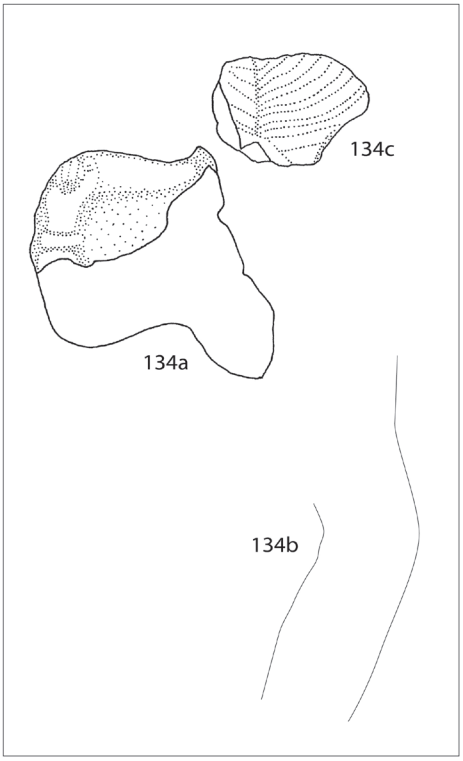
135

136



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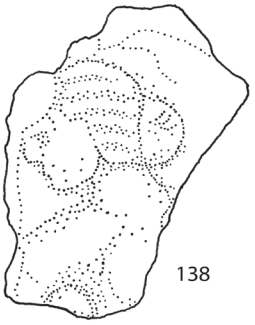

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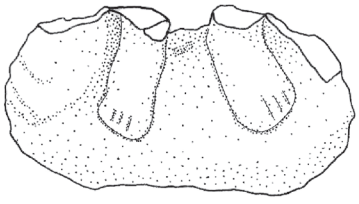

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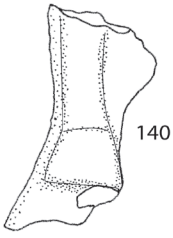
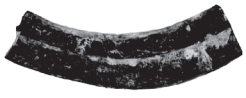


140

0 5cm



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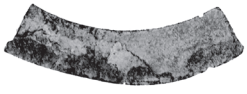


142

143

144

0 5cm

downwards. The upper torso is seen frontally.
References: -
Date: Roman (2nd/3rd century AD).

139.
Pl. 22.139
J14-Jc-67-18
Fragment of human feet standing on base.
H.: 3.6; L.: 6.5; W.: 2.1; D.: 0.3-1.1.
Fabric: Munsell: break inner core: 10R 7/4; int. surface: 10R 7/4; ext. surface: 10R 7/4. Rather finely levigated clay.
Mould-made fragment of terracotta figure showing a pair of feet with toes broken off above the ankle. The toes are incised with fine lines. To the right of the right foot, part of a base (?) is visible.
References: -
Date: Roman (2nd-4th century AD).

140.
Pl. 22.140
J14-Jc-67-18A
Fragment with animal hoof, horse-rider (?).
H.: 2.2; L.: 4.5; W.: 1.9.
Fabric: Munsell: break inner core: 10R 7/4; int. surface: 10R 7/4; ext. surface: 10R 7/4. Rather finely levigated clay.
Mould-made fragment of terracotta figure, probably from a horse-rider. The fragment depicts the lower part of an animal leg and hoof. The hoof belongs to a hind leg, and it is turned to the right.
References: Iliffe 1945: pl. II.17.
Date: Roman (2nd century AD).

Jewellery (SK)
141.
Pl. 22.141
J15-Qd-9-9
Inlay? Stone
Curving and thin inlay; wide inner groove; stone; fragmented; traces of firing.
References: -
Date: Late Roman-Early Byzantine.

142.
Pl. 22.142
J15-Ni-40-11
Glass melon bead.
Diam.: 1.29; H.: 1.09.
Melon bead; bluish-green; opaque; centrally pierced; well preserved.
References: Eisen 1930: 29 (type 2), fig. 2, 1-34; Born 1975: 134-140; Czurda-Ruth 1979: 200-201; Riis and Buhl 2007: pl. III, s.
Date: Byzantine-Early Umayyad.

143.
Pl. 22.143
J15-0b-111-4
Glass bead.
Diam.: 1.1; Diam. hole: 0.3; H.: 0.8.
Globular bead; blue; opaque; centrally pierced; well preserved.
References: Smith 1973: pl. 80, Caj; Lichtenberger *et al.* 2018: fig. 168.
Date: Late Byzantine-Early Umayyad.

Worked Bone (HM)
144.
Pl. 23.144
J15-Qa-18-18
Worked bone, almost intact.
Diam: 0.4-0.8; H: 8.6.
Smoothed and rounded. Head has been carved round and double pierced. Two small horizontal lines are visible.
References: -
Date: Late Byzantine.

Marble (AL and RR)
145.
Pl. 23.145
J15-Nm-76-4
Marble fragment of arm.
L.: 11.4; W.: 7.9; D: 7.6.
Whitish marble, polished surface.
Marble fragment of lower part of arm. The marble has been cut off on all sides, apart from the surface, which is polished. The top and bottom, as well as the back side of the arm, are missing. The back side has been cut straight on both sides, forming a triangle. The piece has most likely been used in a secondary context as building material.
References: -
Date: Roman (2nd-3rd century AD).

Limestone (AL and RR)
146.
Pl. 23.146
J15-Pe-72
Limestone fragment of architectural decoration.
H.: between 15 and 21; L. (max.): 44.5; W. (max.): 52.
Limestone fragment of decorated architectural block.
This limestone block, which was found in a secondary use, is fragmented on all sides, and the exact original size cannot be worked out. The block slants towards the upper left corner. It carries fine chisel traces on the front, broader ones on the back and also on the short sides. In what is here defined as the upper part, a triangular field with decoration is visible. To the left, a simple volute is carved. From the left, under side of the volute, a wine leave extends towards the right. The leave spills over the underside of the decorated field, climbing over the architecturally defined edge of the decorated field. The block is worked in a high quality of craftsmanship.
References: -
Date: Late Roman-Early Islamic.

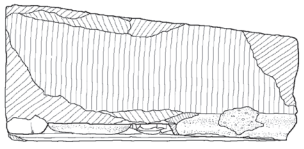
Selected metal objects of the Jarash Northwest Quarter - 2015 campaign
Christoph Eger
In 2015, the Danish-German excavations in the Northwest Quarter again yielded a considerable number of metal objects, of which 18 are registered in the preliminary catalogue below. Most of the objects are made of iron, a smaller number is made of copper alloy (which includes all kinds of copper base alloy, among others bronze). As already noticed in the 2014 report, the iron objects are badly corroded, and therefore, it is difficult to determine the exact shape as well as the function of a number of items.
The functional groups represented in the 2015 campaign are:
• Constructional and possible furniture fittings

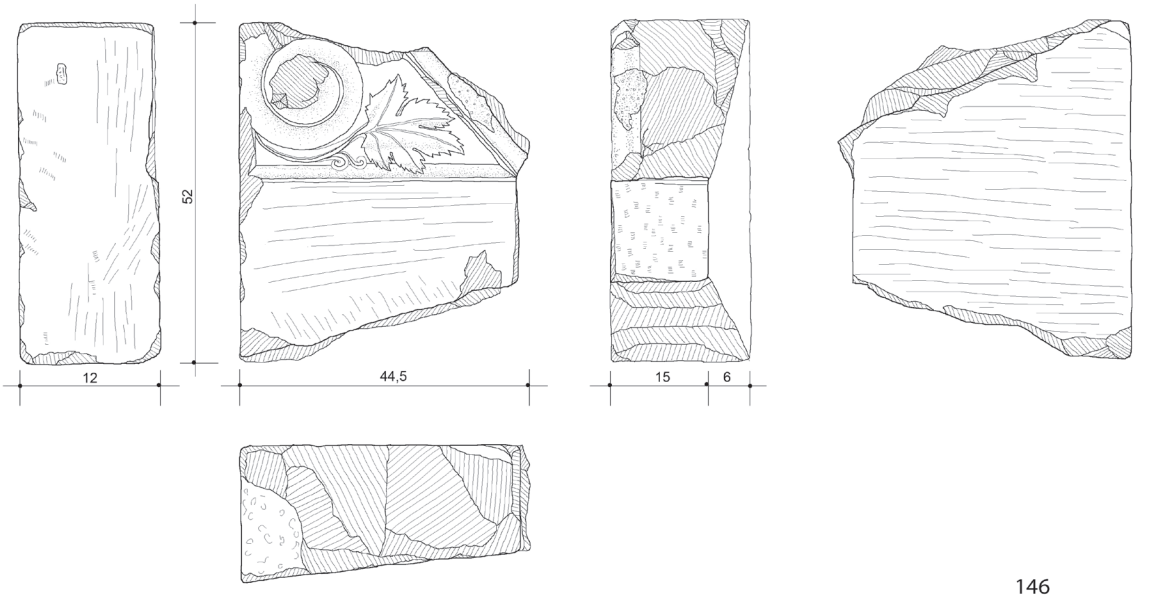
Pl. 23

145

0 5cm

5 0 10 20 30 40 50 60 70 80 cm





146

Drawing: Nicole Pieper

- Household appliances and tools
- Weighing equipment
- Cosmetic implements
- Jewellery
- Weapon

Constructional and Possible Furniture Fittings

Large numbers of iron nails have been found. The varying sizes and some differences in the shape indicate a wide range of possible uses. At least the larger ones, such as J15-Pd-16-24x (pl. 25.159), were primarily used in wooden roofing. Iron fittings or attachments, such as J15-Ob-13-13 (pl. 24.155), could have been part of some smaller domestic furniture as well as the fitting with hinge (?) J15-Ra-5-2 (pl. 24.148). Doors were closed by means of a lock, which was covered by a keyhole plate. The circular type of these plates is already known from the 2014 campaign in Jarash. Parallels form Asia Minor and Greece are of Byzantine and Late Byzantine date. Remarkable are the rivets with big domed head, item J15-Pd-16-7x (pl. 24.147), a decorative element also known from a few parallel findings.

Household Appliances and Tools

At least two small knives have been excavated (pl. 24.151 and 154); another iron fragment could be part of a knife (pl. 25.162). Knives with a length of about 10-15cm and a simple, unspecific blade (oblong, slightly curved edge and a straight back) are a common form of domestic cutting instruments, which were used in every household through all periods since Hellenistic times. The organic handles, usually made of wood or bone, are all lost. They were sometimes closed by an ellipsoid metal plate, such as J15-Ob-13-13 (pl. 24.155), which was slid on to the haft. The Jarash item was probably lost when the handle was replaced or after the knife went out of use. Fragments of an object with a twisted needle-like shaft and a loop (pl. 24.149) might be regarded as remains of an awl - a tool usually used for perforating leather. However, this is not clear, and a reconstruction of the fragments as a hook seems possible too.

Weighing Equipment

There is almost no evidence for the use of balances and weighing activities in the excavated sectors of the 2015 campaign. The small, spherical pendant made of massive bronze, J15-Rac-18-3 (pl. 24.156), might be a small weight rather than a piece of jewellery/a pendant of a necklace. Some similar items from the American excavations in Corinth have been interpreted as weights by Davidson (1952) who dated all pieces to the Byzantine period or later. At other places, spherical weights with a loop at the top are known already from Roman contexts. This type of weight is used as a counter - or sliding weight for steelyard beams.

Cosmetic Implements

The two cosmetic spoons, J15-Ob-13-16 (pl. 24.153), belong to a group of instruments, which are often regarded as accessories of the female toilette such as kohl-sticks and spatulae. Sometimes, they were found kept together in a box. But the real function of the ear or cosmetic spoons is not very clear, and a use as medical or pharmaceutical instrument cannot be excluded, as these instruments also appear in the inventory of burials of doctors.

Jewellery

Just one metal find of the 2015 campaign is a piece of jewellery. The earring, J15-Qa-29-24 (pl. 25.163), is a variant of the so-called earring with one loop, a standard type of Byzantine jewellery of the late 4th to 7th century AD. Almost all known parallels are made of gold, and a lot of them have a richly decorated pendant fixed to the loop. They were part of the jewellery of the social elite in Byzantine times. The Jarash item clearly demonstrates that this type was also imitated in copper alloy to be acquired and worn by women of lower social status. While earrings were usually closed by a small hook, the ring of the Jarash earring is designed as an open ring without any hook. This is typical for some earrings of the late 4th and 5th century AD, after which it went out of use.

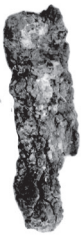
Weapon

The upper part of a small lance head or an arrowhead (pl. 25.160) is so far the only weapon found in the excavations of the Northwest Quarter of Jarash. Because of the central rib and especially because of the unusual material for Roman and later weapons - copper alloy - there is little doubt that the lance head is a product of pre-Roman times. The corroded fragment does not allow a precise dating, so it could be of Hellenistic or even earlier times, when it was still common to use copper alloy instead of iron for weapons. It stems from one of the surface layers in Trench P and was mixed with other displaced material and finds of modern date. Other materials of clear Hellenistic date among the metal findings of the 2015 campaign are missing. The metal objects of the 2015 campaign represent a limited spectrum of findings: some daily-life tools, such as knives and the possible awl, few simple cosmetic accessories, a modest earring and a number of construction fittings (nails). All items would fit to a 'normal' household whose residents were not necessarily members of the city´s social elite. Referring to the metal findings only, it is hardly possible to reconstruct the way in which they made their living. Nothing seems to indicate specialised, professional handicraft being undertaken in this area.

Based on the huge amount of iron nails, it can be assumed that the roof of the building collapsed at a certain moment. Most of the objects are standard forms known since Roman times. Just the earring and the circular keyhole plate can be dated more specifically: the first item to the Byzantine period - and being an open ring even more precisely to the late 4th up to the 5th century AD; the latter item can be dated from the Late Roman up to the Late Byzantine period.

Metal
147.
Pl. 24.147
J15-Pd-16-7x
Iron. Keyhole plate.
Diam.: 12.2-12.8.
Circular plate with a central hole and a small rectangular groove on the upper left side. At least four rivets with domed heads of different size are fixed on the plate. At the rear side a smaller rectangular back plate. Almost complete, but broken in several pieces; badly corroded.
References: Waldbaum 1983: 72-73, pl. 24.385; Baitinger and Völling 2007: 138-142, pl. 56.634; Jantzen 2004: pl. 32.1184. See also a (rectangular) keyhole plate with rivets with domed head from a late 3rd century AD

Pl. 24



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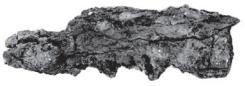
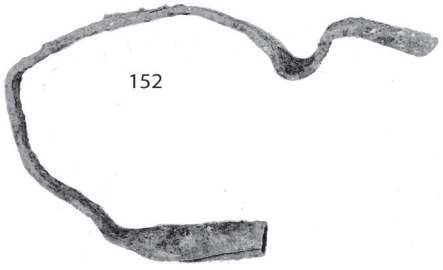


0 5cm

148

149



152

156

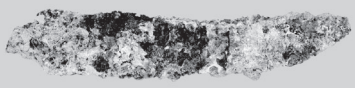
0 2cm

151

a)

b)

153



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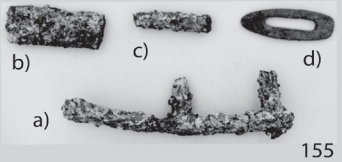


b)

c)

d)

a)

155

0 5cm

context in Jarash: Seigne 1986: pl. 14.2.
Date: Late Roman/Late Byzantine.

148.
Pl. 24.148
J15-Ra-5-2
Iron. Fitting or hinge.
L.: 2.3; W.: 1.8.
Small fitting of rectangular shape with rests of five loops (?).
References: K. Rafael in Patrich 2008: 440; 456, no. 91.

149.
Pl. 24.149
J15-Of-9-7
Copper alloy. Hook or lamp suspender.
L. longest fragment: 2; W. hook: 0.4.
Four fragments of a (one?) wire-shaped item with a loop at one end, probably a hook, as they were used for balances or as a part of lamp suspender; however, one cannot exclude that the pieces formed a twisted and broken awl.
References: Clark 1986: 268, pl. 29.2 I-J; Jantzen 2004: 10, pl. 1.5; for awls of Byzantine time see Jantzen 2004: 128, pl. 23.802-803; Platt and Ray Jr. 2009: 195 fig. 11.20 ("garment pins").
Date: Hellenistic/Roman and later.

150.
Without Pl.
J15-Nb-57-14
Iron. Several nails.
L. longest piece: 6.3; W. head: 1.8.
13 fragments of iron nails, all badly corroded. The nails are of different size; one has a bent shaft. The heads are flat or slightly domed; the shaft usually has a square section.
References: Waldbaum 1983: 68-69, pl. 21-22; Gaitzsch 2005: 52-54, pl. 36-37; Kazanski 2003: 14-21, 87-90, pl. 13-16; K. Rafael in Patrich 2008: 437, 439-440; 455, no. 52-72; selection of iron nails from Jarash: Clark 1986: 268, pl. 30.
Date: Hellenistic/Roman and later.

151.
Pl. 24.151
J15-Pb-16-3x
Iron. Knife.
L.: 8.5; W.: 2.
Blade of a small knife with a slightly curved edge and a straight back. The haft is missing; badly corroded.
References: Waldbaum 1983: 54-58, pl. 15.198; Clark 1986: 267, pl. 28.2; Gaitzsch 2005: 29-37, pl. 31.M4, M9; Jantzen 2004: 113, pl. 17.684; Kazanski 2003: 11; 82, pl. 8.41-42.

152.
Pl. 24.152
J15-Ni-39-7
Copper alloy. Band of unknown function.
L.: 6.6; W.: 0.6.
Twisted band of copper alloy with a wire-shaped central section and flat rectangular ends.
Date: Hellenistic/Roman and later.

153.
Pl. 24.153
J15-Ob-13-16
Copper alloy. Two cosmetic spoons or probes.
a) L.: 14.8; Diam. end: 0.5. b) L.: 11.7; Diam.: 0.3.
Both pieces have a plain and originally straight shaft of round cross section and a small bowl at one end; the shaft is now buckled and slightly twisted.
References: Waldbaum 1983: 105-107, pl. 41.619-634; K. Rafael in Patrich 2008: 446; 466, no. 188; Platt and Ray Jr. 2009: 200, fig. 12.1.2; Davidson 1952: 181, pl. 82.1319-1322; for decorated items of Late Byzantine and Islamic date, see Kazanski 2003: 28; 94, pl. 20.230-235.
Date: Roman and later.

154
Pl. 24.154
J15-Ob-108-1
Iron. Knife.
L.: 11.3; W.: 2.1.
Two fragments of a knife with a slightly curved edge and a straight back. A bigger part of the haft is missing; badly corroded.
References: Waldbaum 1983: 54-58, pl. 15.205; Clark 1986: 267, pl. 28.2; Jantzen 2004: 113, pl. 17.684; Kazanski 2003: 11; 82, pl. 8.41-42.

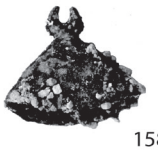
155.
Pl. 24.155
J15-Ob-13-13
Iron (a-c) and copper alloy (d). Lot of 4 pieces.
a) L.: 7.3; W.: 1.2; b) L.: 3.2; W.: 1.3; c) L.: 2.5; W.: 0.5; d) L.: 3; W.: 1.
The flat ellipsoid piece made of copper alloy is a small basic plate of a knife´s handle ("hilt guard"). There is obviously no functional correlation to the other three pieces made of iron. The biggest one (a) is an oblong rectangular fitting with two nails whose function is unknown (furniture fitting?).
References: Basic plate: Gaitzsch 2005: 34-35, pl. 33.M60-68; for a (silver) basic plate of a knife from Jarash, see Clark 1986: 267 ("hilt guard"), pl. 28.2 bottom; furniture fittings: Gaitzsch 2005: pl. 64.3; Jantzen 2004: pl. 26.842-843.

156.
Pl. 24.156
J15-Rac-18-3
Copper alloy. Small weight (?).
L.: 0.9; W.: 0.7.
Spherical, almost onion-shaped body with a loop at the top; probably a small weight.
References: Davidson 1952: 213, pl. 96.1641-1642.1644; Mutz 1983.
Date: Roman and Later.

157.
Pl. 25.157
J15-Jl-33-2
Copper alloy. Rest of a chain.
L.: 1.8; W.: 0.7.
Short fragment of a simple chain with five wire-shaped rings closed by welding or soldering.
References: Jantzen 2004: pl. 36.1229-1231.
Date: Hellenistic/Roman and later.

Pl. 25

157

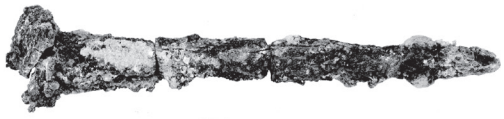


158

163

164

0 2cm



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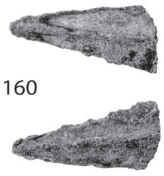
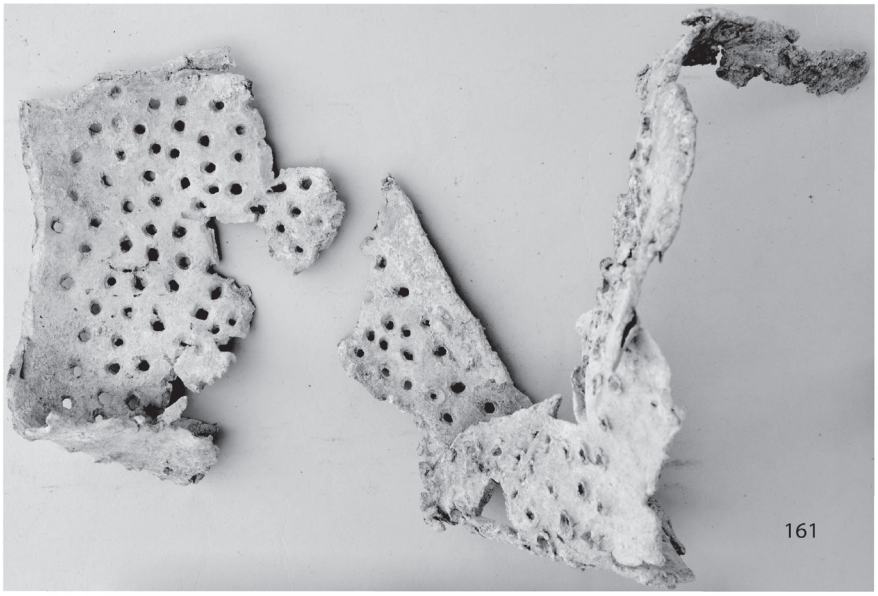


160

162



161

0 5cm

158.
Pl. 25.158
J15-R-13-1
Copper alloy. Small bell.
L.: 2.1; H.: 2.
Hemispherical bell with a loop at the top; bell dented, loop broken.
References: Waldbaum 1983: 42-44, pl. 8.92; Clark 1986: 268, pl. 29.2. H (catalogue: G); Vollenweider and Platt 2009: 300-301, fig. 14.2.6-8.
Date: Roman and later.

159.
Pl. 25.159
J15-Pd-16-24x
Iron. Large nail.
L.: 15.4; W. head: 3.3.
Large, tapered shaft, domed head; badly corroded; head broken.
References: Waldbaum 1983: 68-69, pl. 21.302; Kazanski 2003: 20, pl. 90.159 and 161; similar nails of large size from Jarash: Clark 1986: 268, pl. 30.1 right, pl. 30.2 right.

160
Pl. 25.160
J15-Pd-5-3
Copper alloy. Lance- or arrowhead.
L.: 4.6; W.: 2.
Upper part of a small lancehead or an arrowhead; preserved part of oblong, triangular shape; with a central, vertical rib of circular section.
References: Waldbaum 1983: 32-35, pl. 3.
Date: Hellenistic or earlier.

161
Pl. 25.161
J15-Pc-15-x
Copper alloy. Fragments of a strainer.
a) L.: 13.7; W.: 10.5; b) L.: 18.3; W.: 6.
Two large fragments of a strainer, both dented and twisted; covered with hundreds of small punched holes, more or less arranged in lines; the exact shape of the vessel, however, cannot be determined, but it is probably a bowl. As the fragments are of a curved body, one can exclude an anthepsa. This special vessel form had a flat perforated bottom and was common throughout Roman and Byzantine times.
References: Waldbaum 1983: 59, pl. 16.217; Davidson 1952: 73, pl. 51.555.
Date: Hellenistic/Roman and later.

162.
Pl. 25.162
J15-Pd-16-21x
Iron. Fragment of a knife (?)
L.: 7.1; W.: 2.4.
Fragmented blade with a rest of the haft; the exact shape can not be determined; badly corroded.
References: Waldbaum 1983: 54-58, pl. 14-15.
Date: Hellenistic/Roman and later.

163.
Pl. 25.163
J15-Qa-29-24
Copper alloy. Earring.
L.: 2.4; Diam. of the ring: 2.
Open, wire-shaped ring. Small, almost rectangular loop with lateral granulates.
References: Baldini 1999: 90-92, no. 9.

164.
Pl. 25.164
J15-Ob-108-13
Copper alloy. Chain link.
L.: 2.1; W.: 1.2.
Link of figure-eight type with a larger and a smaller ring; corroded.
References: Waldbaum 1983: pl. 54.946; Clark 1986: 269, pl. 32.1 mid row.
Date: Hellenistic/Roman and later.

Preliminary Report on the Results of GC/MS Analyses of the Amphorae Content

Andreas Springer and Silvia Polla

The contents of seven selected amphorae samples belonging to imported and local/regional types have been analysed, using gas chromatography-mass spectrometry (GC/MS). The aim of the scientific analysis is to get a better understanding of urban economies in Jarash by assessing patterns of use and reuse of transport containers and storage jars in context.

Methodology

Sherds were first surface-cleaned, and powdered samples were extracted using the extraction methods for wine and oil markers, analogous to the methodology described by Pecci *et al.* (2013) and Pecci, Ontiveros and Garnier (2013), including the derivatisation with BSTFA before analysis by GC-MS. The main difference to previous applications was that we used a rotary evaporator for removal of extraction solvents instead of a flow of dry nitrogen. The GC-MS method described in literature was customised for an Agilent G1969A GC-MS system equipped with a DB-5MS GC column (30m × 0.25mm, Agilent Technologies), including a temperature programme (1 min at 50°C, then a ramp of 5°C/min, 10 min at 300°C) utilizing added Dotriocontan to mark the end of the chromatogram and as internal standard. All found compounds were compared to the retention times and mass spectra of standards produced from pure compounds, derivatised using BSTFA.

Preliminary Results

The content of two amphorae of the type Almagro 50 (samples nos. 10009, pl. 14.89 - 10010, pl. 14.90) was analysed. This Lusitanian amphora produced in Portugal between the 3rd/4th and the 5th century usually shows a western Mediterranean distribution and probably transported fish products (Carandini and Panella 1981; Keay 1984). In both analysed samples, very small lactic acid was identified, a compound that refers to fermentation processes. Additionally, palmitic and stearic acid, which may originate from plant oils, such as *e.g.* olive oil as well as animal fat (see to this respect Woodworth *et al.* 2015: 53-54), were detected.

The analysis of one Late Roman 1 amphora (sample no. 10000, *cf.* pl. 16.93), for which both olive oil (Mitchell 2005) and wine (Piéri 2005) have been suggested, shows definitive oil markers.

The same oil markers were detected in both samples of the probably regional production of bag-shaped amphorae (samples nos. 10001 [Type *cf.* Lichtenberger *et al.* 2018: fig. 72] - 10002, *cf.* pl. 14.85) as well as in the "Byzantine" amphora (sample no. 10006, for the type *cf.* pl. 13.82). According to written sources, Palestinian bag-shaped amphorae, belonging to the family of Late Roman 5 and 6 Amphorae, should primarily contain wine but also oil, dry figs and fish sauce for the intraregional trade (Piéri 2005).

The analysis of the content of one amphora of Type Kapitän II (*cf.* pl. 15.92), considered as a wine amphora (Carandini and Panella 1981), shows both oil and wine as a probable source of the detected compounds. Although no direct evidence for wine has been detected at this stage, the presence of markers of fermentation processes, such as lactic acid (Garnier 2015: 34) was observed, indicating reuse/secondary use and/or interchangeability of contents (Peña 2007).

The Faunal Remains from Jarash, Northwest Quarter, Seasons 2012 to 2014

Pernille Bangsgaard

The faunal remains presented in this report include material excavated during the excavation seasons 2012 to 2014. The total collection originates from ten distinct excavation areas. The majority of the material was analysed on site in Jarash in August during the 2014 and the 2015 field seasons. A small selection of faunal material was, however, exported to Denmark and analysed at the Natural History Museum of Denmark, using the large comparative collections of skeletons available there. These mainly include remains from various bird and fish species, which are currently not 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 not, such as cut-marks, fire damage and evidence of pathology. The bones are quantified by number of fragments, NISP (*number of identified specimens*) and weight. When possible, all long-bone fragments were registered with age categories (*foetal, pullus, unfused and fused)* and all mandibles were registered with ontogenetic age when the information was available.

The Faunal Material

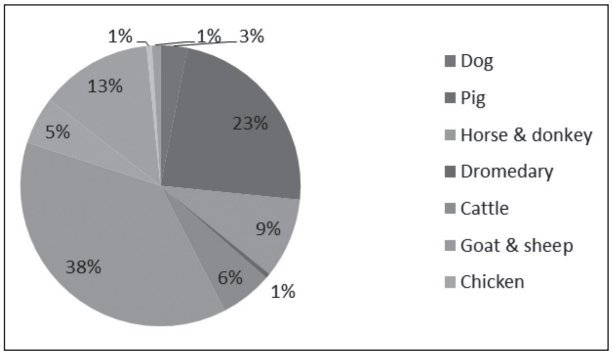
At present, a total of 5,927 fragments have been registered from the excavations (weight: 37,945.5 grams), of which 3,501 were registered during the 2015 season (see **Table 1** for the full species list). This year, it was decided to continue the faunal analysis chronologically, so the remainder of the 2012 season was analysed first, followed by all of the remains excavated in 2013. The 2012 season included material from Trenches A, B and C, whereas the 2013 season included material from Trenches D, E, F, G and H. The remaining trenches, J and K, were excavated in 2014 and analysed during the same field season. The large number of bones analysed means that the analysis is now more comprehensive, and that more statistics can be carried out.

The faunal remains were hand collected during excavation with little sieving or flotation for the majority of contexts. Only in the case of two complete pots was the content sieved to improve small-bone retrieval. It is therefore likely that some loss of small bones occurred as a result of this, in particular the retrieval of fish, bird and rodent bones, along with the minor bones from various small mammal species. The state of preservation is generally very good, meaning that most of the original surface of the bones is preserved, and post- or pre-excavation fragmentation is limited, leaving cut-marks and other minor changes still visible on the surface of the bone.

Bones with a sign of burning or calcined fragments are extremely rare, and only a total of 74 such fragments were identified in the entire collection, accounting for around 1.2 percent of the collection (see **Table 2**). The group includes 55 fragments, which were partly burnt black, 12 which were completely burnt black and 7 fragments which were burnt white, thus implying that the bones were mainly exposed to lower temperatures, or exposure was limited to short intervals. The fragments which could be identified include mainly the domesticated animals, sheep and goat, cattle, pig and equid, with a single mark on a *Phasanidae* sp. bone. The limited amount of burning could indicate that, for the majority, preparation of meat either did not include the bones or the foods prepared primarily included dishes where the meat would not be directly exposed to 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 onwards (See for example Nasrallah 2007). Bones with cut- and chop-marks are more common in the collection, with 450 recorded fragments (see **Table 3**). 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 from domesticates, such as sheep, goat, cattle and pig, but fish and birds are also represented with 12 bones. As more material is identified, it should be possible to reconstruct the butchering pattern for the most common species in the collection.

The Species

A minimum of 30 species were positively identified in the collection, all of which are quantified in **Table 1**, according to the trench of origin. A general overview of the entire identified collection with percentages of total NISP is presented in (**Fig. 31**). Domesticates are by far the most common group of animals and include sheep (*Ovis aries*), goat (*Capra hircus*), pig (*Sus* sp.), cattle (*Bos taurus*) and



31. Distribution of the main species found at Jaresh, with procentage of total NISP.

Table 1: Full species list ot the registered faunal material.

	Trench A	Trench B	Trench C	Trench D	Trench E	Trench F	Trench G	Trench H	Trench J	Trench K	**Total**
Domesticated Animals											
Dog, *Canis familiaris*	2	5	1	10	7	4	2	6	31		**70**
Domesticated pig, *Sus domesticus*		3									**3**
Pig, *Sus* sp. *	9	171	11	28	90	69	52	24	37	36	**527**
Donkey, *Equus asinus*		3	4				2		26		**35**
Horse, *Equus caballus*				3	2	4		6			**15**
Horse/donkey, *Equus* sp.	4	7	9	9	1	2	3	8	115		**158**
Dromedary, *Camelus dromedarus*									1	1	**2**
Camel/dromedary, *Camelus* sp.						3	5	3			**11**
Cattle, *Bos taurus*		9	22	11	19	7	41	7	14	6	**136**
Goat, *Capra hircus*	2	12	2	6	6	15	20	5	11	12	**91**
Sheep, *Ovis aries*	2	14	1	5	11	17	16	8	10	34	**118**
Goat/sheep, *Capra hircus/ Ovis aries*	13	95	28	45	54	77	91	17	48	171	**639**
Chicken, *Gallus gallus domesticus*	8	55		3	10	22		3	10	8	**124**
Wild Animals											
Wolf, *Canis lupus*				1							**1**
Red fox, *Vulpes vulpes*										3	**3**
Carnivore, *Carnivora* sp.				1			1				**2**
Gazelle, *Gazella* sp.					1		2	1	2		**6**
Cape hare, *Lepus capensis*										1	**1**
Hedgehog, *Erinaceidae* sp			1								**1**
Mole rat, *Spalax* sp.								1			**1**
Black rat, *Rattus rattus*		3								1	**4**
Rat, *Rattus* sp.		4			1	1			1	1	**8**
Mice, *Muridae* sp.			1						1		**2**
Rodents, *Rodentia* sp.					1				7	1	**9**
Spur-thighed tortoise, *Testudo graeca*			2								**2**
Tortoise, *Testudo* sp.		7	11	6					1		**25**
Snakes, *Squamata* sp			117								**117**
Frogs and toads, *Anura* sp.			1								**1**
Chukar partridge, *Alectoris chukar*	2	1	2						1	4	**10**
Partridge and francolins, *Phasanidae* sp.	9	22	2	3	3	6	1	1	14	24	**85**
Pigeon and doves, *Columba* sp.		5								1	**6**
Ostrich, *Struthio* sp. #										1	**1**
Bird, *Aves* sp. #	44	64	3	2	5	9	6	1	6	50	**190**
Airbreathing catfish, *Clariidae* sp		1				2					**3**
Catfish, *Bagrus* sp		4									**4**
Fish, *Pisces* sp.			2	1						12	**15**
Crab, *Brachyura* sp.						1					**1**
Sea urchin, *Echinoderm* sp				1							**1**
Molluscs, *Mollusca* sp.										56	**56**
Ungulate, *Ungulata* sp.	3	19	25	12	8	14	28	7	131	42	**289**
Unidentified	89	411	143	146	244	356	554	138	598	477	**3156**
Total number of fragments	**187**	**915**	**388**	**263**	**463**	**609**	**859**	**236**	**1065**	**465**	**5927**
Total weight of fragments	**442**	**4283**	**1939,5**	**1109,1**	**3442**	**3180,5**	**6781,5**	**2333**	**9771**	**2013**	**37948**

Table 2: Distribution of burnt bones according to species

	black burnt	partly black burnt	white burnt	**Total**
Pig, *Sus* sp. *		8		**8**
Cattle, *Bos taurus*		2		**2**
Horse/donkey, *Equus* sp.		2		**2**
Goat, *Capra hircus*		2		**2**
Sheep, *Ovis aries*		6		**6**
Goat/sheep, *Capra hircus/ Ovis aries*	1	13	1	**15**
Partridge and francolins, *Phasanidae* sp.		1		**1**
Unidentified	11	21	6	
Total	**12**	**55**	**7**	**74**

Table 3: Distribution of worked bones according to species

	Chop-mark	**Cut-mark**	**worked**	**Total**
Pig, *Sus* sp. *	40	36	1	**76**
Horse/donkey, *Equus* sp.	1	12		**13**
Camel/dromedary, *Camelus* sp.	1	1		**2**
Cattle, *Bos taurus*	8	10		**18**
Goat, *Capra hircus*	4	3		**7**
Sheep, *Ovis aries*	8	11		**19**
Goat/sheep, *Capra hircus/ Ovis aries*	73	32		**105**
Chicken, *Gallus gallus domesticus*		6		**6**
Partridge and francolins, *Phasanidae* sp.		5		**5**
Fish, *Pisces* sp.	1			**1**
Ungulate, *Ungulata* sp.	14	16		**30**
Unidentified	120	48	12	
Total	**270**	**180**	**13**	

chicken (*Gallus domesticus*) as the main contributors. These species generally contribute as much as 85 percent or more of all identified bones (NISP), although there are exceptions to the rule, such as the collection from Trench A, where domesticates only include around 42 percent, mainly due to a high amount of unspecified bird and wild bird bones.

Wild Fauna

The small remaining group of wild species includes both various mammals, birds, fish and tortoise. Some of these are probably more likely to be commensal species, rather than an actual source of food, such as the small group of rodents. But many of the remaining species could certainly have served well for human consumption; these include gazelle (*Gazella* sp.), cape hare (*Lepus capensis*), red fox (*Vulpes vulpes*), pigeon (*Columba* sp.) and chukar partridge (*Alectoris chukar*). All of the identified wild species are also found in the general area today (Harrison and Bates 1991; Porter and Aspinall 2010). It was possible to identify a few fish remains to family. These include three fragments from the family of airbreathing catfish (*Clariidae* sp.) and four from the general group of catfish (*Bagrus* sp.). The latter includes multiple families, whereas the former only includes species living in freshwater. Although catfish is known to have been exported in large numbers from the Nile (Van Neer *et al.* 2004) it must be considered that the fish was caught locally in a nearby stream. The freshwater fauna of the Middle East is not well studied, but the family of airbreathing catfish is known to be present in Jordan and nearby countries.

Sheep and Goat

Sheep and goat are overall the most common species in the collection, with sheep being slightly more common than goat, which corresponds well with the typical pattern of traditional sheep and goat husbandry in the Middle East and elsewhere (Dahl and Hjort 1976). Interestingly, there is significant variation between individual trenches. Due to the higher amount of fragments from these two species, it was possible to generate a reasonable amount of data for age categories. The time-of-

death distribution is based partly on mandible teeth eruption and wear stages and partly on fusion of the long-bones, according to species and for the sheep/goat group, as can be seen in **Tables 4-7**. The mandibles clearly testify to a fairly spread-out distribution, with no clear concentration of time of death in the period from 6 months to 8 years of age. It is, however, worth noting that goat appears to be represented by younger animals compared to sheep, but this is based on a small sample size. The long bones include more material, but the trend of younger goats (which died before the age of 1½ years) is not so evident here. In fact, most appear to have reached an age of 1½ to 3 years, but there is little evidence of older or senile animals. Regarding sheep and the sheep/goat group, the main time of death appears to be later, in the high-age category of 3 years or older. Although based on a fairly small sample size, such distribution could suggest different patterns of use for the two species. It could be suggested that goat was primarily used for milk; thus, males would be killed off very young, and milking females would be killed off as milk production started to decline. For the sheep long bones, the pattern of a reasonably high proportion of adult and older individuals based on the late fusion group, suggests that wool production might have been of some importance in the area (Payne 1973).

Table 4: Distribution of goat, sheep and goat/sheep mandibles, which could be aged (Payne, 1973).

Age category	Goat	Sheep	Sheep/goat	total
6-12 months	2	1	-	3
2-3 years	1	2	1	4
3-4 years	-	-	4	4
4-6 years	-	3	1	4
6-8 years	-	4	-	4

Table 5: Distribution of goat bones, which could be aged (Reitz and Wing, 1999).

	Time of fusion (months)	Unfused	Fused
Early Fusion			
Metapodium, proximal	At birth	-	12
Radius, proximal	4-9	-	2
2. Phalanges	9-13	-	7
Humerus, distal	11-13	-	7
1. Phalanges	11-15	1	11
Early Fusion Total		**1**	**39**
Middle Fusion			
Tibia, distal	19-24	1	-
Metapodium, distal	23-36	1	7
Calcaneus	23-60	2	1
Middle Fusion Total		**4**	**8**
Late Fusion			
Humerus proximal	23-84	-	2
Radius, distal	33-84	-	5
Late Fusion Total		**0**	**7**

Table 6: Distribution of sheep bones, which could be aged (Reitz and Wing, 1999).

	Time of fusion (months)	Unfused	Fused
Early Fusion			
Metapodium, proximal	At birth	-	18
Radius, proximal	3-10	-	5
Humerus, distal	3-10	2	8
Pelvis, acetabulum	6-10	-	1
2. Phalanges	6-16	-	10
1. Phalanges	6-16	-	8
Early Fusion Total		**2**	**50**
Middle Fusion			
Metapodium, distal	18-28	1	13
Middle Fusion Total		**1**	**13**
Late Fusion			
Calcaneus	30-36	2	2
Femur, distal	36-60	1	-
Humerus, proximal	36-42	1	2
Radius, distal	36-42	1	4
Femur proximal	23-84	-	2
Late Fusion Total		**5**	**10**

Pig

Pig is the second most important species at Jarash as counted by the number of identified fragments, and this is particularly clear in Trenches B and E, where it is in fact the most numerous species. With an increase in the amount of identified material during the current 2015 season, it is now possible to estimate the time of death for pigs based on mandibular tooth eruption and wear, along with long-bone fusion (see **Tables 8** and **9** for the results). The evidence from the mandibles clearly suggests a

Table 7: distribution of sheep and goat bones which could be aged (Reitz and Wing, 1999).

	Time of fusion (months)	Unfused	Fused
Early Fusion			
Metapodium, proximal	At birth	-	24
Radius, proximal	3-10	-	9
Humerus, distal	3-13	-	4
Scapula	5-13	3	8
Pelvis, acetabulum	6-10	4	26
2. Phalanges	6-16	-	3
1. Phalanges	6-16	-	5
Early Fusion Total		**7**	**79**
Middle Fusion			
Tibia, distal	15-24	2	19
Metapodium, distal	18-36	2	-
Middle Fusion Total		**4**	**19**
Late Fusion			
Tibia, proximal	23-60	6	1
Calcaneus	23-60	2	3
Ulna, proximal	24-84	2	-
Femur proximal	23-84	11	3
Femur, distal	36-60	5	2
Radius, distal	33-84	5	-
Vertebrate	48-60	14	35
Late Fusion Total		**45**	**44**

reasonably early time of death for the majority of the pig population, around the age of 6 months to 1 year to be precise. The data based on long-bone fusion suggests a slightly older age, from 1½ to 3 years of age. Combined, the tables clearly suggest that pig was kept as a supply for meat, as the animals were killed around the age at which the meat gain would be optimal.

Cattle

Interestingly, the evidence points to a completely different distribution for cattle, for which data is available from long-bone fusion (see **Table 10** for the results). It is evident that the overwhelming majority of the animals were in the oldest category, which begins around 3 years of age and older. This clearly supports the assumption that cattle primarily served other functions, such as a beast-of-burden or milk production, and only secondarily as a meat resource. Thus, they were not killed and consumed, until after they had out-served their primary purpose.

Table 8: Distribution of pig mandibles, which could be aged (Lemoine *et al.* 2014).

Age Category	Number
≤1 month	2
1-8 months	2
3-5 months	4
6-8 months	6
6-12 months	6
8-16 months	3
12-16 months	1
12-52 months	3
30-72 months	2

Table 9: distribution of pig bones which could be aged (Reitz and Wing, 1999).

	Time of fusion (months)	Unfused	Fused
Early Fusion			
Metapodium, proximal	At birth	1	40
Scapula	12	2	6
Pelvis, acetabulum	12	3¤	10
2. Phalanges	12	-	3
Humerus, distal	12-18	6	2
Early Fusion Total		**12**	**61**
Middle Fusion			
1. Phalanges	24	8	1
Tibia, distal	24	12	3
Calcaneus	24-30	-	4
Metapodium, distal	24-27	27	2
Middle Fusion Total		**47**	**10**
Late Fusion			
Ulna, proximal	36-42	6*	-
Ulna, distal	36-42	8*	-
Humerus, proximal	42	1#	-
Tibia, proximal	42	3	-
Femur, distal	42	4¤	-
Femur proximal	42	1	-
Radius, distal	42	1	-
Vertebrate	48-84	19	7
Late Fusion Total		**43**	**7**

*2 foetal, 2 pullus, ¤ 2 pullus, 1 pullus

Dog

The majority of dog remains originate from two evidences in Trench J, amounting to 31 of a total of 70 fragments (from Trench Jc,

Table 10: Distribution of cattle bones which could be aged, according to trench (Reitz and Wing, 1999).

	Time of fusion (months)	Unfused	Fused
Early Fusion			
Metapodium, proximal	Before birth	0	8
Radius, proximal	12-18 months	0	1
Scapula	7-10 months	0	1
Pelvis, acetabulum	6-10 months	0	6
Humerus, distal	12-18 months	0	2
2. Phalanges	18-24 months	0	4
1. Phalanges	18-24 months	0	13
Early Fusion Total		**0**	**35**
Middle Fusion			
Tibia, distal	24-30 months	0	2
Metapodium, distal	24-36 months	0	6
Middle Fusion Total		**0**	**8**
Late Fusion			
Calcaneus	36-42 months	0	2
Femur proximal	42 months	2	3
Humerus, proximal	42-48 months	0	2
Radius, distal	42-48 months	1	3
Ulna, proximal	42-48 months	1	-
Ulna, distal	42-48 months	1	-
Vertebrate	84-108 months	2	1
Late Fusion Total		**7**	**11**

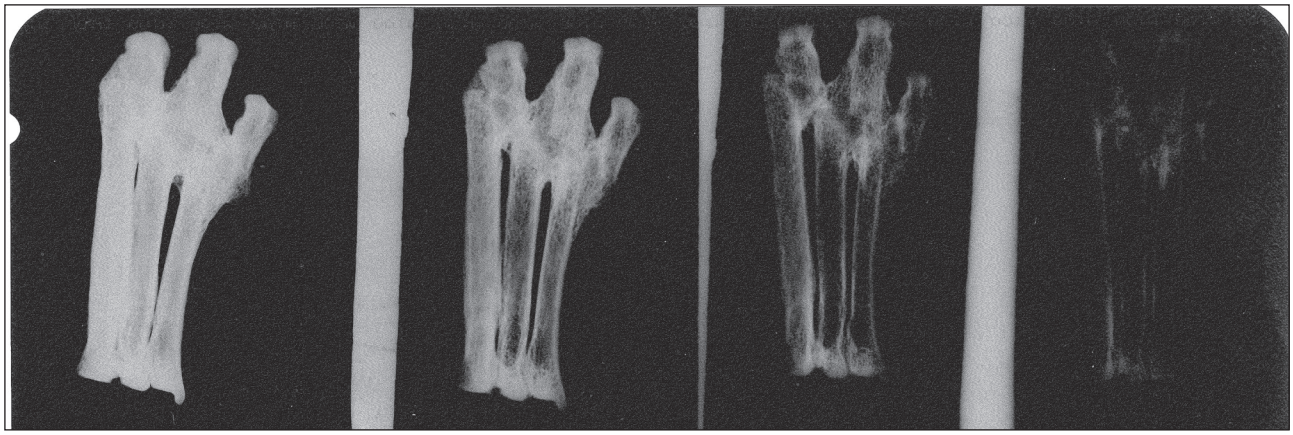
ev. 67 and ev. 68). Three complete long bones indicate that the dog had a shoulder height of around 50cm [Two radii with GL: 147mm and 171.4mm and one femur with GL: 170.1mm. These and all other measurements mentioned in this report were taken according to von den Driesch 1979]. As there are no duplicates of any one bone among the dog remains from Jc, it is likely that the fragments originate from a single individual. All of these long bones are fused, and the animal would therefore have been more than two years of age when it died (Based on Silver 1969). Among the remaining 39 fragments from dogs are three metapodia with excessive new bone depositing, thus locking 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 in a permanent position (see **Fig. 32**) [trench Jc, ev. 35]. The remaining bones are dispersed among all the trenches, and clearly illustrate that dog was generally present at Jaresh.

Equid

The overwhelming majority of the Equus remains originate from two evidences in Trench Jc (141 fragments of a total 208) [trench Jc, from ev. 67 (find#1, find list# B149) and 68 (not yet numbered)]. Among the 141 fragments, 26 could be identified as donkey (*Equus asinus*) based on a series of distinct morphological markers (Johnstone 2004). 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. Among the collection, five measurements can be used to calculate the shoulder height of the animals [Two metatarsals with GL: 230mm and 217.4mm, two tibia with GL: 305mm and 280mm and one radius with GL: 288,5mm]. They indicate a shoulder height between 133 and 115 cm. Included in the collection are 19 fragments, which display signs of various pathologies. These do not appear to be of a traumatic origin. Instead, all are consistent with old and working animals (see **Fig. 33** for an example). It might therefore be suggested that the bones were from older caravan donkeys that had out-served their purpose as pack animals. The equid group does, however, also include some 15 fragments, which could be identified to horse. These are distributed among 4 different trenches and could well be from multiple individuals [Horse remains were identified from Trench D (3), Trench E (2), Trench F (4) and Trench H (6)].

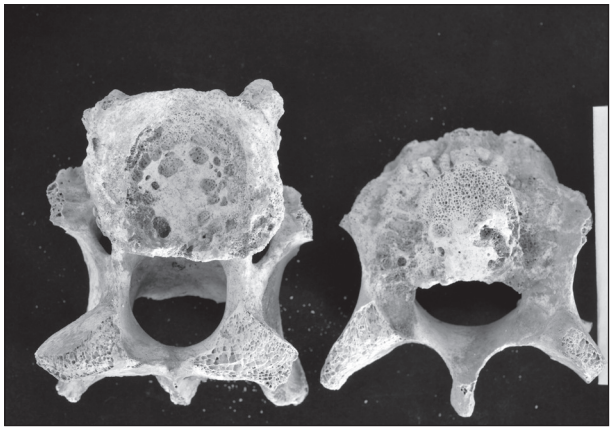
Dromedary

Among the remaining domesticated mammals, it is worth noting that among the small group of dromedary or dromedary/camel frag-

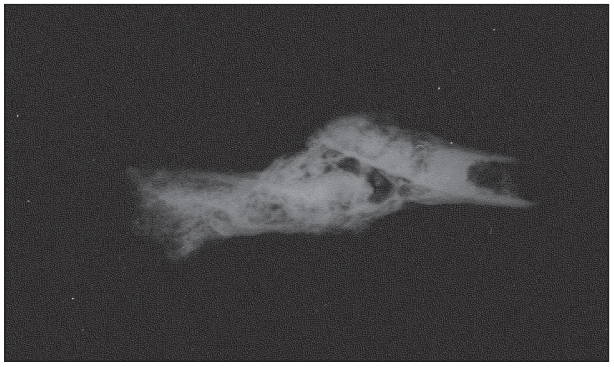


32. X-ray of three joined dog metapodiums with clear fracture and regrowth stabilising the bones.

ments (13 in total), eight display signs of fusion and none are unfused. The remains, therefore, follow the pattern seen elsewhere, namely that very few fragments are found inside towns, and those that are discovered are all from adult animals. This has elsewhere been interpreted as evidence for the animals' function in caravan transport, meaning that they rarely entered cities, and only when an animal became injured or too old was it butchered and consumed.



33. Two equids cervical vertebrates (6.-7. V.ce.) with significant osteoarthritis in the joint.



34. X-ray of a fractured and healed humerus from domesticated hen.

Domesticated Hen

The domesticated chicken is the main avian species in the collection, and it is represented by both bones and eggshell, in total 124 fragments. Additionally, the *Phasanidae* family and the general bird category are both likely to contain mainly elements from chicken, elements that were simply too fragmented to be assigned to a more specific category. The chicken remains include elements from the entire body; among these is a humerus with clear signs of a healed mid-diafyse fracture. The two ends were not placed in the anatomically correct position afterwards, and thus, the wing was shortened significantly (**Fig. 34**) [from Trench Gb, ev. 12]. Apart from representing a significant addition to the daily diet at the site of Jarash, it is worth noting that chicken was considered a good and light form of meat in both Byzantine and Early Islamic written sources (Dalby 2010: 71 and 143; Nasrallah 2007: 104).

Concluding Remarks

The collection of some 5,927 fragments from ten different areas of excavation has now been analysed during two single weeks of fieldwork in 2014 and 2015. Currently, a minimum of 30 species have been identified. These include a significant number of domesticates but also a smaller collection of various wild species. The present results testify to the potential output of a more detailed faunal analysis with significant diversity of data, regarding species, body-part preferences and food preparation. A more detailed study of the find contexts and a chronological development is underway.

Appendix on Two Possible Arabic Graffiti
John Møller Larsen

In the case of item cat. no. 127 (pl. 20.127) the character and quantity of the remaining incisions make it difficult to establish if we are looking at script or a decoration. On the assumption that the remains are indeed script, it seems that we should look at the figure turned 90 degrees to the right. We can then rule out Latin and Greek (unless we have a very coarsely executed ω). Within the Aramaic script family a possibility is Christian Palestinian Aramaic (Melkite Aramaic), but the remains are too meagre to suggest any meaningful reading [a chart of the Christian Palestinian script is found in Desreumaux 1998: 513]. Another possibility is Arabic, but in this case it is noteworthy that the shapes are made up of short contiguous straight lines rather than single flowing strokes. This would be simpler to explain if the lines had been incised after the brick had been fired. As long as the clay was wet, it would have been easy to add semicircular strokes with a finger or a tool. If the remains are Arabic they are open to numerous interpretations, partly due to the lack of diacritical points. So, the angular form to the right could be interpreted as *b*, *t*, *th*, *n*, or *y*. If the small oblique stroke above the other lines is an intentional part of a letter, we could read *k* or *l*. If it is not, a possibility is *n*; in that case we could for instance read *bn*. This could either be the Arabic *ibn* (*son of*) as part of a name or it could be *bānin* (*builder*, (*someone*) *building*) written defectively (without notation of the ā) unless the small oblique stroke is seen as a perpendicular *alif*, which is not very likely. Clearly, these suggestions are quite conjectural and would need corroboration from other finds.

In the case of cat. no. 132 (pl. 21.132) the fragment to the left clearly shows the remains of script. They could be interpreted as Syriac script in its Serto variant, but a more likely possibility is Arabic. The letter to the right may possibly be interpreted as *d* or *dh*, though it is unusual that the left part of the top of the letter points downwards. It is not possible to see if the letter is connected to the left. For the next two letters the lower parts are missing. The first can safely be taken as *alif* or *l*, while the second is most likely *j*, *ḥ*, or *kh* (letters only distinguished by means diacritical points). The remains to the left are tiny but would most readily fit the letter *h*. On the assumption that all letters belong to the same word and that we have all the letters of the word (which is likely since no letter is visible to the right of the first letter), we then have twelve possible permutations: *d-ʾ-j-h*, *d-ʾ-ḥ-h*, *d-ʾ-kh-h*, *d-l-j-h*, *d-l-ḥ-h*, *d-l-kh-h*, *dh-ʾ-j-h*, *dh-ʾ-ḥ-h*, *dh-ʾ-kh-h*, *dh-l-j-h*, *dh-l-ḥ-h*, *dh-l-kh-h*. However, the interpretation is further complicated by the fact that the *alif* either may be a root letter or may indicate the vowel ā. Also, the *h* may be either a root letter or a feminine ending. Still, in spite of the many possibilities only few words would actually fit: *dājjah* as an active participle in the feminine of the verb *dajja*, i.a. *creep along*, *walk leisurely*; or *duljah* (also found with alternative vocalizations) meaning a *night journey* or an *hour of the latter part of the night*. Without a context it is obviously impossible to know if any of these meanings could be correct. The remains on the middle fragment could possibly be one of the letters *j*, *ḥ*, and *kh* but may just as well be part of a decoration. Finally, the remains on the fragment to the right can only be interpreted as decoration.

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