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The Byzantine Settlement History of Miletus and Its Hinterland – Quantitative Aspects: Stratigraphy, Pottery, Anthropology, Coins, and Palynology

with contributions by Arzu Demirel, Adam Izdebski, Hacer Sancaktar, Nico Schwerdt, and Harald Stümpel

A century of archaeological field work at and around Miletus on the Aegean coast of Turkey (Fig. 1) has led to the discovery of many fine Byzantine buildings, among them the Bishop's Palace[1], numerous churches and chapels[2], several fortifications, gates, and a citadel[3], as well as countless marble artefacts[4]. In addition and more importantly, some mostly qualitative aspects of Byzantine urbanism and settlement history have also been established, in particular early Byzantine antiquarianism[5], a seventh century-date for the Byzantine fortifications[6], urban collapse and abandonment in the middle Byzantine period[7], followed by the building of new fortifications against the Turks[8], and rural prosperity in the early and middle Byzantine periods[9]. As a result, knowledge of Byzantine Miletus has reached the critical mass, at which quantitative aspects start to become apparent, and this paper elaborates on some of them. It presents new evidence that, taken on its own, would be of little interest, but which gains in importance by filling in gaps in the previous research and thus providing sufficient data and coverage for quantitative historiography. In the end this leads to a continuous, early to middle Byzantine model for the quantitative development of urban and rural populations and economies and how they related to each other.

On first sight, early Byzantine Miletus appears to have done rather well. For one, the ancient cityscape was preserved throughout the period, even when Miletus was newly fortified in the seventh century A.D. The new city walls incorporated various ancient monuments, including a temple of Serapis and a monumental gateway to the ›South Market‹, both of which became main decorative features of major city gates[10]. Before that, in the later sixth century, the ›Great Church‹ had already made similar use of an ancient porch or propylon that served as main entrance to the church and hid the inferior Byzantine masonry behind a venerable marble façade[11]. Other antiquities that remained on display throughout the Byzantine period include nude pagan marble sculptures on the façade of a nymphaeum and inside the ›Baths of Faustina‹[12], the latter having previously been renovated by the same Hesychios who also built a church and was himself honoured with a statue[13]. A large necropolis church

1 Niewöhner 2015b.
2 Von Gerkan 1925, 44–46; Feld 1996; Niewöhner 2013, 215–224; Niewöhner 2016a.
3 Müller-Wiener 1967; Niewöhner 2013, 181–189. 206–214; Niewöhner 2016c, 136–143.
4 Niewöhner 2007b; Niewöhner 2013, 190–205; Niewöhner 2016a, passim.
5 Niewöhner 2016a, 111–124.
6 Niewöhner 2013, 186–189.
7 Niewöhner 2013, 228; Niewöhner 2016b.
8 Müller-Wiener 1967; Niewöhner 2013, 206–214. 226–228.
9 Lohmann 1995, 323–328; Lohmann 1999, 465; Lohmann 2004, 352; Niewöhner 2007b; Niewöhner 2013, 190–205.
10 Knackfuß 1924, 69–155; Niewöhner 2008, 189–193; Niewöhner 2013, 181–186.
11 Niewöhner 2016a, 12 f.
12 Schneider 1999, 8–12; Bol 2011, 79–118; Dally 2012; Dally et al. 2015, 336–338.
13 Milet 6, vol. 1, 116 f. 213 f. cat. 341–343.

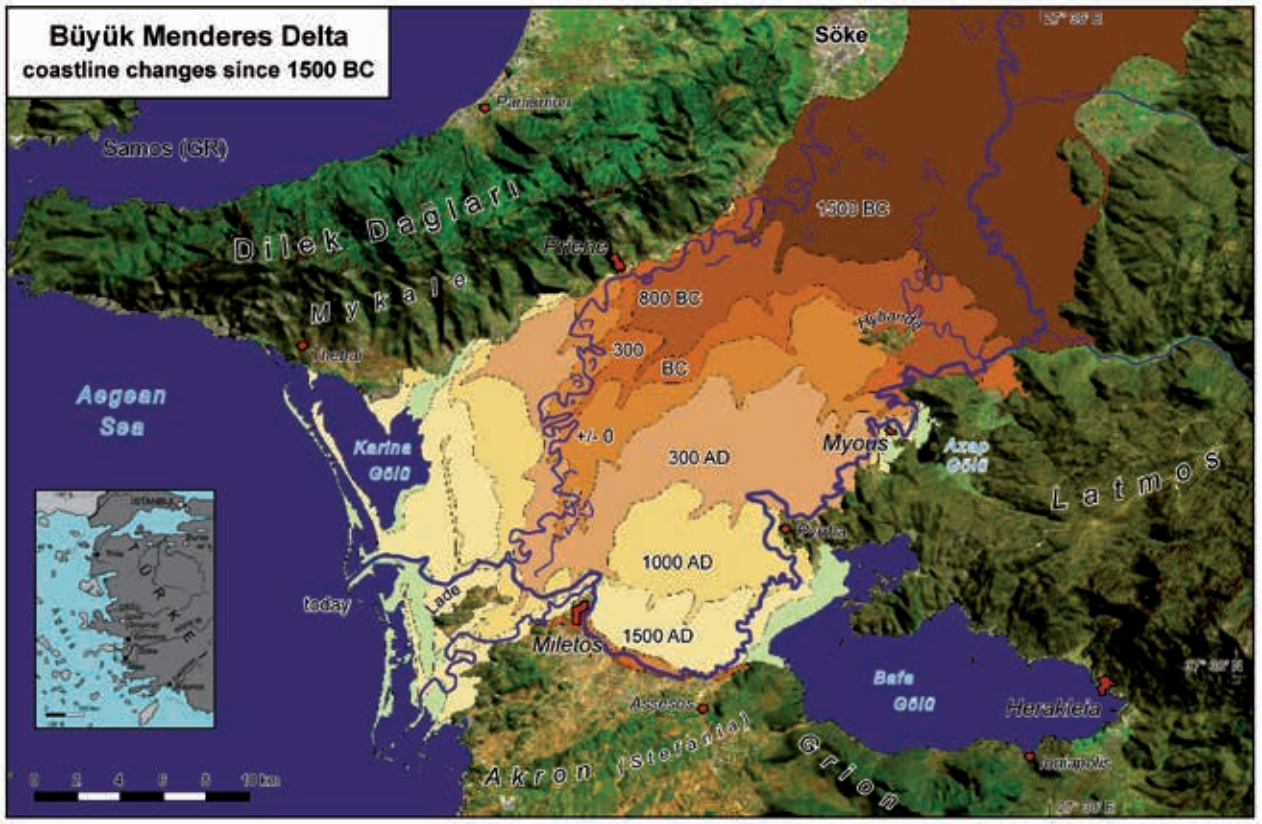

Fig. 1 Miletus and Lake Bafa, successive siltation of the Maeander River Delta from 1500 B.C. until today. Lake Bafa was cut off from the sea in late antiquity, when the siltation reached Miletus and the city started to be flooded

cum martyrium dates from the turn of the sixth century[14], a round church of St Mary from the later sixth century[15], and a chapel of St Michael inside the Bishop's Palace (fifth century)[16] was rebuilt in the shape of a basilica with galleries as late as the seventh century[17]. Various other buildings[18], a relatively large number of sixth century-inscriptions, several of which relate to the reign of Justinian[19], and a prosperous hinterland[20] appear to confirm that Miletus did well throughout the early Byzantine period.

However, most of the archaeological evidence stems from the city centre, inside the seventh century-fortifications, which included only a fraction of the ancient city (Fig. 2). In antiquity, most citizens will have lived on the outlying hills to the northeast and northwest, the Humeitepe and the Theatre Hill, and in the southern city, all of which were included in a late Roman renovation of the ancient city walls[21]. When and why were those quarters abandoned? Did that happen only in the seventh century, when the constant threat of sudden raids by the Arab fleet might have necessitated a short circuit of walls that could be manned and defended by a small local garrison[22]? Alternatively, Miletus could have shrunk already during the early Byzantine period, as did many other Anatolian cities that were in decline by the sixth century at the latest[23]. The contemporary early Byzantine prosperity of the rural hinterland appears in a different light, depending on whether the city remained large and populous, or whether it was losing the majority of its inhabitants.

If the city had shrunk by the sixth century, the Arab raids of the seventh and eighth centuries could have made less of a difference than sometimes assumed[24], and the middle Byzantine abandonment and oblivion of Miletus – the later fortifications against the Turks went by the new name of Ta Palatia – might have been the final consequence of a long drawn out process of rurali-

14 Niewöhner 2016a, 59–101.
15 Feld 1996.
16 Niewöhner 2015b.
17 Niewöhner 2016a, 37–57.
18 Niewöhner 2013; Niewöhner 2015a.
19 Milet 6, vol. 2, 137–146; vol. 3, 289–296.
20 Lohmann 1995, 323–328; Lohmann 1999, 465; Lohmann 2004, 352; Niewöhner 2007b.
21 Von Gerkan 1935, 105; Blum 1999, 62 f.; Niewöhner 2008, 184–186.
22 Niewöhner 2007c.
23 Rose 2011, 161 f.; Niewöhner 2011b, 119 f. (bibliography).
24 Foss 1975; Foss 1977.

sation[25]. In this matter much also depends on how the hinterland faired during the Invasion Period: Did the Arab raids lead to a collapse of the countryside, or did some of the rural population continue to live in the area from the early into the middle Byzantine period, when rural prosperity is attested once again? If so, what was the ecological model that would allow for such continuity in the Lower Meander Valley, and how does it compare to other parts of Anatolia[26]?

An opportunity to excavate some trenches in the southern city of Miletus and to investigate the late antique and Byzantine settlement history of this outlying quarter arose in 2013. The project lasted until 2015, and the results form the first part of this paper. Secondly, in 2016, it was possible to study the finds from an earlier excavation of a late antique context outside the Sacred Gate to the southeast of the city and to establish when this area outside the ancient city walls stopped to be occupied. Thirdly, recent years brought the first overview of all late Roman and Byzantine coins that were found and recorded at Miletus, either in excavations or as stray surface finds; they are presented in part three of this paper. As it turns out, the numismatic evidence deviates from that of the inscriptions and corrects the misleading impression that the sixth century was a particularly prosperous time at Miletus. Fourthly, improved referencing through new age-depth models enables a more precise interpretation and better understanding of old pollen cores from Lake Bafa in the hinterland of Miletus. They provide a continuous record of agricultural activity and rural economy from late antiquity through Byzantine times, including the Invasion Period in the seventh and eighth centuries, until the Turkish takeover and into the Ottoman period. The palynological evidence from the hinterland compares favourably to the coin finds from the city and confirms that the countryside developed differently and better during the Byzantine period. This paper is thus divided into the following sections:

Late antique occupation and early Byzantine burials in the southern part of the city
- Historical topography
- Middle Byzantine flooding
- Early Byzantine abandonment and burials
- Late antique building phase
- Earlier occupation
- Pottery
  - Trench 01+04
  - Trench 02
  - Trench 03
  - Summary
  - Catalogue
- Anthropology

A late antique context outside the Sacred Gate
- Historical topography
- Pottery
  - Stratigraphy
  - Catalogue

Late Roman and Byzantine coins
- Late Roman
- Byzantine

Environmental history of the hinterland
- Pollen data from Lake Bafa
  - A new age-depth model for core S6

25 Niewöhner 2013, 228; Niewöhner 2016b.

26 Izdebski 2013.

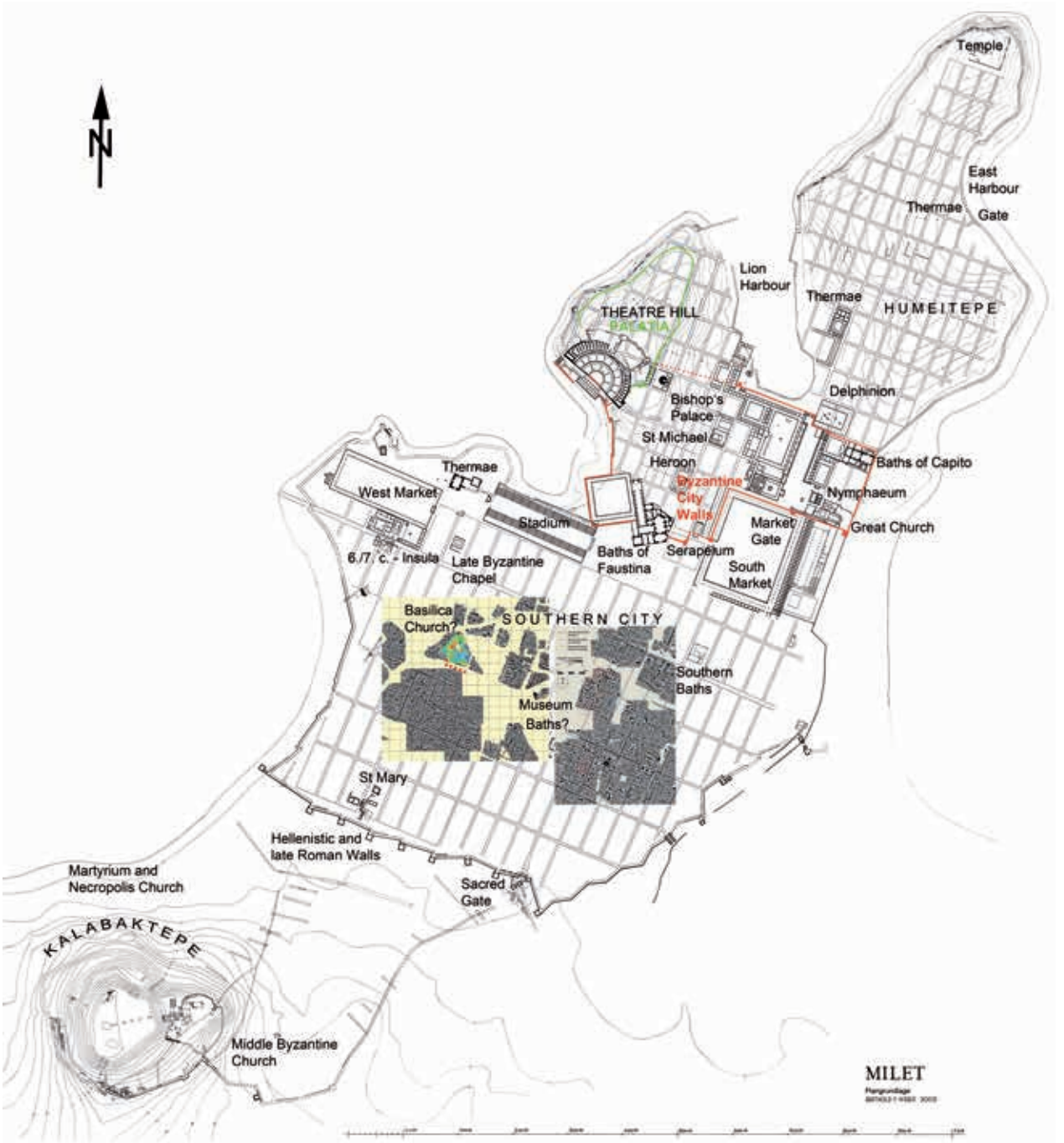

Fig. 2 Miletus in late antiquity and Byzantine times. The geophysical charts highlight the meadow with cropmarks to the east of the museum (cf. Figs. 4. 5) and the area around the excavated drainage channel (red dotted line; cf. Fig. 6). The Byzantine city walls (red) collapsed and were abandoned during the middle Byzantine period. Later, Ta Palatia (green) was newly founded on the Theatre Hill in order to defend against the arriving Turks

Pollen distribution, the catchment area of Lake Bafa, and the hinterland of Miletus

Vegetation history of the Milesia as recorded in core S6 from Lake Bafa

- Environmental micro history: contextualizing the vegetation change

Late antiquity and the early Byzantine period (fourth to sixth centuries)

Invasion Period (seventh to ninth centuries)

Middle Byzantine period and the arrival of the Turks (tenth to twelfth centuries)

The Beylik of Menteşe and the Ottoman conquest (13th to 15th centuries)

- Summary

Conclusions

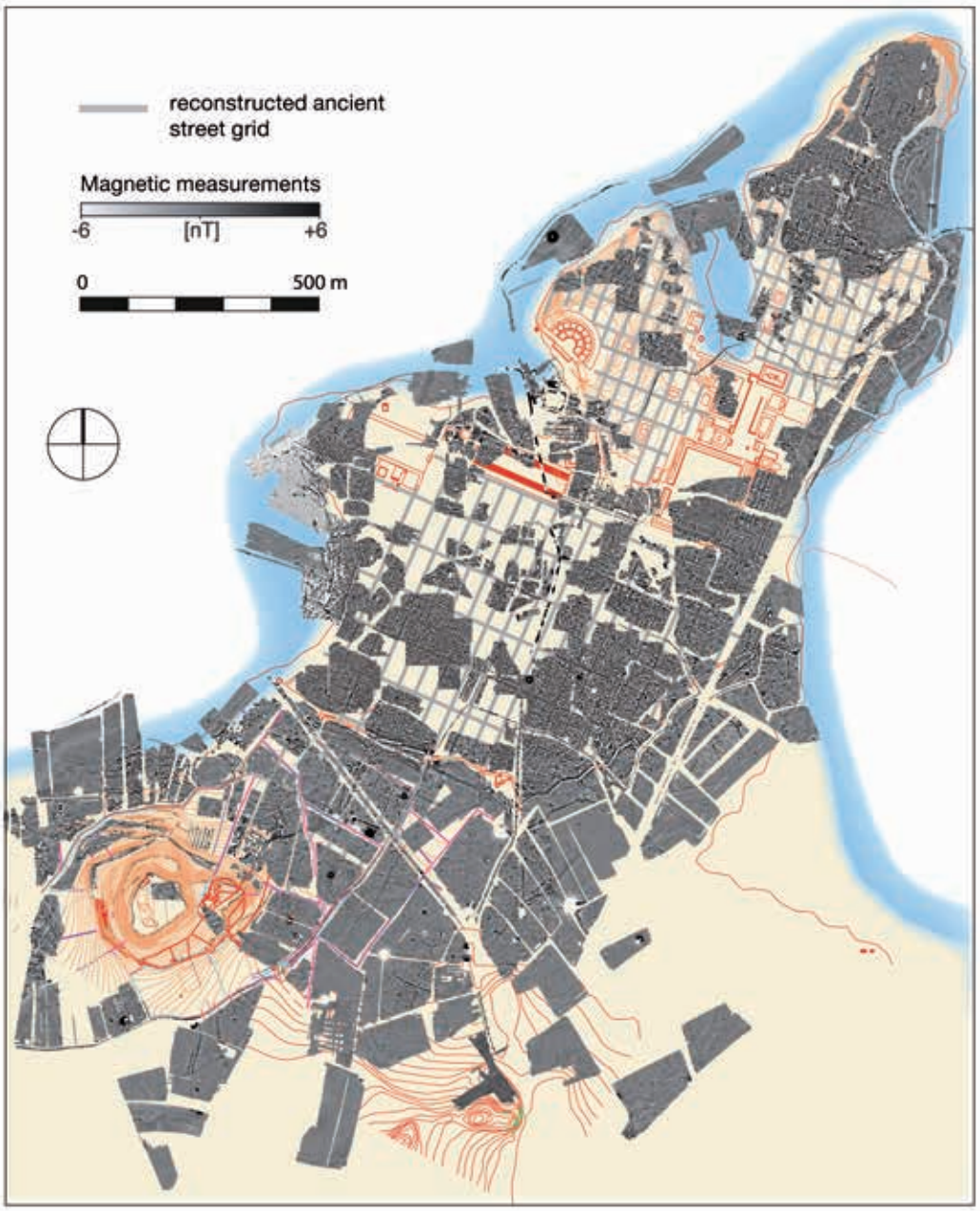

Fig. 3 Miletus, geomagnetic chart. The *insulae* in the south-eastern part of the ancient city stand out more clearly than elsewhere (scale 1 : 15 000)

Late Antique Occupation and Early Byzantine Burials in the Southern Part of the City

Historical Topography

Today, most of the southern city is under cultivation and contains cotton and other fields that lend themselves to geomagnetic prospection. Thus, an orthogonal street grid has been revealed (Fig. 3). The gird is surrounded by the ancient city walls, and the geomagnetic chart shows a marked contrast between the intramural ruins and the area outside the fortifications that was not built up.

A Roman ruin to the southeast of today's museum, in the centre of the southern city, may have been a bath building[27]. Other Roman baths were

27 Tuttahs 2007, 311–318.

Fig. 4 Miletus, meadow with cropmarks in the centre of the southern city, to the east of the museum (cf. Fig. 2); the ground plan of the ancient city becomes visible to the naked eye as the grass dries out and turns brown where walls run immediately beneath the turf

excavated further to the northeast, to the south of the South Market and the Ilyas Bey Mosque[28]. These ›Southern Baths‹ may have serviced a living quarter and were renovated twice, once in the late fourth century A.D. and for a second time around 500 A.D., when they were divided into two separate units, probably for the simultaneous but separate bathing of men and women. An *insula* to the south of the ›West Market‹ contained shops and workshops on its north and east sides; they were last renewed in the sixth century A.D. and stayed in use until the first half of the seventh century A.D.[29].

Other *insulae* to the east and southeast of the museum may have been given up earlier. Their modern ground level is one to two meters below the ground level in the before-mentioned areas with late antique and early Byzantine occupation, and this appears to be due to an absence of debris. The same is also suggested by the results of the geomagnetic survey, because the *insulae* in question stand out exceptionally well in the geomagnetic chart (Fig. 3); the *insulae* were obviously fully built up, and their internal structures stand out clearly, because no debris is covering and hiding the foundation walls as in other areas of the ancient city. This is confirmed by cropmarks on a meadow to the east of the museum (Fig. 4); brown stripes where the grass withers early indicate walls that lie immediately below the modern ground level and deprive the turf of water.

When we mapped the cropmarks[30], most of them turned out to correspond with buildings on ancient *insulae*, as attested by the geomagnetic prospection (Fig. 5); these ›ancient‹ cropmarks are charted in red. In contrast, one cropmark deviates significantly from the orientation of the grid plan, cuts across an ancient street, and does not have an equivalent in the geomagnetic chart; this cropmark is plotted in yellow. It probably reflects a more recent wall, most likely from the Turkish period, when the ancient street grid was buried and forgotten[31] and walls were often built with small stones and mud that tend to show up less well or not at all in the geomagnetic survey[32].

The absence of debris above the ancient walls must be due to removal, and this happened most likely during late antiquity or the early Byzantine period. Earlier on, the southern city should still have been fully occupied, as indicated by the late Roman renovation of the ancient city walls; in contrast, the early Byzantine circuit from the seventh century excluded the southern half of the city (Fig. 2). The early Byzantine fortifications were also the last known building project for which material from the southern city may have been re-used; afterwards, during the middle Byzantine period, Miletus appears to have been deserted[33]. Before that, a round church of St Mary from the sixth century is among the last known building projects inside the southern city[34]; it was inserted into an earlier Byzantine building of unknown function that stood close

28 Niewöhner 2015a.
29 Niewöhner 2013, 175–181.
30 With the help of Duygu Göcmen, to whom I would like to extend thanks.
31 Sarre et al. 1935, 12; Niewöhner 2016b.
32 Cf. Niewöhner 2015b, 246–248 for such an Ottoman building. Before excavation the building was detected by geo-radar, but an initial geomagnetic prospection had failed to register any traces of it.
33 Niewöhner 2013, 228; Niewöhner 2016b.
34 Feld 1996.

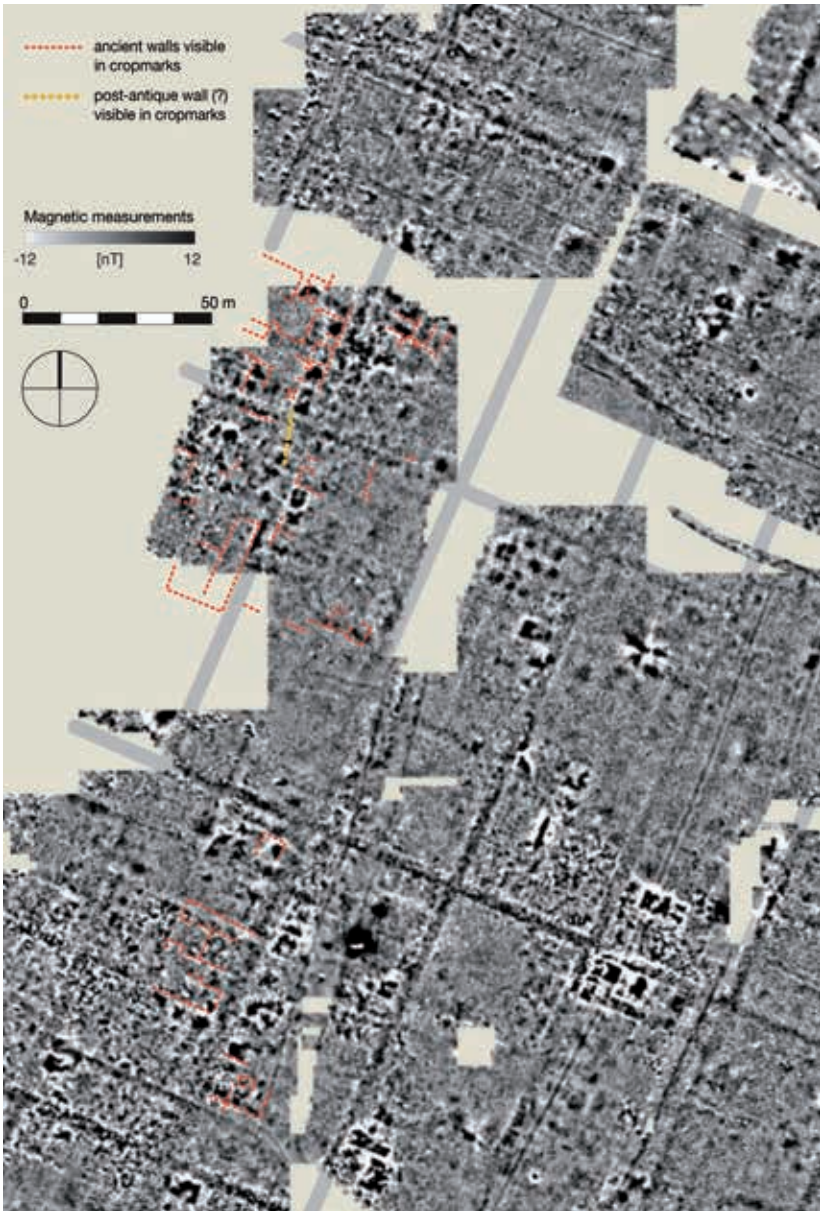

Fig. 5 Miletus, geomagnetic chart of the meadow with cropmarks in the centre of the southern city, opposite the museum (cf. Fig. 2); most cropmarks (red) correspond with buildings on the ancient *insulae* that show up as white anomalies in the geomagnetic chart. In contrast, one cropmark (yellow) has a different orientation, overbuilds an ancient street, and does not correspond with any geomagnetic anomaly; this cropmark is probably indicative of a later, Turkish wall (scale 1 : 2000)

to the southernmost section of the city walls (Fig. 2). A second, larger early Byzantine church may have occupied one or, more likely, two *insulae* to the northwest of the museum, as is indicated by several large Ionic impost capitals and numerous other marble parts that turned up there over the last 40 years[35].

Overall, the picture is mixed: The low laying quarters to the southeast of the southern city appear to have been deserted first. In contrast, the Southern Baths and the *insula* to the south of the West Market that are situated further north in close proximity to the city centre were still occupied in the sixth and the early seventh centuries respectively[36]. The evidence of the churches inside the southern city is ambivalent. They could each have marked the centre points of thriving living quarters, or they could indicate the availability of vacant plots and spare parts, because the respective *insulae* had already been deserted.

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35 Niewöhner 2016a, 103–105.
36 Niewöhner 2013, 175–181; Niewöhner 2015a.

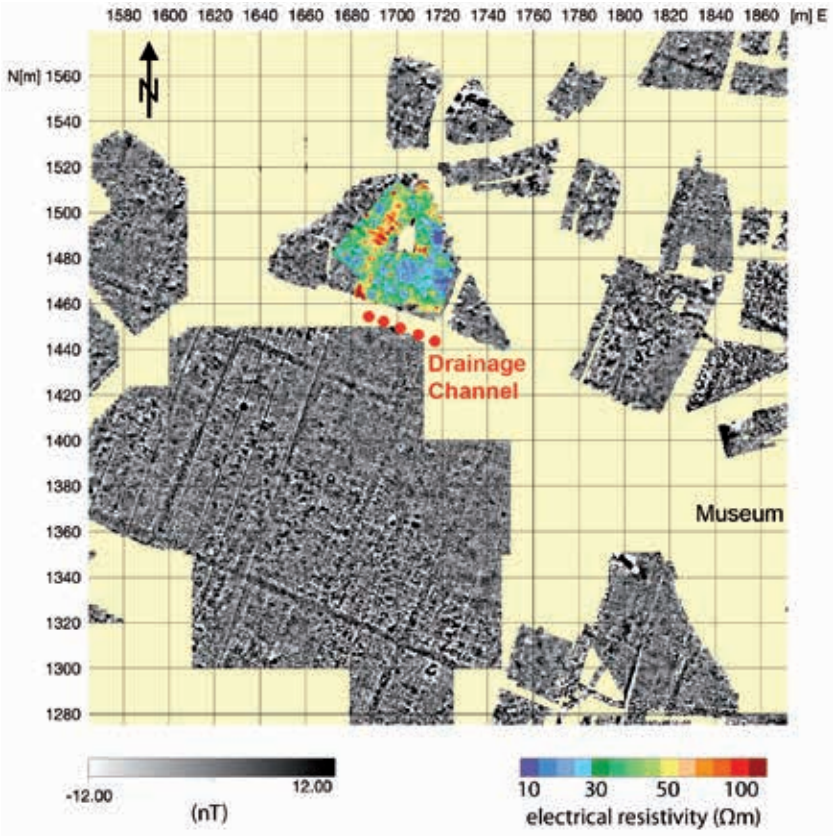


Fig. 6 Miletus, geophysical chart of the area around the excavations in the southern part of the city (cf. Fig. 2). The black and white patterns are geomagnetic reflections of ancient streets and *insulae*, the red dots mark the excavated drainage channel, the rainbow-coloured field to the north of it has been surveyed electrically and probably contains a church

Middle Byzantine Flooding

The previous section described the state of research up to 2013, when extraordinarily severe flooding led to an opportunity for stratigraphic excavations in the middle of the southern city, next to where the parts of what seems to have been a large early Byzantine church turned up, to the northwest of the museum (Figs. 2. 5). The excavations promised to clarify the ambivalent evidence of the church and establish whether the area was still prosperous during the early Byzantine period and when it was abandoned. The opportunity arose because the floods threatened to submerge the museum, which was prevented through the digging of a westerly drainage channel through the western part of the southern city. The channel drains into the old Maeander River to the west of Miletus, where the sea is closer and the water level lower than on the east side of the ancient city (Fig. 1). The floods that had arrived from the east could thus drain off towards the west. The channel followed an old Turkish road that had once serviced the old village of Balat, the Turkish successor of late Byzantine Palatia, but had gone out of use after Balat was destroyed by an earthquake and relocated to a new site outside the excavation area in 1955.

The new drainage channel was dug hurriedly with heavy machinery trying to forestall a flooding of the museum. This and the floods themselves precluded any immediate archaeological observations. Such became possible only in summer, when the channel had fallen dry. It was thus decided to excavate parts of the channel in the summer of 2014[37]. Ahead of actual excavations the southern side of the channel was cut back vertically for 45 m in order to gain a profile across the width of an ancient street and an *insula*, which the channel crosses perpendicularly from east to west (Fig. 6).

37 The field-work in 2014 and the processing of the finds in 2015 were financed by the German Archaeological Institute, and thanks are due to the president Friederike Fless, the general secretary Philipp von Rummel, and the director of the Istanbul department Felix Pirson. Thanks are also due to Emmanuel Giagtzoglou, Domino Leitold, Deborah Priß, and Sarah Rühl, who were in 2014 studying at Bochum University and participated in the excavations.

In the upper part of the profile the Turkish road stands out as a thick, whitish, horizontal band (Figs. 7. 8). The brown soil above the road accumulated during the last half-century or so, as the former village of Balat was converted into farmland after its earthquake distruction in 1955. Below the road lies a thick layer of fine grey sediment with next to no inclusions that dries quickly, hardens considerably, and cracks vertically (Figs. 9. 10). The same layer is known from further south outside the ancient city walls[38] and from a cemetery on the southwestern outskirts of Miletus[39]; it can be identified as fluvial sediment that resulted from annual flooding by the Maeander River[40] and accumulated during the later Byzantine period, when the city was deserted. Below that follows darker and softer alluvial sediment with few inclusions that covers, hides, and seals the ancient ruins and their debris. As this sediment accumulated, the ancient ruins and their debris disappeared from sight, never to be dug up and disturbed again, whilst the annual flooding by the Maeander River had not yet set in.

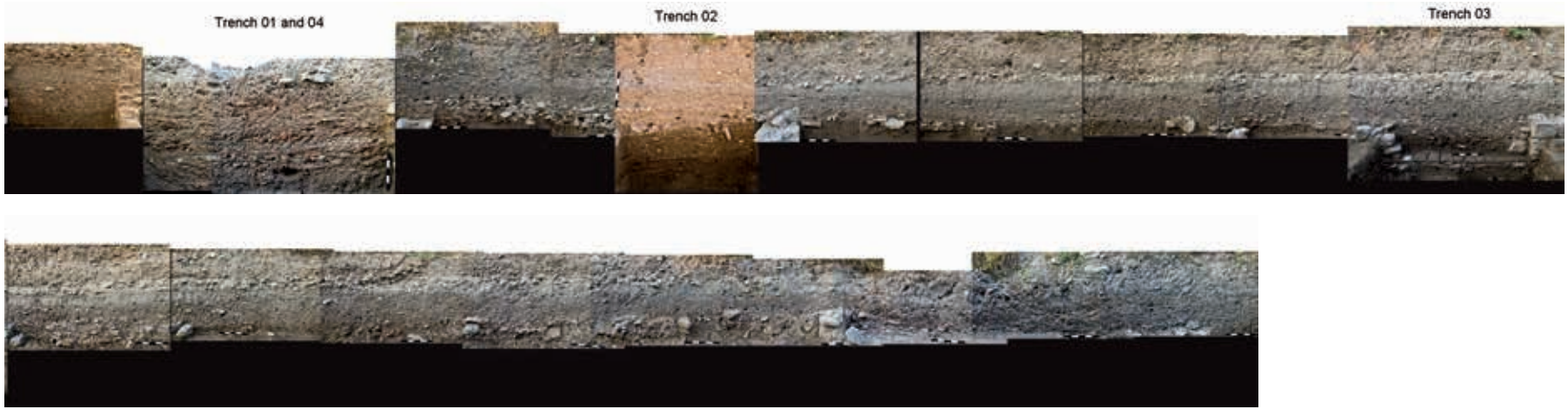
Miletus began to be flooded from the east, when the siltation of the Maeander River reached the city in late antiquity (Fig. 1)[41]. The opposite, western side of the urban peninsula that faced the open sea took several more centuries until it was also enclosed by siltation and started to be flooded[42]. The alluvial sediment dates from these later centuries before the onset of the flooding, and the youngest finds from the ruins and debris below establish an (early Byzantine – see below) terminus post quem. Further south outside the ancient city walls the same sediment followed upon early Byzantine layers[43], and at the necropolis on the southwestern outskirts of the city the alluvial deposits started to accumulate, cover, hide, and seal the ruins of an early Byzantine cemetery church after the seventh century A.D.[44].

Early Byzantine Abandonment and Burials

Below the alluvial sediment follow the ruins of buildings and their debris (Figs. 7–10). Various walls run from north to south, form obstacles perpendicular to the channel, and will have prevented the digger from going any deeper. Thus the lower layers were preserved intact beneath the bottom of the drainage channel and could be excavated stratigraphically. After deepening and levelling the bottom of the channel below the gully that had been dug by the digger, three roughly 2 m wide sections were chosen for stratigraphical excavation. Trench 01 explored the east side of the street, whilst trenches 02 and 03 lay further to the west, inside the *insula* (Fig. 8). Trench 01 was later enlarged to also include the other, western side of the street, and this enlargement became trench 04.

All trenches contained similar debris with bits of mortar and bricks, but no whole bricks and few larger stones; all usable building material had already been removed. The removal must have happened during the early Byzantine period, as the latest finds from the debris date from the sixth or seventh centuries A.D. The same finds also establish a terminus post quem for the accumulation of the alluvial sediment that covered, hid, and sealed the ruins and the debris. These latest finds are few in number as befits a period of spoliation, when the area was not inhabited any more. In trench 01+04 the material was more finely spread and layered (Figs. 11. 12), probably because the street was still in use and brick and other fragments served as road surface. Concentrations of plaster (0111. 0409. 0413) may have fallen off the east wall of the *insula* that flanked the street to the west (see below).

38 Schneider 1997, 134.
39 Niewöhner 2016a, 62.
40 Brückner et al. 2006, 76 f.
41 Niewöhner 2015a, 205; Niewöhner 2016a, 8–11.
42 Niewöhner 2016a, 101.
43 Schneider 1997, 134. Nico Schwerdt has studied the finds in 2016 and confirms an early Byzantine terminus post quem for the alluviation.
44 Niewöhner 2016a, 101.



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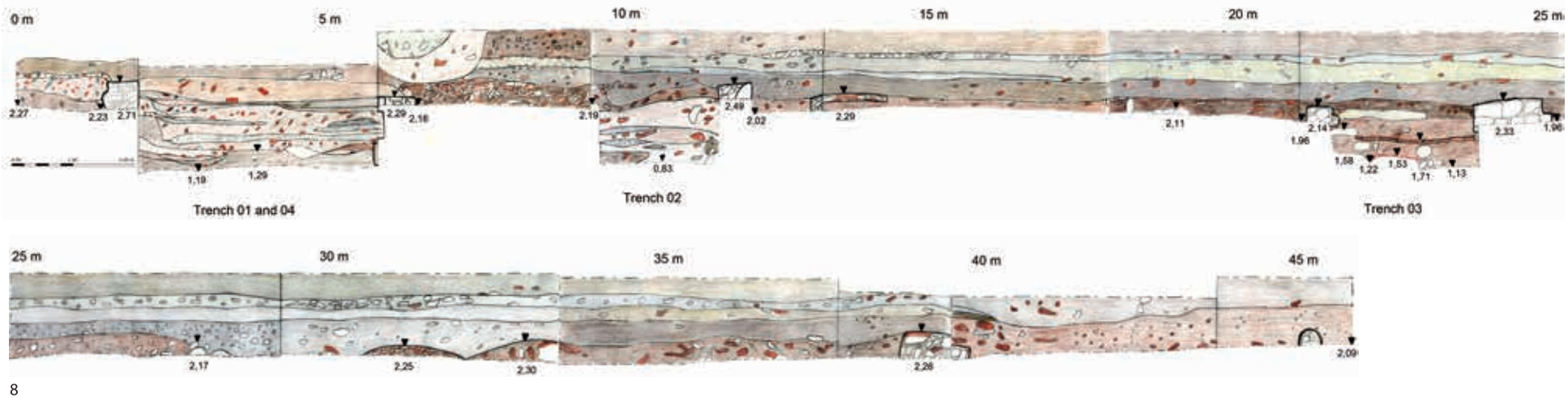

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Figs. 7. 8 Miletus, southern profile of the excavated drainage channel with trenches 01+04, 02, and 03 (Fig. 8 scale 1 : 100)

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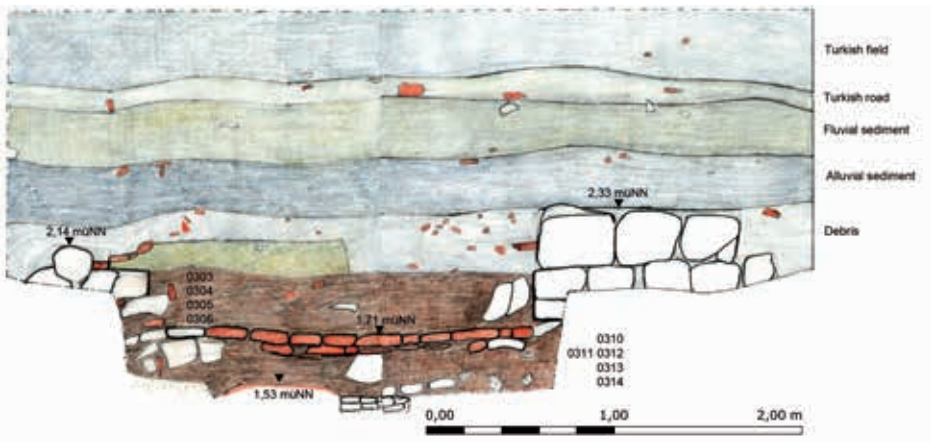

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Figs. 9. 10 Miletus, drainage channel, trench 03, southern profile (Fig. 10 scale 1 : 40)

In trench 03 the debris did not contain larger stones or brick fragments either, but a higher proportion of dark brown soil instead of yellowish mortar, sand, and brick dust (Figs. 9. 10). The soil probably entered towards the end of the early Byzantine spoliation period, when the alluvial sediment had already started to accumulate above the debris and the latter was dug up and filled in again for one last time in order to bury people among the ruins. One burial was found to have been laid down in-between the two walls that flank trench 03 to the east and west (Figs. 13. 14, skull 1). A second burial took place next to and on the northern side of the first (skull 3). The burials were contained within the layer of debris and must date from after the spoliation period and before the alluvial sediment accumulated above, because the latter covered, hid, and sealed the burials as well as the debris (Figs. 9. 10). It follows that the burials date from the later sixth to seventh centuries or soon thereafter.

Both bodies had been arranged so as to look in an eastwardly direction, with their arms folded above the upper body (Figs. 13. 14, skull 1 and 3), as was typical for early Byzantine burials[45]. The southern body belonged to a woman in her forties (skull 1), who was buried together with a young adult of undetermined sex (skull 2) and two small children (skulls 4 and 5) that could have been her children or her child and grandchild. The northern body represented a teenage boy (skull 3), possibly a second or fourth child of the

45 Rush 1941, 1–22. 236–253; Niewöhner 2016a, 29.

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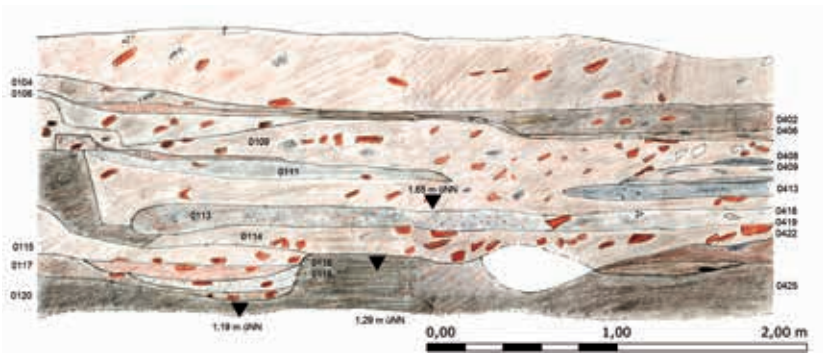

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Figs. 11. 12 Miletus, drainage channel, trench 01+04, southern profile (Fig. 12 scale 1 : 40)

same woman. The skeletons were found incomplete and seem to have been damaged by the digger. The deceased were generally in good health, and it is not clear what lead to their collective and premature deaths; thus, an epidemic like the plague that is known to have afflicted Asia Minor in the later sixth and in the seventh centuries[46] appears a likely cause.

The location for the burials may have been chosen because of the church that likely stood immediately to the north of the drainage channel (Fig. 2). Burials had become closely associated with churches in the course of the early Byzantine period. By the early sixth century a special cemetery church had been built in the necropolis of Miletus[47]. Later, the vicinity and even the interior of the ›Great Church‹ in the centre of Miletus, that dates from the later sixth century, were also used for burials[48]. By the end of the early Byzantine period burials and graveyards around intramural churches had become a widespread phenomenon[49]. However, in the southern city of Miletus the location inside the ancient city walls will hardly have mattered any more when the burials took place in or after the late sixth or seventh century, because the area had already been deserted and lay in ruins.

Late Antique Building Phase

Apart from the few sixth or seventh century-sherds, the debris consisted mostly of material from the later fourth and earlier fifth centuries, i. e. the Theodosian period. This seems to have been the last time when the *insula* was properly occupied, and further excavation revealed that much of the standing remains have actually been built during that period. Before the debris accu-

46 Stathakopoulos 2004; Sarris 2007.
47 Niewöhner 2016a, 59–101.
48 Niewöhner 2016a, 29.
49 Equini Schneider 2010, 54–109; Berti 2012; Steskal 2013, 244–246.

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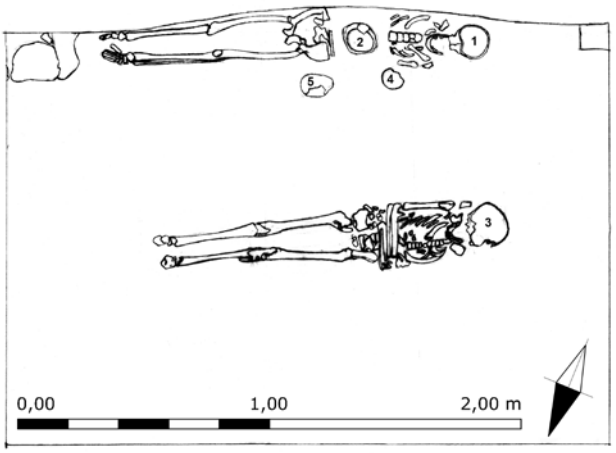

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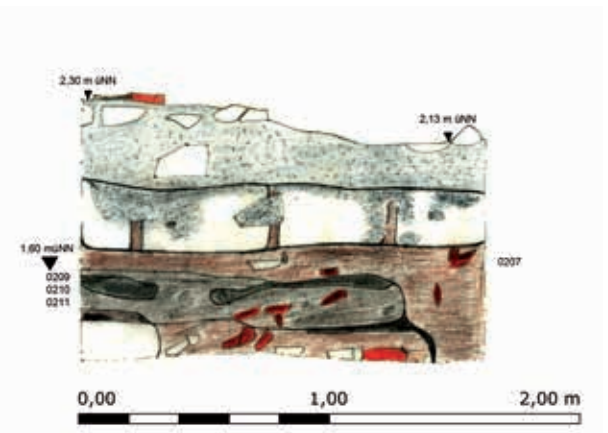

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Miletus

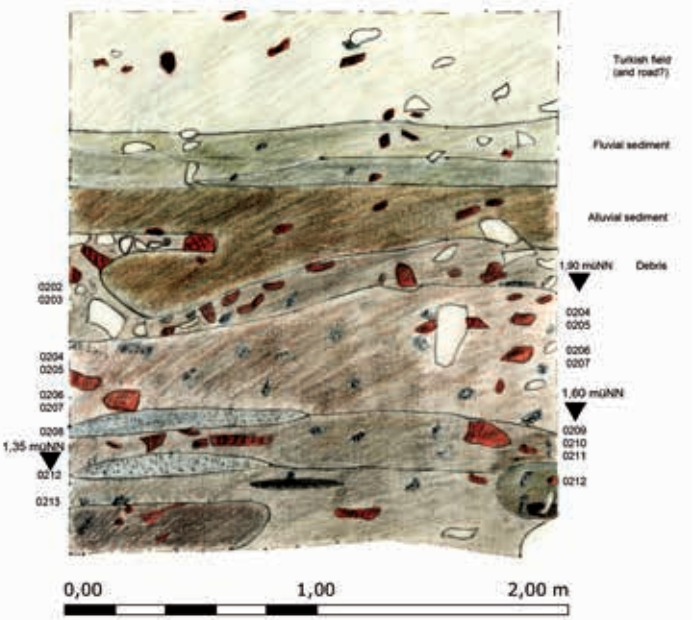
Figs. 13. 14 Drainage channel, trench 03, Byzantine burials, from north; Fig. 14: the heads are numbered 1 to 5 (scale 1 : 30)

Fig. 15 Drainage channel, trench 04, western wall above foundation level (= east wall of the *insula* on the west side of the street), looking west. The upper layers appear to have been dislodged by the digger

Figs. 16. 17 Drainage channel, trench 02, western profile with wall. The bottom layer of the wall served as foundation, the upper part is covered in white plaster (Fig. 17 scale 1 : 30)

mulated above it, the street was at one point covered by bits of white plaster that can still be seen in the southern profile of trench 01+04 (Figs. 11. 12, 0113+0418. 0419). This plaster corresponds with the plaster on a wall that flanks the street on the west side, i. e. the east wall of the *insula* (Fig. 15). The wall is plastered down to the same level on which the street was covered by plaster, and the latter appears to have accumulated as the wall was plastered. Lower down follow the foundations of the wall and another layer of debris in the street that must have accrued as or before the wall was built (Figs. 11. 12, 0114+0422). Thus the finds from this layer of debris provide a terminus ad or post quem for the wall in the fourth or fifth century A.D.

18



19

20

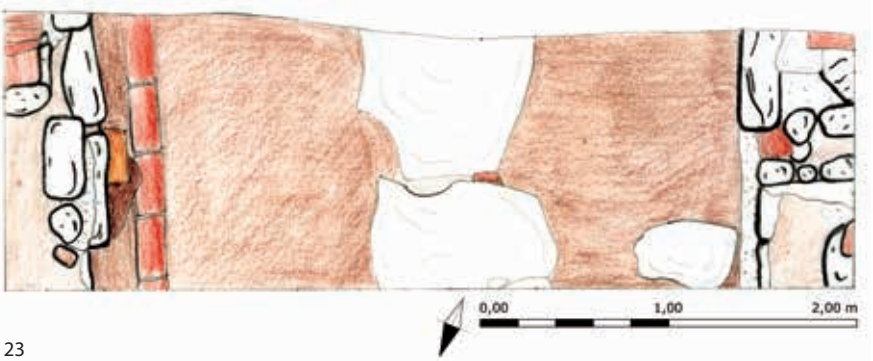
Miletus, drainage channel, trench 02

Figs. 18. 19 Southern profile
(Fig. 19 scale 1 : 30)

Figs. 20. 21 Eastern profile
(Fig. 21 scale 1 : 20)

21

22



23

Figs. 22. 23 Miletus, drainage channel, trench 01+04, Roman street with waste water channel (centre), fresh water pipe (left), and flanking *insula* walls (outer left and right), from north. Both walls appear to have been partly dislodged by the digger; Fig. 23 from north (scale 1 : 40)

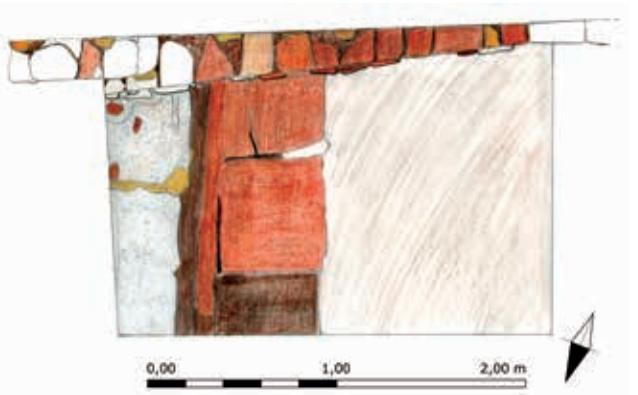
This is confirmed inside the *insula*, where a wall on the west side of trench 02 also dates from the fifth century (Figs. 16. 17). The floor level is somewhat higher than in the street (trench 01+04), as seems proper. The foundations of the west wall are imbedded in a layer of debris (Figs. 16–21, 0207) that is similar to the corresponding layer in the street (Figs. 11. 12, 0114+0422) and also dates from the fifth century, thus providing a terminus ad or post quem for the wall. Trench 03 further to the west inside the *insula* yielded similar results: Two walls end at the south-eastern and south-western corner of the trench respectively (Fig. 9 and 10). They are connected by a row of re-used bricks that marks roughly the same floor level as in trench 02. The walls and the bricks were embedded in a layer of debris similar to that under the floor levels of trench 01+04 and trench 02, and the finds establish the same terminus ad or post quem in the fifth century A.D. The *insula* appears to have been rebuilt at that time, but seems to have gone out of use again before the end of the fifth century, as is indicated by the general lack of sixth century-finds.

Earlier Occupation

Below the late antique building phase follows a marked change in colour, in the street (trench 01+04 Figs. 11. 12, 0117+0425 and below) as well as inside the *insula* (trench 02 Figs. 16–21, 0208. 0209 and below; trench 03 Figs. 9. 10, 0317 and below). The lower layers are darker, as they comprise less mortar and fewer bricks, and the finds confirm dates in the Roman imperial period, when the use of bricks was not yet as widespread as in late antiquity[50]. The Roman street contains a tubular freshwater pipe that runs along its east side, where the street is bordered by a Roman wall, apparently the east wall of the next *insula* (Figs. 22. 23). Large stones in the centre of the Roman street cover a sewage channel that will have lead southwards to the next junction, where

50 Deichmann 1956, 19–33; Thür 2009.

24



25

Figs. 24. 25 Miletus, drainage channel, trench 03, Byzantine brick floor (top). Roman foundation walls (bottom left), and modern groundwater (bottom right), from north (Fig. 25 scale 1 : 40)

it probably continued westwards in the direction of the sea. Above the level of the freshwater pipe a couple of re-used coloured marble slabs formed a branch sewer that lead from a hole in the eastern wall into the main sewage channel in the centre of the road (0119).

Tubular freshwater pipes have been found in numerous streets at Miletus[51]. They were typically placed along the edge, whilst the centre of the street was often occupied by a wastewater channel, which could thus be serviced without interfering with the freshwater pipe. Most other streets also appear to have remained unpaved.

The *insula* to the west of the street seems to have had a different structure in the Roman period. A wall of large red tuff blocks crosses trench 03 from north to south (Figs. 24. 25). Tuff was mostly restricted to foundation walls, because the material erodes easily when exposed to the elements. To the east the tuff wall is flanked by an even more solid foundation that consists mostly of field stones plus white cement mortar and may also have had a northerly orientation. The other, western side of the trench was empty apart from a concentration of fieldstones in the south west corner, under the late antique bricks, but separated by a layer of late antique debris (Figs. 9. 10, 0310–0314).

Whilst it seems impossible to identify the Roman or the late antique buildings, it is clear that the layout of the *insula* changed fundamentally. The later, Theodosian building phase was not a small matter; the *insula* was built up anew and on a different ground plan. This may have been due to a previous collapse of the earlier, Roman structures, as could be indicated by a lack of late Roman finds. The later third and earlier fourth centuries are conspicuously absent, and the *insula* may not have been in use during that time. The same lacuna has been observed elsewhere in Anatolia, for example at Ephesus, where parts of the city appear to have lain in ruin from the mid-third to the mid-fourth century, until building set in again in the Theodosian period[52].

Ph. N.

Pottery[53]

The analysis of the pottery from the southern city trenches builds on and continues a series of recent publications on Roman and Byzantine pottery from Miletus, which step by step provides ever more insight into the ceramic spectrum of the city[54]. A comprehensive overview is in preparation for a future monograph[55]. This chapter is mainly concerned with dating the various

51 Kleiner – Müller-Wiener 1972, 65 Beil. 4; von Graeve 2005, 168–170 Figs. 1. 2; Niewöhner 2016c, 70–72 fig. 9.

52 Ladstätter – Pülz 2007, 391–398; Ladstätter 2010c, 493–499.

53 Lisa Dziobaka (Bochum) and Guido Teltsch (Berlin) helped studying the pottery at the depots of the Miletus excavations in July and August 2015. Nina Ullrich (Berlin) prepared the drawings Figs. 26–31 for publication in 2016. I would like to thank all of them for their collaboration and support.

54 Voigtländer 1982; Pülz 1985; Pülz 1986; Pülz 1987; Berndt 2003; Lüdorf 2006; Niewöhner 2013, 175–181 (V. Sossau – T. Hintermann). 186–189 (N. Schwerdt et al.); Schwerdt 2014; Niewöhner 2015a, 220–231 (A. Waldner); Niewöhner 2015b, 226–240 (N. Schwerdt); Niewöhner 2016a, 292–302 (J. Becker – H. Möller); Schwerdt forthcoming.

55 The cooking pottery, common wares, and amphorae from excavations in the Baths of Faustina (1994, 2008–2012), on Humeitepe (2011), in the Bishop's Palace (2013), and from the three trenches in the southern city (2014) form the subject of my dissertation project: Long Term Urban Change in Miletus from Roman Antiquity to Early Byzantine Times. A Ceramic Perspective (Martin Luther University Halle-Wittenberg).

excavation layers and thus focuses primarily on table wares, since table wares are best suited for dating purposes[56]. For the same reason, close attention is paid to the youngest pieces within each layer. The spectrum consists mainly of Eastern Sigillata B (ESB)[57] and Eastern Sigillata C (ESC)/Çandarlı[58] wares from the Roman Imperial period and of Late Roman C (LRC)[59] and African Red Slip (ARS)[60] wares from late antiquity and the early Byzantine period.

Trench 01+04

Early Byzantine Layers (0101. 0103–0106. 0401–0403. 0406. 0407)
A LRC dish (cat. 23), presumably form 3/10 transitional, dates from around the middle of the sixth century[61]. A LRC dish form 3 (cat. 24) was made in the later fifth century, at the earliest[62]. Other LRC forms are 3A (cat. 25), 1 (cat. 26–27), and a stamped base fragment (cat. 28)[63]. A single ARS fragment form 67 (cat. 29) also turned up[64]. Yet another LRC dish form 3 (cat. 30) has presumably been produced at Grynion[65]. A lamp (cat. 31) can plausibly be attributed to the fourth or fifth century[66]. An imported *mortarium* (cat. 32) dates from the late third or the first half of the fourth century[67]. Surprisingly, the same late layers also included a Geometric painted sherd (cat. 33).

Upper Late Antique Layers (0108–0112. 0408. 0409. 0412. 0413)
Three LRC dishes (cat. 34–36) belong to form 1[68]. ARS is slightly more numerous and represented by forms 50 (cat. 37), 59 (cat. 38), 61 (cat. 39. 40), and a lamp type Atlante X (cat. 41)[69]. LRC and ARS forms (except cat. 37) overlap chronologically in the late fourth and mid-fifth century. An ESC bowl form Loeschke 19 (cat. 42) dates from the late first or the second century and is obviously residual[70].

Late Antique Plaster Layer (0113. 0418. 0419)
LRC form 2 (cat. 43) indicates a date in the late fourth to mid-fifth century[71]. ARS forms 50 (cat. 44), 60 (cat. 45), and 61A (cat. 46) provide a date range from the mid-third to the early fifth century[72]. One sherd (cat. 47) has been misfired or burned for a second time, which obscured the shape, either LRC form 1 or the third-century ESC/Çandarlı form 4 (cf. cat. 48).

Lower Late Antique Layers (0114. 0115. 0420–0423)
LRC dishes form 3A (cat. 49), form 4 (cat. 50), and a decorated base (cat. 51) date from the fifth century[73]. Another dish (cat. 52) appears to represent a late

56 All dates are A.D. unless stated otherwise.
57 All ESB form numbers in the text are adopted from the Atlante typology after Hayes 1985, 53–70.
58 Numbers of late ESC/Çandarlı forms after Hayes 1972, 318–322.
59 Numbers of LRC forms after Hayes 1972, 323–346.
60 Numbers of ARS forms after Hayes 1972, 13–211.
61 Ladstätter – Sauer 2005, 150; Hayes 2008, 88.
62 Hayes 1972, 329–338; Ladstätter – Sauer 2005, 150; Hayes 2008, 85–88; Cau Ontiveros et al. 2011, 6.
63 Form 3: see above note 62; form 1: Hayes 1972, 325–327; Hayes 2008, 87; stamped decoration of Hayes group II: Hayes 1972, 346. 349.
64 Hayes 1972, 112–116; Hayes 2008, 76 f.
65 Cf. Empereur – Picon 1986; Ladstätter – Sauer 2005, 158 f. (»Scherbenrohstofftyp LRC-C«); Yılmaz 2007, 125–127; Hayes 2008, 84.
66 Miltner 1937, 100–105; compare Niewöhner 2015b, 229 cat. 46 (N. Schwerdt) for a similar example from the Bishop's Palace and for further references.
67 Hayes 1967, 337; Yangaki 2009, 248.
68 See above note 63.
69 Form 50: Hayes 1972, 69–73; Hayes 2008, 74 f.; Cau Ontiveros et al. 2011, 5; form 59: Hayes 1972, 96; Bonifay 2004, 167; Hayes 2008, 76 f.; Cau Ontiveros et al. 2011, 5; form 61: Hayes 1972, 100–107; Hayes 2008, 76 f.; Cau Ontiveros et al. 2011, 5; lamp Atlante X: Anselmino – Pavolini 1981, 200–203; Bonifay 2004, 370–390.
70 Hayes 1972, 321; Hayes 1985, 76; Hayes 2008, 52.
71 Hayes 1972, 327–329; Hayes 2008, 87.
72 Forms 50 and 61: see above note 69; form 60: Hayes 1972, 100; Hayes 2008, 76 f.; Cau Ontiveros et al. 2011, 18.
73 Form 3: see above note 62; form 4: Hayes 1972; Ladstätter – Sauer 2005, 150; stamped decoration Hayes group II: see above note 63.

variant of ARS form 50 that is commonly dated to the first half of the fifth century[74]. An ESC/Çandarlı dish form 4 (cat. 53) and a bowl, presumably of form 5 (cat. 54), date from the third century[75].

Roman Imperial Layers (0117. 0119–0121. 0425)
ESB forms 60 (cat. 56. 57), 70 (cat. 58), and 80 (cat. 59) are key to the dating of these layers[76]; the large diameter and the hooked, inwardly bent rim of form 60 point to a date between the mid-second and the mid-third century[77]. Production of ESC/Çandarlı bowls form Loeschke 19 (cat. 60. 61) started at the end of the first century and was replaced by Hayes's form 3 in the later second century[78]. Another specimen of the same ware (cat. 62) presumably dates from the second or the third century and belongs either to Loeschke's form 26 or to Hayes's forms 1 or 2[79]. A Pompeian Red Ware pan (cat. 63) may be attributed to the late first or the second century[80]. A colour coated dish with impressed decoration (cat. 64) is probably residual. A single LRC bowl sherd form 8 (cat. 55) dates no earlier than the second half of the fifth century and must somehow have intruded the otherwise purely Roman layers, either mistakenly during excavation or already before[81].

Trench 2
Early Byzantine Layer (0201–0203)
A LRC dish form 10C (cat. 65) is usually attributed to the early or mid-seventh century[82]. A LRC dish form 2 (cat. 66) is of fifth-century date[83].

Late Antique Layer (0204–0207)
LRC dishes forms 3C (cat. 67. 68) and 6 (cat. 69) point to a date in the second half of the fifth or the early sixth century[84]. ARS forms 50 (cat. 70), 59 (cat. 71), and 61 (cat. 72) are earlier[85]. An ESC/Çandarlı dish form 4 (cat. 73) dates from the third century[86].

Roman Imperial Layers (0208–0214)
Unlike the Roman layers in trench 01+04, the latest ESB form 60 was not present in trench 02. Instead, form 74 (cat. 74) and two ESB base fragments (cat. 75. 76), one of which is stamped with a rosette, suggest a late-first to early-second century date[87]. An ESC dish (cat. 77) and a Sanded Ware bowl (cat. 78) probably date from the first century. Lamps (cat. 79–81) are of a type that was widespread and long-lived, from the later first to the fourth century[88]. One sherd (cat. 79) has a red slip, probably in Red-on-White technique that was common from the first to the third century[89]. A Hellenistic bowl with out-turned rim (cat. 82), a Late- or Subgeometric deep skyphos (cat. 83), and a bird-kotyle (cat. 84) are obviously residual[90].

74 Bonifay 2004, 197.
75 Hayes 1972, 321 f.; Hayes 2008, 51 f.
76 Form 60: Hayes 1985, 64; Hayes 2008, 39; form 70: Hayes 1985, 66 f.; Hayes 2008, 39; form 80: Hayes 1985, 69 f.; Pülz 1985, 85; Wintermeyer 2004, 147; Hayes 2008, 38; Ladstätter 2010a, 183.
77 Pülz 1985, 85; Ladstätter 2002, 20 f.; Ladstätter 2005, 241; Hayes 2008, 39; Ladstätter 2010a, 183.
78 See above note 70.
79 Hayes 1972, 318–321; Hayes 1985, 77; Hayes 2008, 52.
80 Hayes 2008, 119–121.
81 Hayes 1972, 342; Ladstätter – Sauer 2005, 151; Hayes 2008, 88.
82 Ladstätter 2008, 120 proposes an initial date at the end of the sixth century. Continuation of production until the end of the seventh or into the eight century is possible, see Hayes 1972, 343–346; Hayes 2008, 88; Cau Ontiveros et al. 2011, 7.
83 See above note 71.
84 Form 3: see above note 62; form 6: Hayes 1972, 341; Ladstätter – Sauer 2005, 151.
85 See above note 69.
86 See above note 75.
87 Form 74: Hayes 1985, 68; Hayes 2008, 39; stamped decoration: Hayes 2008, 34 f.
88 Heimerl 2001, 55 Pergamon Gruppe 9; Loeschke type VIII; Broneer type XXV.
89 Ladstätter – Waldner 2014, 457.
90 Thanks to Ivonne Kaiser and Alexandra von Miller for their help with

Trench 3

Early Byzantine Layer and Burials (0302–0306)

The youngest finds are a body sherd of Mica-Dusted Ware[91] (0302) and a LRC dish form 10A[92] (cat. 1). The latter was found next to skeleton 5 and establishes a terminus ad or post quem for the burials from the mid-sixth to the early seventh century. The surrounding layer that received the burials appears to have accumulated earlier, because it contained only earlier finds. They include two LRC dishes form 3 (cat. 2. 3) from the later fifth to the early sixth century[93]. Three base fragments of LRC dishes cannot be dated precisely, but must belong to roughly the same period. ARS dishes form 45 or 48 (cat. 4. 5) and a stamped base fragment (cat. 6) date from the mid-third to the fourth or early fifth century, at the latest[94]. Four flat-based fragments of ARS dishes likely date from the fourth or fifth century. A wheel-made lamp (cat. 7) compares to specimens from the Bishop's Palace of Miletus, where they were included in a context from the first half of the fifth century[95]. An ESC/Çandarlı dish form 4 (cat. 8) is a typical third-century product[96]. An ARS fragment of the fourth-century form 58 from the lowest Byzantine context belongs to the same vessel as a second fragment from the topmost late antique context (cat. 13)[97], and one of the two may have mistakenly been attributed to the wrong context during excavation.

In conclusion, the early Byzantine layer appears to have accumulated in or after the later fifth century and contains mostly earlier finds from the preceding Theodosian period, the last era of late antiquity, which is otherwise represented by the next lower layer (see below). The burials seem to have been added later in or after the middle of the sixth century.

Late Antique Layer (0308–0314)

The late antique layer dates from the fourth to mid-fifth century, thus preceding immediately before the early Byzantine layer from the later fifth century or thereafter. The youngest late antique finds include LRC dishes forms 1 (cat. 9) and 2 (cat. 10. 11) and ARS dishes forms 50 (cat. 12), 58 (cat. 13)[98], and 59 (cat. 14)[99]. An ARS base fragment should date from roughly the same period, but cannot be attributed to any particular type. A thin-walled cup (cat. 15) appears also to date from late antiquity[100]. A wheel-made lamp (cat. 16) is similar to the specimen found in the early Byzantine layer above (cat. 7) and compares to late antique lamps from the Bishop's Palace[101]. An ESB dish or bowl (cat. 17) and a terracotta mould (cat. 18) are two of several more residual pieces from late Hellenistic to Roman times.

Roman Imperial Layer (0317. 0318)

An ESB bowl form 37 (cat. 19)[102], another ESC bowl (cat. 20), and a Red Gloss Ware fragment with West Slope decoration (cat. 21) date from the first century, at the latest[103]. A thin-walled mug (cat. 22) is slipped on the exterior, should thus be early in the series of such mugs, and must therefore also date from the first century[104].

Summary

The chronological distribution patterns of the pottery are similar in all trenches. As to the late antique and early Byzantine layers, a clear distinction of precisely datable layers is difficult. A few pieces from the uppermost layers prove activities in the later sixth or seventh century. The timespan from the second half of the fifth to the early sixth century is sparsely represented in all trenches. Most finds date from the fourth to the mid-fifth century, i. e. the Theodosian

the Geometric pieces. Their shapes are common at Miletus, for example von Graeve 1973/1974, 86; von Graeve 1975, 41; von Graeve 1978, 35; Kerschner 1999, 19 f.; Akurgal et al. 2002, 63–72.

91 A better preserved example of a Mica-Dusted Ware jug from Miletus is discussed in Niewöhner 2013, 180 fig. 15 (V. Sossau – T. Hintermann); some fragments occurred in later sixth – early seventh century deposits at the Baths of Faustina.

92 See above note 82.

93 See above note 62.

94 Form 45: Hayes 1972, 62–65; Hayes 2008, 74 f.; form 48: Hayes 1972, 65–67; Hayes 2008, 74 f.; stamped decoration Hayes style a (ii): Hayes 1972, 218; Hayes 2008, 76 f.

95 Niewöhner 2015b, 229 (N. Schwerdt).

96 See above note 75.

97 Hayes 1972, 93–96; Hayes 2008, 76.

98 Note the joining fragment in context 0306 above.

99 LRC forms 1 and 2: see above notes 63. 71; ARS forms 50. 58. 59: see above notes 69. 97.

100 Bass – Van Doorninck 1971, 35 fig. 22.

101 Niewöhner 2015b, 229 (N. Schwerdt).

102 Hayes 1985, 60.

103 ESC Meyer-Schlichtmann 1988, type N 3; Red Gloss Ware with West Slope decoration: Ladstätter 2005, 234.

104 Ladstätter 2010a, 185 f.

period. Mixed in are third-century sherds and older residuals. The composition compares well with assemblages from the Bishop's Palace of Miletus[105].

The Roman Imperial layers in trench 02 and trench 03 appear to date from the first century, whilst the bottom layers in trench 01+04 seem to be of mid-second to mid-third century date. However, the limited extend of the trenches and the small number of finds preclude any further conclusions. Residuals from Hellenistic and earlier times are also present. Most sherds are not well preserved and relatively few were found to join, in spite of much effort to match finds within and across stratigraphical units.

Catalogue

Further abbreviations: eve – estimated vessel equivalent; cpl. – complete; D. – diameter; pres. – preserved; Fab. – fabric (local reference number); Surf. – surface; ext. – exterior, external; int. – interior, internal; Dec. – decoration. All measurements in cm. Four-digit numbers mark layers or contexts; they are followed by a full stop and the inventory number of the find.

1 03Skel5.1 (Fig. 26)
LRC, dish Hayes form 10A.
Pres. frgt. rim eve: 7 %. D. 28.2. Fab. FW 88, hard, 2.5YR-5.5/7. Surf. slip all over 2.5YR-3/2.
Par. Hayes 1972, fig. 71 no. 4.
Dat. c. 550 – early seventh cent.

2 0303.1 (Fig. 26)
LRC, dish Hayes form 3E?
Pres. frgt. rim eve: 6.5 %. D. 25.4. Fab. FW 88, hard – very hard, 2.5YR-6/6. Surf. slip all over ext. 2.5YR-6/6 and int. 10R-5/6. Dec. three lines of rouletting on ext. of rim.
Par. Hayes 2008, cat. 1278; Ladstätter – Sauer 2005, cat. 35.
Dat. c. 475–525.

3 0303.2 (Fig. 26)
LRC, dish Hayes form 3E?
Pres. frgt. rim eve: 2.5 %. D. 31.2. Fab. FW 88, hard – very hard, 2.5YR-6/8. Surf. slip all over ext. 10R-6/6 and int. 10R-5.5/8.
Par. Ladstätter – Sauer 2005, cat. 35.
Dat. c. 475–525.

4 0303.3 (Fig. 26)
ARS, bowl Hayes form 45?
Pres. frgt. rim, eve: 2.5 %. D. c. 38. Fab. FW 272, hard, 2.5YR-6/6. Surf. slip all over 10R-6/8.
Par. Hayes 1972, 63 nos. 9. 10.
Dat. c. mid-third – early fourth cent.

5 0305.1 (Fig. 26)
ARS, dish Hayes form 45B or 48B?
Pres. frgt. rim eve: < 3 %. D. > 20. Fab. FW 113, very hard, 10R-5/8. Surf. slip all over ext. 1.25YR-5/8 and int. c. 10R-4/8.
Par. Hayes 1972, fig. 11 form 45 no. 10, form 48 nos. 8. 11.
Dat. mid-third – early fourth cent.

6 0306.2 (Fig. 26)
ARS, dish/bowl with stamp Hayes style A (ii).
Pres. frgt. base. D. pres. 4.9. Fab. FW 272, hard – very hard, 1.25YR-6/8. Surf. slip all over ext. 1.25YR-6/8 and int. 1.25YR-6/8. Dec. four concentric circles in the centre, six palm-branches radiating from the centre, small scrap of fill-motive (concentric circles?) between branches.
Par. Hayes 1972, pl. 12b (P93) fig. 38 no. 4k.
Dat. c. mid-fourth – early fifth cent.

7 0306.1 (Fig. 26)
Lamp, wheel-made.
Pres. 2 frgts. posterior part incl. handle, eve: 30 %. H. 4.4 W. pres. 2.8 D. base 4. Fab. FW 238, soft, 7.5YR-7.5/5. Surf. ext. 2.5Y-8/3 and int. 7.5YR-8/4.
Par. Niewöhner 2015b, 226–240 cat. 47 (N. Schwerdt).
Dat. third – fifth cent.?

8 0306.5 (Fig. 26)
ESC/Çandarlı, dish Hayes form 4.
Pres. frgt. rim, eve: 6 %. D. 36.6. Fab. FW 278, soft – hard, 5YR-7/6. Surf. slip all over 2.5YR-5/8, mostly worn off.
Par. Hayes 1972, fig. 64 form 4; Ladstätter 2010a, cat. B-K 485.
Dat. third cent.

9 0309.1 (Fig. 26)
LRC, dish Hayes form 1.
Pres. frgt. rim, eve: 9 %. D. 13.2. Fab. FW 58, very hard, 10R-5.5/8. Surf. slip all over ext. 2.5YR-4/4 (rim), 10R-4.5/8 (body), and int. 10R-5.5/8.
Par. Ladstätter – Sauer 2005, cat. 5; Niewöhner 2015b, 226–240 cat. 37 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

10 0309.2 (Fig. 26)
LRC, dish Hayes form 2.
Pres. frgt. rim, eve: 8.5 %. D. 16.5. Fab. FW 292, hard – very hard, 2.5YR-6/8. Surf. slip all over 1.25YR-5.5/7.
Par. Niewöhner 2015b, 226–240 cat. 29 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

11 0314.1 (Fig. 26)
LRC, dish Hayes form 2.
Pres. frgt. rim, eve: 5 %. D. 28.2. Fab. FW 292, hard, 10R-5.5/8. Surf. slip all over 10R-5/8.
Par. Niewöhner 2015b, 226–240 cat. 54 (N. Schwerdt).
Dat. first half fifth cent.

12 0307.1 (Fig. 26)
ARS, dish Hayes form 50.
Pres. cpl. profile, eve: 5 %. D. rim 23.2. Fab. FW 113, hard, 10R-5/8. Surf. slip all over ext. 10R-5.5/8 and int. 10R-5/8.
Par. similar Hayes 1972, fig. 12 no. 60; Ladstätter – Waldner 2014, cat. K 1158.
Dat. fourth cent.

13 0307.2 (Fig. 26)
ARS, dish Hayes form 58.
Pres. frgt. rim, inv. 0306.3 belongs to the same vessel, eve: 4 %. D. 32. Fab. FW 101, very hard, 10R-6/8. Surf. slip all over 10R-5.5/8.
Par. Hayes 1972, fig. 14 no. 11.
Dat. fourth cent.

14 0310.1 (Fig. 27)
ARS, dish Hayes form 59.
Pres. frgt. rim, eve: 3,5 %. D. 37.8. Fab. FW 272, hard – very hard, 10R-6.5/8. Surf. slip all over 1.25YR-5/8.
Par. Niewöhner 2015b, 226–240 cat. 39 (N. Schwerdt).
Dat. c. 320–420.

105 See Niewöhner 2015b, 228–231 (N. Schwerdt).

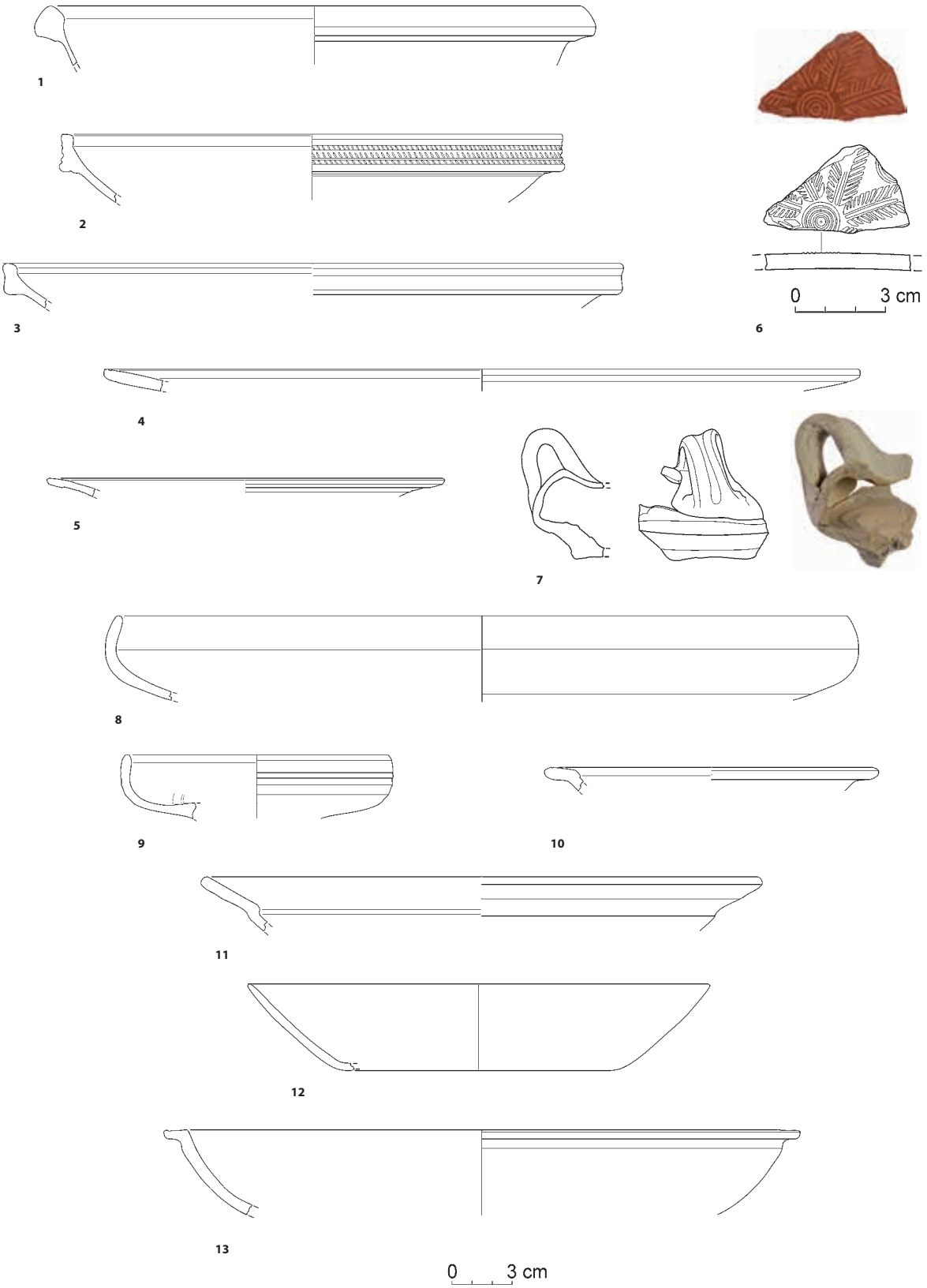


Fig. 26 Miletus, drainage channel, pottery cat. 1–13 from trench 03 (cat. 1–5. 8–13: scale 1 : 3; cat. 6. 7: scale 1 : 2)

15 0307.5 (Fig. 27)
Thin Walled Ware, cup.
Pres. frgt. rim, eve: 6 %. D. 7.6. Fab. FW 249, very hard, core ext. 10R-5/8 and int. 10R-5/1. Surf. ext. 2.5YR-6/8 and int. 10R-6/8.
Par. Bass – Van Doorninck 1971, fig. 22.
Dat. fourth cent.?

16 0312.1 (Fig. 27)
Lamp, wheel-made.
Pres. frgt. base, eve: 100 %. D. 3–3.4. Fab. FW 212, hard, 5YR-6/8. Surf. ext. 10YR-8/3 and int. 5YR-7/6.
Par. see cat. 7.
Dat. third – fifth cent.?

17 0312.2 (Fig. 27)
ESB, dish Atlante form 55 or bowl Atlante form 76?
Pres. frgt. rim, eve: 8,5 %. D. 18.4. Fab. FW 255, hard, 2.5YR-5/8. Surf. slip all over 1.25YR-5/8.
Par. Hayes 2008, cat. 302; Ladstätter – Waldner 2014, cat. K 933; Hayes 2008, cat. 302.
Dat. c. late first – second cent.

18 0314.10 (Fig. 27)
Terracotta, mould of male? head.
Pres. cpl. H. 4.4 W. 3.7. Fab. frequently mica, occasionally lime. Surf. ext. 10YR-6/4 and int. 7.5YR-6/4.
Dat. Roman.

19 0317.2–3 (Fig. 27)
ESB, small bowl Atlante form 37.
Pres. 2 frgts. rim and base, probably from the same vessel, rim eve: 10 %, base eve: 17 %. D. rim 6.4, D. base 4. Fab. FW 193, hard, 2.5YR-6/8. Surf. cpl. dense, lustrous slip 2.5YR-5/8.
Par. Ladstätter – Waldner 2014, cat. K 808.
Dat. c. second half first cent.?

20 0317.4 (Fig. 27)
ESC, bowl Meyer-Schlichtmann type N 3.
Pres. 1 frgt. rim, eve: 6 %. D. 12.6. Fab. SGW 1, very hard, 2.5YR-6/8. Surf. slip ext. 1.25YR-5/8 on rim partly blackened and int. 2.5YR-5/8, lower body on ext. plain without slip c. 1.25YR-7/8.
Par. Meyer-Schlichtmann 1988, cat. 105–109.
Dat. c. third quarter first cent. B.C. – late first cent. A.D.

21 0317.6 (Fig. 27)
Red Gloss Ware with West Slope decoration, beaker.
Pres. 1 frgt. rim, eve: 2 %. D. 20? Fab. FW 3, hard, core ext. 10R-7/8 and int. 5YR-7/7. Surf. slip ext. 2.5YR-5/6 and int. 10R-5/8. Dec. ext. below the rim two grooves and a row of painted white dots inbetween.
Par. Ladstätter 2005, cat. K 96.
Dat. first cent. B.C. – early first cent. A.D.

22 0317.9 (Fig. 27)
Thin-walled ware, mug.
Pres. frgt. rim, eve: 8 %. D. 9.2. Fab. FW 130, very hard, 10R-5.5/8. Surf. thin, matt slip all over ext. 2.5YR-3/3 and int. 10R-3.5/4.
Dat. first cent.

23 0101.1 (Fig. 27)
LRC, dish Hayes form 3/10 transitional (or 3G?).
Pres. frgt. rim, eve: 5.5 %. D. 20.6. Fab. FW 88, hard, 10R-4/8. Surf. slip all over 1.25YR-4.5/8, ext. rim darker.
Par. Ladstätter – Sauer 2005, cat. 76.
Dat. c. mid-sixth cent.

24 0105.1 (Fig. 27)
LRC, dish Hayes form 3E?
Pres. frgt. rim, eve: 4.5 %. D. 30.2. Fab. FW 1, hard – very hard, 2.5YR-6/8. Surf. slip all over 1.25YR-4.5/8.
Par. Hayes 2008, cat. 1276.
Dat. c. 475–525.

25 0106.2 (Fig. 27)
LRC, dish Hayes form 3A.
Pres. frgt. rim, eve: 7.5 %. D. 26.2. Fab. FW 116, hard, 2.5YR-7/8. Surf. slip all over 1.25YR-4/8.
Par. Hayes 2008, cat. 1250.
Dat. c. first half fifth cent.

26 0104.1 (Fig. 27)
LRC, dish Hayes form 1.
Pres. 6 frgts. rim, eve: 15 %. D. 31.6. Fab. FW 277, hard, 1.25YR-5.5/8. Surf. slip all over 1.25YR-5.5/8.
Par. Ladstätter – Sauer 2005, cat. 3.
Dat. late fourth – first half fifth cent.

27 0106.1 (Fig. 27)
LRC, dish Hayes form 1.
Pres. frgt. rim, eve: 10 %. D. 18.4. Fab. FW 292, hard, 2.5YR-6.5/8. Surf. slip all over 1.25YR-6/8.
Par. Ladstätter – Sauer 2005, cat. 9. 13.
Dat. late fourth – first half fifth cent.

28 0104.2 (Fig. 27)
LRC, dish with stamped decoration Hayes group II A.
Pres. frgt. base. L. pres. 2.2, W. pres. 2. Fab. FW 292, hard, 1.25YR-5/8. Surf. slip all over 1.25YR-5/8. Dec. int. rouletting.
Par. Hayes 2008, pl. 60.
Dat. c. second half fifth cent.

29 0402.1 (Fig. 27)
ARS, bowl Hayes form 67.
Pres. frgt. rim, eve: c. 2 %. D. 45.4? Fab. FW 56, very hard, 1.25YR-6/8. Surf. slip all over ext. 1.25YR-5/8 and int. 1.25YR-6/8.
Par. Bonifay 2004, 171 Sigillée type 41 C, fig. 92 no. 8.
Dat. c. second half fifth cent.

30 0105.2 (Fig. 27)
LRC Grynion, dish Hayes form 3.
Pres. frgt. rim, eve: 5.5 %. D. 21.6. Fab. SGW 17, very hard, 7.5YR-7/6. Surf. thin, matt, and blotchy slip all over 1.25YR-6/8. Dec. rouletting on ext. rim.
Par. Yılmaz 2007, fig. 3 no. 2.
Dat. fifth – sixth cent.

31 0104.6 (Fig. 28)
Lamp with planta pedis stamp.
Pres. frgt. base, eve: 18 %. D. c. 4. Fab. FW 68, hard, 5YR-6/6. Surf. slip ext. 2.5YR-5.5/8 and 2.5YR-3/2, int. plain 2.5YR-5/8. Dec. ext. stamp planta pedis.
Par. Niewöhner 2015b, 226–240 cat. 46 (N. Schwerdt).
Dat. fourth – fifth cent.

32 0407.1 (Fig. 28)
North Syrian Mortarium.
Pres. frgt. rim, eve: 9.5 %. D. 36.8. Fab. SGW 15, hard, 1.25YR-5/8. Surf. ext. 1.25YR-5/6 and int. 1.25YR-5.5/6.
Par. Hayes 1967, fig. 3 no. 5.
Dat. late third – first half fourth cent.

33 0105.3 (Fig. 28)
Geometric painted ware, closed vessel?
Pres. 3 frgts. body, eve: 12 %. D. pres. 17. Fab. FW 315, hard, 7.5YR-7/4. Surf. 10YR-8/3. Dec. two horizontal bands, below concentric circles and animal head?
Dat. Geometric.

34 0109.2 (Fig. 28)
LRC, dish Hayes form 1.
Pres. frgt. rim, eve: 6.5 %. D. 15.4. Fab. secondarily burned or misfired? FW 88? very hard, 3.75YR-4/3. Surf. burned slip all over 5YR-3/2.
Par. Niewöhner 2015b, 226–240 cat. 23. 38 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

35 0109.3 (Fig. 28)
LRC, dish Hayes form 1.
Pres. frgt. rim, eve: 3.5 %. D. 24.4. Fab. FW 1, hard – very hard, 10R-6.5/8. Surf. slip all over 1.25YR-5/8.
Par. Ladstätter – Sauer 2005, cat. 10. 12.
Dat. late fourth – first half fifth cent.

36 0409.1 (Fig. 28)
LRC, dish Hayes form 1.

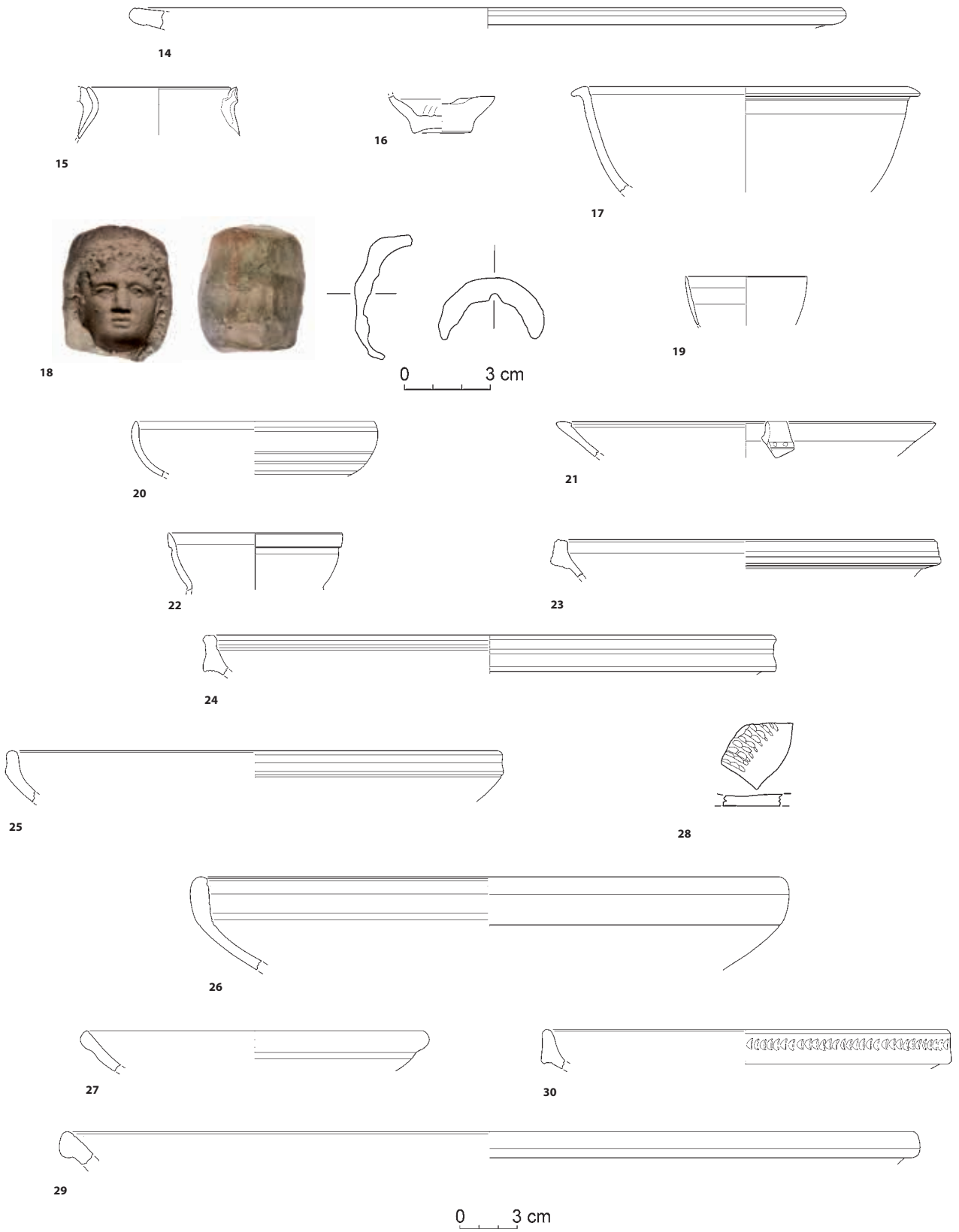


Fig. 27 Miletus, drainage channel, pottery cat. 14–30 from trenches 03 and 01+04 (cat. 14–17. 19–27. 29. 30: scale 1 : 3; cat. 18. 28: scale 1 : 2)

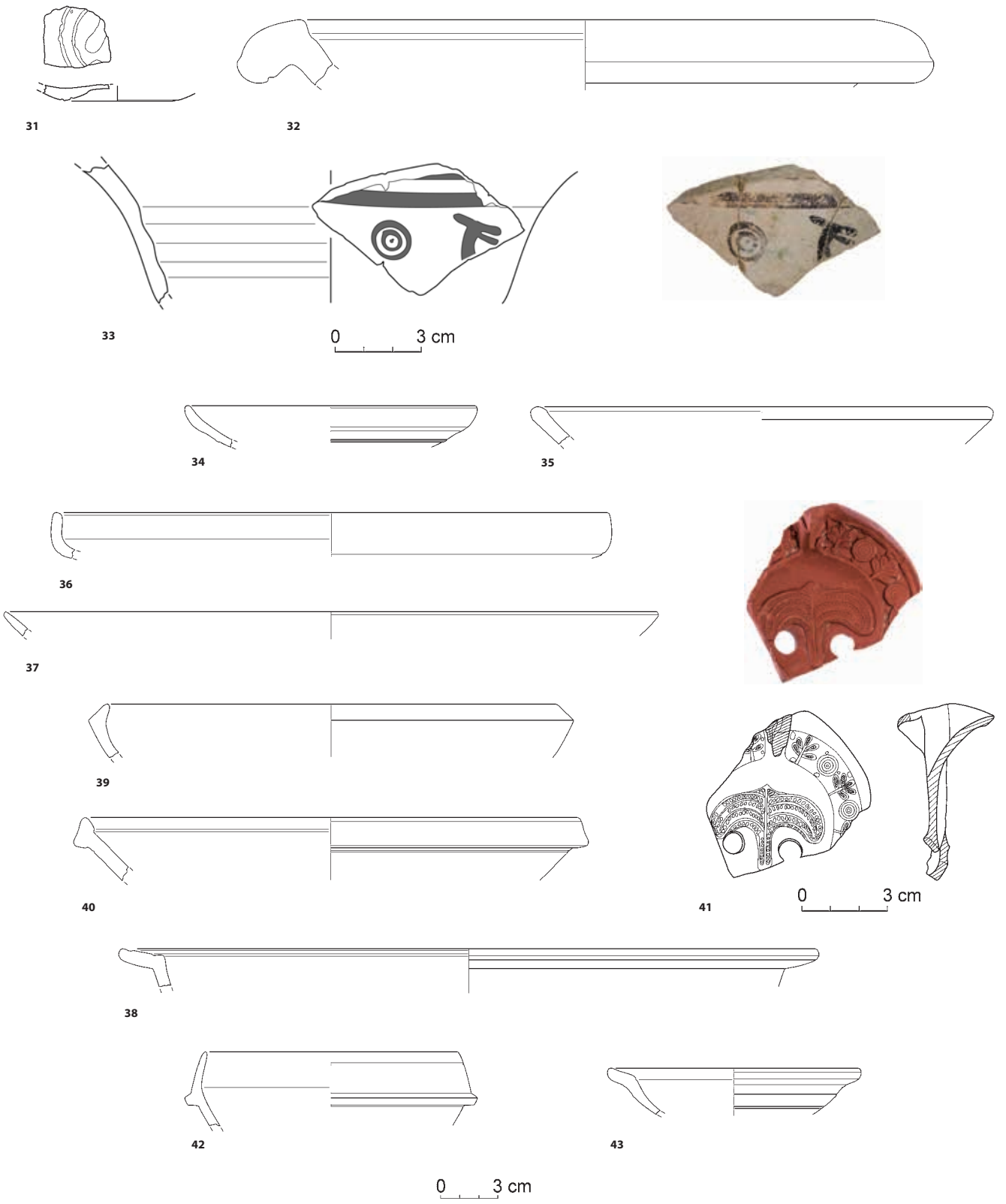


Fig. 28 Miletus, drainage channel, pottery cat. 31–43 from trench 01+04 (cat. 32. 34–40. 42. 43: scale 1 : 3; cat. 31. 33. 41: scale 1 : 2)

Pres. frgt. rim, eve: c. 3 %. D. 29.6? Fab. FW 58, hard, 2.5YR-6/8. Surf. slip ext. 2.5YR-6/8 (rim darker), int. slip worn off.
Par. Niewöhner 2015b, 226–240 cat. 21 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

37 0108.4 (Fig. 28)
ARS, dish Hayes form 50.
Pres. frgt. rim, eve: c. 2 %. D. 34.6. Fab. FW 151, hard, 3.75YR-7/8. Surf. slip all over 2.5YR-5/8.
Par. Hayes 1972, fig. 12 nos. 7. 8.
Dat. c. mid-third – mid-fourth cent.

38 0110.1 + 0108.1(Fig. 28)
ARS, dish Hayes form 59.
Pres. 2 frgts. rim, eve: 7,5 %. D. 37. Fab. FW 272, hard – very hard, 1.25YR-5/8. Surf. slip all over 1.25YR-4.5/8.
Par. Hayes 1972, fig. 15 no. 16.
Dat. c. 320–420.

39 0412.1 (Fig. 28)
ARS, dish Hayes form 61A.
Pres. frgt. rim, eve: c. 3.5 %. D. 25.6. Fab. FW 272, hard – very hard, 1.25YR-5/8. Surf. slip all over 1.25YR-5/8.
Par. Hayes 1972, fig. 17 nos. 4. 7.
Dat. c. 325–400/420.

40 0109.1 (Fig. 28)
ARS, dish Bonifay type 38 or 39 (Hayes 61B3 or C).
Pres. frgt. rim, eve: c. 4.5 %. D. 27.2. Fab. FW 272, hard, 10R-6/8. Surf. slip all over 10R-5.5/8.
Par. Bonifay 2004, fig. 91 nos. 33. 38.
Dat. c. middle – second half fifth cent.

41 0109.5 (Fig. 28)
ARS, lamp Atlante form X.
Pres. 2 frgts. not joining, discus, shoulder, body, handle and nozzle missing. L. pres. 6, W. pres. 5.7. Fab. FW 151, very hard, 10R-5/8. Surf. ext. slip 10R-5/8, int. plain 10R-5/8. Dec. Palm tree in relief at the centre of the discus, trunk flanked by two oil-holes, on shoulder in relief small trees or branches alternating with concentric circles.
Dat. fifth – sixth? cent.

42 0108.2 (Fig. 28)
ESC/Çandarlı, bowl Loeschke form 19.
Pres. frgt. rim, eve: 9.5 % D. 14.8. Fab. FW 277, hard, 2.5YR-6/8. Surf. slip all over 2.5YR-5/8.
Par. Hayes 2008, cat. 793.
Dat. late first – second cent.

43 0113.2 (Fig. 28)
LRC, dish Hayes form 2.
Pres. 2 frgts. rim, eve: 12 %. D. 13.4. Fab. FW 292, very hard, 1.25YR-6/8. Surf. slip all over 10R-5.5/8, rim darker.
Par. Niewöhner 2015b, 226–240 cat. 34. 35 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

44 0418.1 (Fig. 29)
ARS, dish Hayes form 50.
Pres. frgt. rim, eve: c. 3 %. D. 25.2. Fab. FW 113, very hard, 1.25YR-5/8. Surf. slip all over ext. 1.25YR-6/8 and int. 1.25YR-5/8.
Par. see cat. 37.
Dat. c. mid-third – mid-fourth cent.

45 0113.1 (Fig. 29)
ARS, dish/plate Hayes form 60.
Pres. frgt. rim, eve: 3 %. D. 37.8. Fab. FW 272, hard, 10R-6/8. Surf. slip all over 1.25YR-5.5/8.
Par. Hayes 1972, fig. 15 form 60 nos. 1. 2.
Dat. c fourth cent.

46 0419.4 (Fig. 29)
ARS, dish Hayes form 61A.
Pres. frgt. rim, eve: c. 3 %. D. c. 28. Fab. FW 151, hard, 1.25YR-5.5/8. Surf. slip all over 1.25YR-5.5/8.
Par. see cat. 39.
Dat. c. 325–400/420.

47 0113.6 (Fig. 29)
LRC or ESC/Çandarlı, dish Hayes form 1 or 4.
Pres. 7 frgts. rim, eve: c. 5 %. D. c. 33? Fab. secondarily burned or misfired? occ. white inclusions, very hard, centre c. 10YR-4/2, margins black. Surf. burned, blotchy slip all over ext. 5YR-3.5/2 and int. 7.5YR-3/1.
Par. Hayes 1972, fig. 64 form 4; Hayes 2008, cat. 1230.
Dat. third – late fourth cent.?

48 0419.2+3 (Fig. 29)
ESC/Çandarlı, dish Hayes form 4.
Pres. 3 frgts. rim and 1 frgt. base probably from the same vessel, rim eve: 6.5 %, base eve 20 %. D. rim 20.2, D. base 9.2. Fab. FW 337, hard, 2.5YR-6/8. Surf. slip all over 1.25YR-5/8.
Par. Hayes 1972, fig. 64 form 4.
Dat. third cent.

49 0423.2 (Fig. 29)
LRC, dish Hayes form 3A.
Pres. frgt. rim, eve: 4 %. D. 32. Fab. FW 88, very hard, 1.25YR-6/8. Surf. slip all over 1.25YR-5/8, ext. of rim without slip and partly grey.
Par. Hayes 2008, cat. 1250.
Dat. c. first half fifth cent.

50 0423.4 (Fig. 29)
LRC, dish Hayes form 4.
Pres. frgt. rim, eve: 4 %. D. 26.8. Fab. FW 292, very hard, 1.25YR-5/8. Surf. slip all over 10R-5/8.
Par. Hayes 2008, cat. 1299.
Dat. first half fifth cent.?

51 0423.1 (Fig. 29)
LRC, dish with combed decoration.
Pres. frgt. base, eve: 9 %. D. 11.4. Fab. FW 58, hard, 1.25YR-5/8. Surf. slip all over 1.25YR-5.5/8. Dec. combed loops within a groove.
Par. Hayes 2008, cat. 1341 (combed loops).
Dat. first half fifth cent.?

52 0423.3 (Fig. 29)
ARS, dish Hayes form 50B late variant.
Pres. 2 frgts. rim and body, eve: 5 %. D. 26.8. Fab. FW 31, hard, 10R-4/4. Surf. slip all over 1.25YR-5/8.
Par. Bonifay 2004, 197 Sigillée type 65 no. 3.
Dat. first half fifth cent.

53 0422.1 (Fig. 29)
ESC/Çandarlı, dish Hayes form 4.
Pres. 2 frgts. base, eve: 6.5 %. D. 11. Fab. FW 337, hard – very hard, 2.5YR-6/8. Surf. slip all over 1.25YR-4.5/8.
Par. Hayes 1972, fig. 64 form 4.
Dat. third cent.

54 0421.3 (Fig. 29)
ESC/Çandarlı, bowl Hayes form 5?
Pres. frgt. rim, eve: 15 %. D. 10.4. Fab. FW 337, hard, 2.5YR-6.5/8. Surf. slip all over 1.25YR-4.5/6.
Par. Hayes 1972, fig. 64 form 5.
Dat. third cent.?

55 0425.1 (Fig. 29)
LRC, bowl Hayes form 8.
Pres. frgt. rim, eve: 9 %. D. 16.4. Fab. FW 88, hard – very hard, 10R-6/8. Surf. slip int. 10R-5/8, ext. slip only on top of rim 10R-3/3.
Par. Hayes 2008, cat. 1317.
Dat. c. second half fifth cent.

56 0117.1 (Fig. 29)
ESB, dish Atlante form 60.
Pres. frgt. rim, eve: 8 %. D. 28. Fab. FW 264, hard, 2.5YR-6/8 + 6.25YR-6/6. Surf. except on ext. rim slip all over 1.25YR-5/8.
Par. Niewöhner 2015b, 226–240 cat. 1 (N. Schwerdt).
Dat. c. mid-second – mid-third cent.

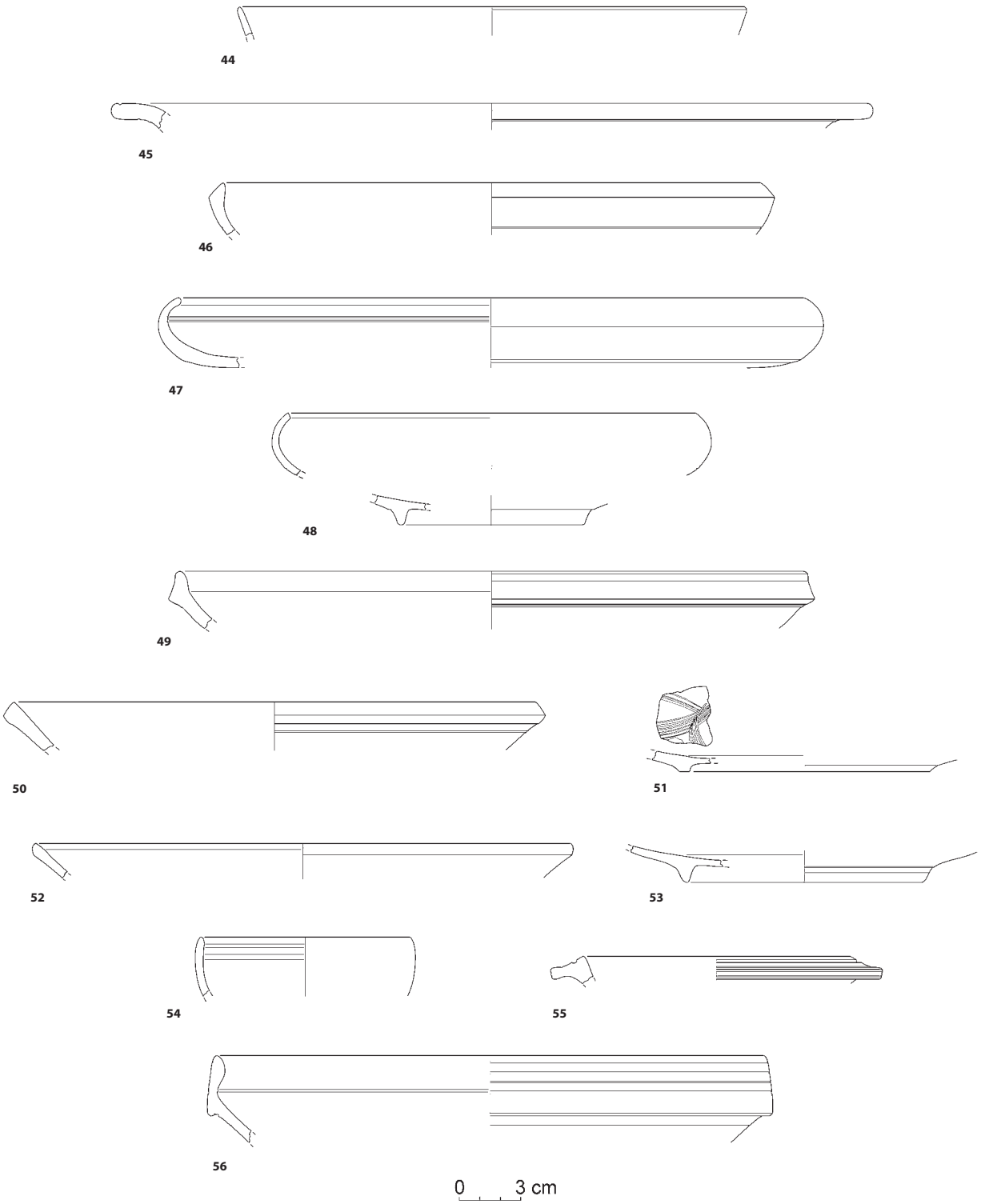


Fig. 29 Miletus, drainage channel, pottery cat. 44–56 from trench 01+04 (scale 1 : 3)

57 0120.1 (Fig. 30)
ESB, dish Atlante form 60.
Pres. cpl. profile, eve: 9.5 %. D. rim 22. Fab. FW 255, hard, 2.5YR-6/8. Surf. glossy slip all over 2.5YR-5/8.
Par. Niewöhner 2015b, 226–240 cat. 2 (N. Schwerdt).
Dat. c. second – mid-third cent.

58 0120.5 (Fig. 30)
ESB, cup Atlante form 70.
Pres. frgt. body + lower rim, eve: 13 %. D. 12.5. Fab. FW 193, hard, 5YR-6/8. Surf. glossy slip all over 2.5YR-5/8.
Par. Niewöhner 2015b, 226–240 cat. 5 (N. Schwerdt).
Dat. mid-first – mid-second cent.

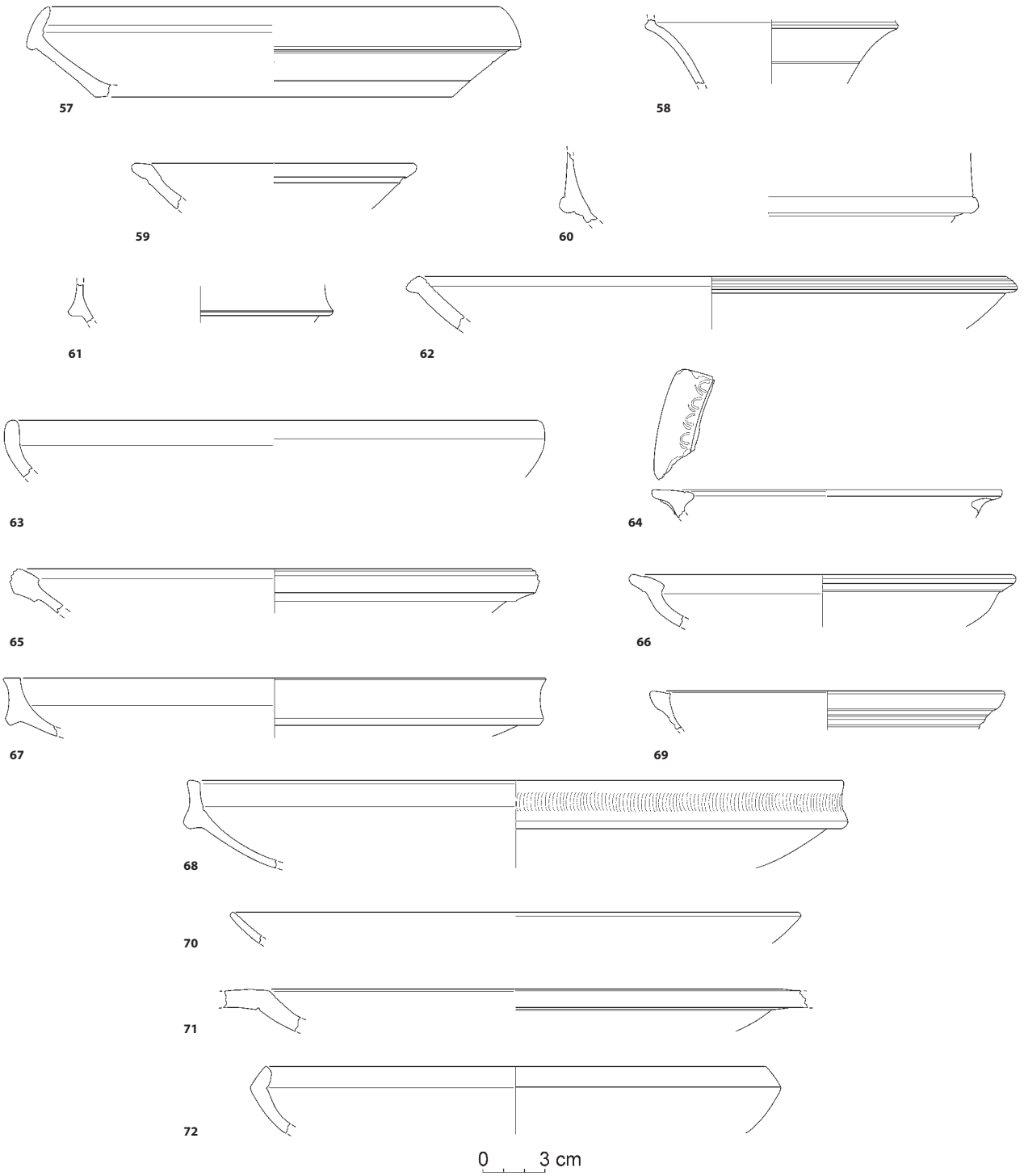


Fig. 30 Miletus, drainage channel, pottery cat. 57–72 from trenches 01+04 and 02 (scale 1 : 3)

59 0117.3 (Fig. 30)
ESB, bowl Atlante form 80.
Pres. frgt. rim, eve: 5 %. D. 14. Fab. FW 255, soft, 2.5YR-6/8. Surf. slip all over 1.25YR-5/8.
Par. Niewöhner 2015b, 226–240 cat. 7. 8 (N. Schwerdt).
Dat. c. second cent.

60 0117.4 (Fig. 30)
ESC/Çandarlı, bowl Loeschke form 19.
Pres. 3 frgts. rim, eve: 7 %. D. 20. Fab. FW 337, very hard, 2.5YR-7/8. Surf. glossy slip all over 2.5YR-4.5/8.
Par. see cat. 42.
Dat. late first – second cent.

61 0119.2 (Fig. 30)
ESC/Çandarlı, bowl Loeschke form 19.
Pres. frgt. rim, eve: 7 %. D. 13. Fab. FW 277, very hard, 2.5YR-6/6. Surf. glossy slip all over 2.5YR-4.5/8.
Par. see cat. 42.
Dat. late first – second cent.

62 0120.7 (Fig. 30)
ESC/Çandarlı, bowl Loeschke form 26/Hayes form 1–2?
Pres. frgt. rim, eve: c. 2 %. D. c. 30? Fab. FW 255 (sic), hard, 2.5YR-6/8. Surf. slip all over ext. 2.5YR-5/8 and int. 2.5YR-5.5/8.
Par. Meriç 2002, cat. K317.
Dat. c. second – third cent.

63 0121.2 (Fig. 30)
Pompeian Red Ware, pan.
Pres. frgt. rim, eve: 7 %. D. 26.6. Fab. SGW 9, hard, 3.75YR-6/8. Surf. slip int. all over, ext. only on lip 2.5YR-6, plain ext. 2.5YR-6/5.
Par. Hayes 2008, cat. 1821.
Dat. c. late first – later second cent.

64 0117.2 (Fig. 30)
Colour Coated Ware, dish with projecting rim.
Pres. frgt. rim, eve: 9 %. D. 17.2. Fab. FW 130, hard, 2.5YR-7/8 turning grey to the inner margin. Surf. slip all over ext. 2.5YR-5/8, int. very thin and blotchy 7.7YR-3/3. Dec. impressed ovolo pattern on rim.
Par. Ladstätter 2010b, cat. 246. 250 (for shape only).
Dat. Hellenistic?

65 0201.2 (Fig. 30)
LRC, dish Hayes form 10C.
Pres. frgt. rim eve: 7 %. D. 26. Fab. FW 88, hard – very hard, 10R-5.5/7. Surf. slip all over 10R-4/8.
Par. Hayes 2008, cat. 1278; Ladstätter – Sauer 2005, cat. 91.
Dat. c. end of sixth – mid- or late seventh cent.

66 0202.1 (Fig. 30)
LRC, dish Hayes form 2.
Pres. frgt. rim, eve: 9 %. D. 19. Fab. FW 58, hard, 2.5YR-5.5/8. Surf. slip all over 3.75YR-5.5/8, rim darker.
Par. Niewöhner 2015b, 226–240 cat. 34 (N. Schwerdt).
Dat. late fourth – first half fifth cent.

67 0206.1 (Fig. 30)
LRC, dish Hayes form 3C.
Pres. frgt. rim, eve: 5 %. D. 26.6. Fab. FW 88, hard – very hard, 10R-6/8. Surf. slip all over 1.25YR-5/8.
Par. Hayes 2008, cat. 1270. 1272.
Dat. c. second half fifth cent.

68 0207.1 (Fig. 30)
LRC, dish Hayes form 3C.
Pres. 2 frgts. rim, eve: 13 %. D. c. 32.2. Fab. FW 88, hard, 2.5YR-6/7. Surf. slip all over ext. 10R-5/8 + c. 10R-3/6 on rim, int. 1.25YR-5/8. Dec. single band of rouletting on ext. rim.
Par. Hayes 2008, cat. 1267. 1270.
Dat. c. second half fifth cent.

69 0206.3 (Fig. 30)
LRC, dish Hayes form 6.
Pres. frgt. rim, eve: 11.5 %. D. 17.4. Fab. FW 58, hard, 2.5YR-6.5/8. Surf. slip all over 1.25YR-6/8.
Par. Hayes 1972, fig. 90 form 6 no. 2.
Dat. early sixth cent.

70 0207.2 (Fig. 30)
ARS, dish Hayes form 50A/B or B.
Pres. 2 frgts. body + rim, eve: c. 3 %. D. c. 28. Fab. FW 113, very hard, 10R-6/8. Surf. slip all over 10R-5/8.
Par. Hayes 1972, fig. 12 nos. 55. 60.
Dat. c. fourth cent.

71 0204.5 (Fig. 30)
ARS, dish Hayes form 59.
Pres. frgt. rim, eve: 6 %. D. 24.2. Fab. FW 101, hard, 10R-6/8. Surf. Slip all over ext. 1.25YR-5.5/8 and int. 1.25YR-5/8.
Par. see cat. 14. 38.
Dat. c. 320–420.

72 0206.2 (Fig. 30)
ARS, dish Hayes form 61A/B?
Pres. frgt. rim, eve: c. 3.5 %. D. 26. Fab. FW 151, hard, c. 5YR-5/4 with dark blotches. Surf. slip all over ext. 2.5YR-4/8 and int. 1.25YR-5/8.
Par. c. Bonifay 2004, fig. 90 no. 1.
Dat. c. late fourth – early fifth cent.?

73 0205.1 (Fig. 31)
ESC/Çandarlı, dish Hayes form 4.
Pres. frgt. rim, eve: 4 %. D. 23.2. Fab. FW 278, hard, core ext. c.10R-7/8 and int. 2.5YR-6.5/6. Surf. slip all over ext. 1.25YR-5/8 and int. 10R-4/8.
Par. Hayes 1972, fig. 64 form 4; Ladstätter 2010a, cat. B-K 485.
Dat. third cent.

74 0208.2 (Fig. 31)
ESB, cup Atlante form 74.
Pres. frgt. rim, eve: 1 %. D. c. 13 (reconstructed, rim almost cpl. missing. Dimensions below rim: D. 10.6, eve: 15 %). Fab. FW 255, soft, 2.5YR-6.5/6. Surf. slip all over, ext. mostly worn off 2.5YR-5/8, black blotches.
Par. Hayes 2008, cat. 341. 342.
Dat. late first – first half second cent.

75 0210.2+3 (Fig. 31)
ESB, open vessel.
Pres. two frgts. base, not joining but probably one vessel, eve: 4 + 6 %. D. c. 11.6–15.6 (reconstructed, D. at int. groove c. 10–13). Fab. FW 193, hard, 2.5YR-7/8. Surf. slip all over 1.25YR-5/8.
Dat. first – second cent.

76 0212.2 (Fig. 31)
ESB, dish.
Pres. three frgts. base, eve: 21 %. D. 10.4. Fab. FW 193, hard, c. 3.75YR-6,5/8 (discoloured). Surf. slip all over, but discoloured, ext. c. 2.5YR-7/6 and int. c. 2.5YR-6,5/8. Dec. int. central rosette-stamp.
Dat. first – first half second cent.

77 0209.2 (Fig. 31)
ESC? dish.
Pres. frgt. rim, eve: 10 %. D. 15.4. Fab. SGW 6, hard – very hard, 5YR-6/6. Surf. thin, matt slip all over, ext. 1.25YR-5/8 (rim) + 2.5YR-3,5/1,5 (lower body) and int. 2.5YR-4/4.
Dat. first cent.?

78 0212.7 (Fig. 31)
Sanded Ware, carinated cup/bowl.
Pres. two frgts. rim, eve: 32 %. D. c. 10. Fab. SGW 10, hard, 3.75YR-6/8. Surf. blotchy slip all over c. 1.25YR-5/8. Dec. ext. rough cast/sanding.
Par. Kögler 2010, cat. K.386.
Dat. Augustan – first cent.

79 0208.1 (Fig. 31)
Lamp, Red on White? Form Pergamon group 9, Broneer XXV, Loeschke VIII.
Pres. 10 frgts. discus, handle, base, and partly nozzle, surface heavily worn off. L. pres. 8.8 W. pres. 5.5 H. 3–4.7. Fab. BPW 11, soft, 5YR-7/6. Surf. white engobe pres. inside nozzle, slip ext. 1.25YR-5/8 and partly int. 10YR-5/8. Dec. plain discus, surrounded by two grooves, joint between nozzle and shoulder forms straight line.
Par. Ladstätter – Waldner 2014, cat. K 869.
Dat. first – third cent.

80 0210.11 (Fig. 31)
Lamp form Pergamon group 9f.
Pres. frgt. nozzle. L. pres. 3.5 W. pres. 3.2. Fab. FW 209, soft, 5YR-6/6. Surf. slip all over, ext. 1.25YR-5/8 and int. 1.25YR-4/8.
Par. Heimerl 2001, cat. 385.
Dat. second – third cent.

81 0212.1 (Fig. 31)
Lamp form Pergamon group 9?
Pres. frgt. discus, shoulder, partly handle, nozzle and base missing. L. pres. 7 W. pres. 4.5 H. pres. 2.6. Fab. SGW 8, soft, 7.5YR-7.5/6. Surf. plain, ext. 10YR-8/4 (shoulder and wall) + 7.5YR-7.5/6 (discus and int.).Dec. on shoulder rosette and dot in relief.
Dat. second – third cent.?

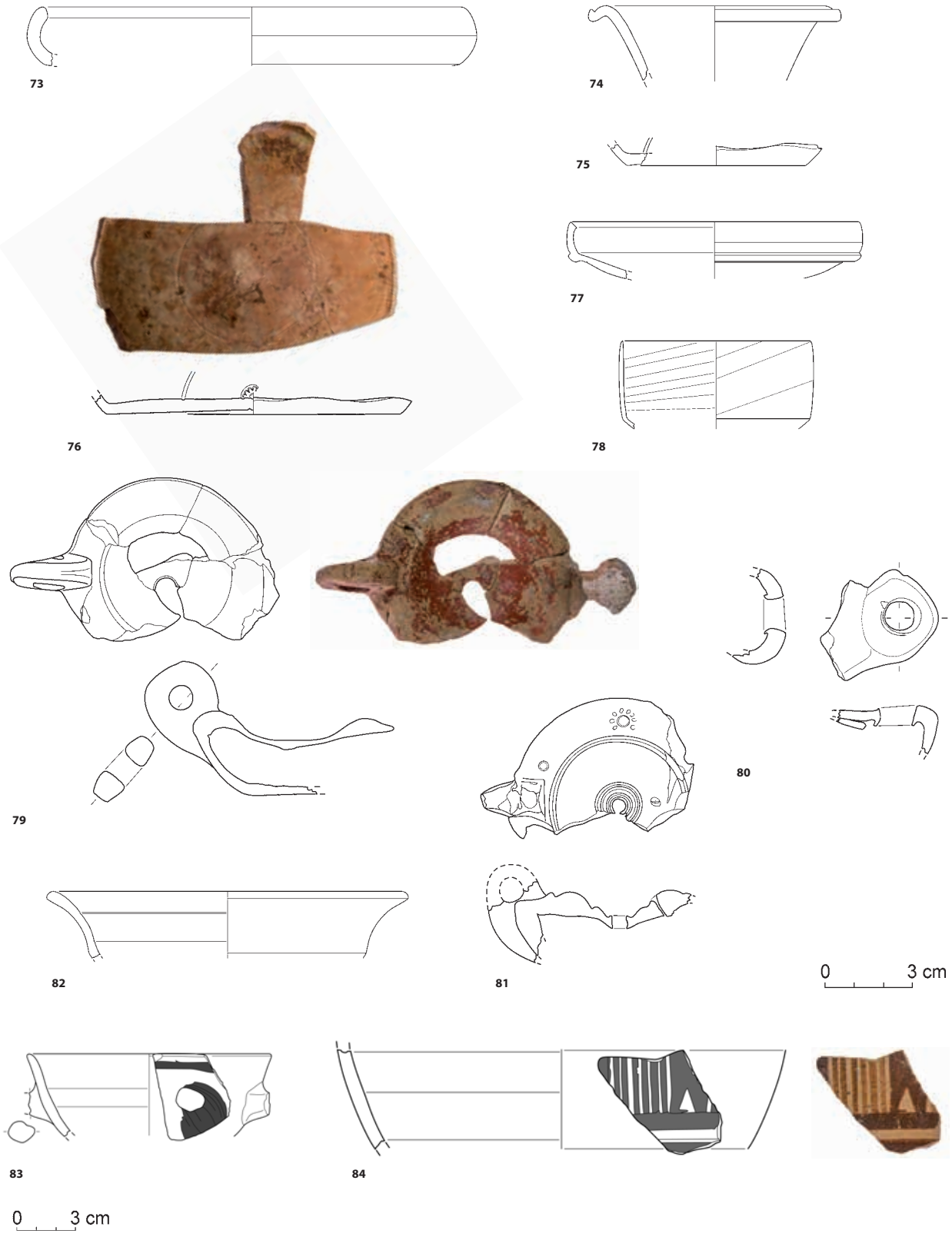


Fig. 31 Miletus, drainage channel, pottery cat. 73–84 from trench 02 (cat. 73–75. 77. 78. 82. 83: scale 1 : 3; cat. 76. 79–81. 84: scale 1 : 2)

82 0212.5 (Fig. 31)
Red Gloss Tableware, bowl with out-turned rim.
Pres. frgt. rim, eve: 10.5 %. D. 18.6.
Fab. BPW 4, hard, c. 2.5YR-6/8 + 7.5YR-6/6. Surf. slip all over c. 2.5YR-5,5/8.
Par. Ladstätter – Waldner 2014, cat. K 161.
Dat. second – first cent. B.C.

83 0212.9 (Fig. 31)
Geometric painted pottery, deep skyphos.
Pres. frgt. rim and partly handle, eve: 7 %. D. 12.6. Fab. FW 315, hard, core int. 2.5YR-7/8 and ext. 10YR-7/5. Surf. ext. wet smoothing 2.5Y-8/2, int. slip 1.25YR-4/8. Dec. ext. brown to black horizontal band below rim, handle painted black.
Par. Kerschner 1999, cat. 24.
Dat. Late Geometric – Subgeometric.

84 0212.10 (Fig. 31)
Geometric painted pottery, bird-kotyle.
Pres. frgt. body, eve: c. 6.5 %. D. pres. c. 14? Fab. FW 315, hard, 7.5YR-6/6. Surf. ext. 7.5YR-7/6, int. slip 5YR-3/2,5. Dec. ext. brown painted: two horizontal bands at the bottom, from left to right rest of double axe, six narrow streaks, and double axe.
Par. Coldstream 1968, pl. 61 d.
Dat. Late Geometric.

N. S.

Anthropology

The human skeletal remains that formed the early Byzantine burials in trench 03 were examined in 2015, one year after they had been discovered, disassembled, and removed to the excavation depot. The main aim was to determine the number of individuals buried, their ages, and their sexes; in addition, non-metric and pathological conditions were also recorded. The state of preservation varied; most of the long bones and the skulls were fragmented; smaller skeletal elements were mostly intact. All in all, the burials included five individuals, a female of 40–45 years in age (Figs. 13. 14, skull 1), a young adult (skull 2), an adolescent (skull 3), a child (skull 4), and an infant (skull 5).

The adult female (skull 1) shows no significant disease on her bones apart from some light joint diseases such as osteophytes (bony spurs) on the vertebra that would have occurred as part of the normal aging process. This suggests that the woman was probably not subjected to heavy physical stress[106]. However, the parietal bones of her skull have slightly thickened, a condition which is typically caused by Paget's disease, a chronic inflammation of a bone, or by haemolytic anaemia[107]. Paget's disease, which is rarely reported in paleopathological literature[108], tends to affect the axial skeleton, with the skull, lumbar spine, pelvis, and proximal femur accounting for the majority of cases[109], but apart from the thickened skull the rest of the woman's skeleton does not have any other lesion that may be related to Paget's disease. Haemolytic anaemia was quite common in Byzantium[110], may have been genetic or metabolic, and is normally associated with some more lesions on the skull, such as pitting on the superior wall of the eye sockets and parietal porosity[111], but the orbits of the woman in question are missing and her parietal bones are not particularly porous. The thickening of her parietal bones may thus have had a different cause; it could be related to another lesion on the woman's skull, a slight depression on the frontal bone above the left orbit that seems to be the result of a blunt force trauma; the same blow or impact could also have caused blood disorder and led to a thickening of the skull vault.

The second individual and young adult (skull 2) is represented by skull fragments and some remains of an arm. It is thus not possible to determine the sex, but the available evidence indicates a young adult of 20–25 years in age. The third body (skull 3) was adolescent and around 15 (±3) years old; sex criteria are not yet fully developed, but the general morphology of the skeleton suggests a probable male teenager. The fourth individual is represented by skull fragments and a jaw bone (skull 4) that belong to a child of around 6 (±2) years in age. Finally, a few skeletal fragments (skull 5) belong to an infant that was 3–6 months old. None of them showed any pathological lesions.

106 Manchester – Roberts 1995.
107 Waldron 2009.
108 Manchester – Roberts 1995.
109 Waldron 2009.
110 e. g. 36.8 % at Boğazköy (cribra orbitalia: Schultz 1986), 21.8 % at Herakleia-Perinthos (cribra orbitalia: Demirel 2016), 66.7 % at Tepecik-Çiftlik (Büyükkarakaya et al. 2009), and 11 % at Elaiussa Sebaste (cribra orbitalia and porotic hyperostosis: Paine et al. 2007).
111 Cribra orbitalia and porotic hyperostosis: Manchester – Roberts 1995; Waldron 2009.

The organization of the skeletons could suggest a family burial that may have included a mother (skull 1) and her four children (skulls 2–5) or a grandmother (skull 1) with two children (skulls 2 and 3) and two grandchildren (skulls 4 and 5). The generations often followed more swiftly during the Byzantine period than is common today[112]. The cause of death is in no case apparent, and as far as the skeletons have been preserved, any major and potentially lethal bone pathology, anomaly, or trauma can be excluded. Other possible causes of mass mortality that would not necessarily have left any visible marks on the skeletons include infectious diseases such as diarrhoea, dysentery, measles, pneumonia, and flu. The potentially disastrous effects of any such disease would have been increased by inadequate living conditions such as a poor diet, contaminated water, and poor hygiene, but as none of the skeletons show any signs of general, long-term malnutrition, a highly lethal disease like, for example, the plague that killed even well-nourished people appears a more likely cause of death.

A. D.

A Late Antique Context outside the Sacred Gate

Historical Topography

The Sacred Gate was the main landward gate of Miletus in the southern section of the ancient city walls (Fig. 2)[113]. After the city walls were renovated in the late Roman period, the gate stayed in use throughout late antiquity and the early Byzantine period. This appeared to be confirmed, when in 1995 an excavation outside the Sacred Gate (trench SM95.1) came across a 1 m thick layer of late antique debris[114]. In conjunction with the sixth-century church of St Mary further west along the same section of city walls (Fig. 2)[115], this could suggest that the southern city remained settled to the brim and that occupation spilled over outside the Sacred Gate. However, the exact date of the late antique context was not established in 1995, and it remained open, when the occupation lapsed. This was remedied in 2016, when the finds from the context in question were for the first time studied in detail. As it turned out, the area outside the Sacred Gate appears to have flourished in the fifth century and to have been abandoned by the sixth century, thus confirming the evidence from inside the southern city. When the church of St Mary was established in the later sixth century, it may have stood out as a single building in a largely deserted quarter. What comes to mind is the outer part of Constantinople, between the Constantinian and the Theodosian city walls, that was never fully built up and included space for large open air cisterns, gardens, and monasteries[116].

Ph. N.

Pottery

Stratigraphy

The stratigraphy of trench SM95.1 can be summarized as follows: The top was formed by a layer of fluvial sediment, 1.20–1.40 m thick, with very few ceramic finds. At 2.88 m a.s.l. the debris of a north-south running wall appeared. The debris had a maximum height of c. 1 m to the north and was slanting southwards down to 2.45 m a.s.l. It contained limestone blocks, some

112 Demirel forthcoming.
113 Von Gerkan 1935, 12–36.
114 Schneider 1997, 134 f. fig. 20 trench »Q95«.
115 Feld 1996.
116 Mango 1990; Berger 2011, 25–33.

of them re-used, roof tiles, bricks, mortar, and late antique pottery. Below the late antique debris followed sediment with Roman and Hellenistic pottery and then more debris, from the Hellenistic period. At sea level a massive east-west foundation wall of large and regular tuff blocks (c. 30 cm × 60 cm) appeared. Two rows were preserved. At the level of this foundation a water pipe was found (-0.25 m b.s.l.). A second water pipe ran below the foundation (-0.84 m b.s.l.). The fill around the foundation wall contained Hellenistic pottery[117].

For the scope of this paper the upper, late antique debris is of primary interest. The excavator had dated it to late antiquity on the basis of LRC sherds, but he had not described or illustrated the pottery. Thus, it was decided to re-examine the late antique finds in 2016[118]. At the excavation depots the late antique sherds in question were contained in boxes SM95.1.4 to SM95.1.10. Joining fragments of the same vessels were found in all boxes and confirm that the finds belong to one single late antique context. The principal aim of the new pottery analysis was to date this context and to establish when the site was abandoned.

The latest finds that can be dated with precision are variants of LRC form 3 (3A: uncatalogued, 3B to 3E or 3F: cat. 85–89); their dates range from the late fourth or early fifth century to the early or perhaps to the middle of the sixth century. LRC form 1 (e. g. cat. 90), form 2, and a stamped fragment (cat. 91) also occur; they date mainly from the first half of the fifth century. Cat. 92 is obviously a regional or local imitation of LRC form 3H or 4[119]. ARS is represented by forms 59, 67, 91B (cat. 93), 99A (cat. 94), and the stamped base fragment cat. 95[120]; similar to LRC Ware, the ARS pieces date from the late fourth to the early sixth century A.D. Cypriot Red Slip Ware or Late Roman D Ware (LRD) is not common at Miletus[121], but one fragment of LRD form 2 (cat. 96) matches with fifth-century variants[122].

Chronologically, the latest Red Slip Ware forms overlap mainly in the late fifth century, with a single, dubious exception of a LRC form 3E or 3F (cat. 89). The late-fifth century cluster makes it likely that the whole context dates from this time, although a few single sherds could also date from the sixth century, and earlier material is of course also present. The tableware is accompanied by common late antique to early Byzantine amphorae, for example Late Roman Amphora 1 and 3 or Agora M273/Samos Cistern group and its presumably local variant FW 95 amphora. Cooking pottery consists of the common late antique Aegean cooking ware and the local FW 95 pots. Additional domestic vessels are pitchers, bowls, basket handle, and storage jars. Residual pieces from Roman times are frequent, e. g. handles of pseudo Koan amphorae, bowls Lüdorf SIII and SIV, and frying pans Lüdorf PII.

117 Schneider 1997, 134 f. fig. 20 trench »Q95«.

118 With the help of Guido Teltsch all sherds were screened, the spectrum of wares and shapes was noted, and a selection was drawn. No complete statistical record was kept except of Red Slip wares. The subsequent Roman and Hellenistic deposits have not been studied so far. Two complete lamps and some coins mentioned by the excavator were absent.

119 Form 1: see above note 63; form 2: see above note 71; form 3: see above note 62. For LRC imitations from the Bishop's Palace, see Niewöhner 2015b, 231 (N. Schwerdt).

120 Form 59: see above note 69; form 67: see above note 64; form 91: Hayes 1972, 140–144; Hayes 1980, 515–517; Bonifay 2004, 179–181. 203; Hayes 2008, 7 f.; form 99: Hayes 1972, 152–155; Hayes 1980, 515–517; Bonifay 2004, 181; Hayes 2008, 80; Cau Ontiveros et al. 2011, 5; stamped decoration Hayes style a (iii): Hayes 1972, 219; Hayes 2008, 77.

121 Cf. Niewöhner 2015b, 229 cat. 41 (N. Schwerdt).

122 Hayes 1972, 373 f.; Hayes 2008, 89 f.; Reynolds 2011.

Catalogue

85 1.7.3 (Fig. 32)
LRC, dish Hayes form 3B.
Pres. frgt. rim, eve: 6 %. D. 32. Fab. FW 1, very hard, 2.5YR-5/6. Surf. fairly dense slip all over 10R-5/8, ext. rim darker 10R-4/2 and slip partially worn off. Dec. single band of rouletting on ext. rim.
Par. similar Hayes 2008, cat. 1259.
Dat. c. mid – late fifth cent.

86 1.4.2 (Fig. 32)
LRC, dish Hayes form 3C.
Pres. frgt. rim, eve: 5 %. D. c. 28–30. Fab. FW 58, hard, 2.5YR-7/8. Surf. slip all over ext. 10R-6/7 and int. 10R-5.5/8.
Par. Hayes 2008, cat. 1270.
Dat. c. second half fifth cent.

87 1.6.1 (Fig. 32)
LRC, dish Hayes form 3E.
Pres. frgt. rim, eve: 7 %. D. 31. Fab. FW 1, very hard, 10R-4.5/8. Surf. slip all over 10R-5/8, ext. rim grey 5YR-3/1.
Par. Hayes 2008, cat. 1275.
Dat. c. 475–525.

88 1.7.2 (Fig. 32)
LRC, dish Hayes form 3E.
Pres. frgt. rim, eve: 10 %. D. 21. Fab. FW 1, hard – very hard, 10R-5/8. Surf. slip all over 10R-5/8, ext. rim darker 10R-4/4.
Par. Hayes 2008, cat. 1277.
Dat. c. 475–525.

89 1.4.1 (Fig. 32)
LRC, dish Hayes form 3E or 3F.
Pres. frgt. rim, eve: 5 %. D. c. 28. Fab. FW 58, soft, 3.75YR-7/7. Surf. slip all over 2.5YR-6/8, part. worn off. Dec. three lines of rouletting on ext. of rim.
Par. similar cat. 2, Hayes 2008, cat. 1284; Ladstätter – Sauer 2005, cat. 35.
Dat. c. 475–550.

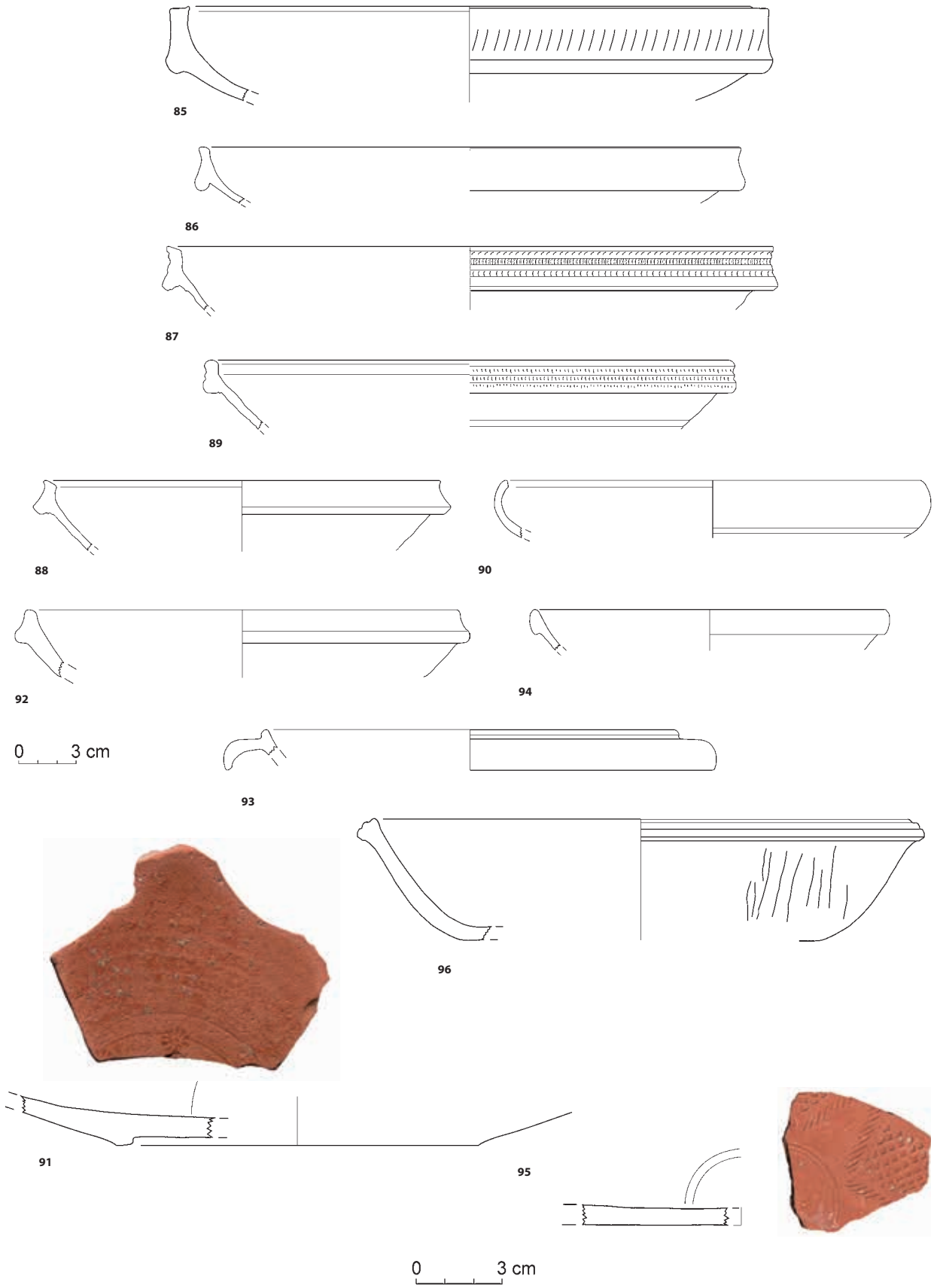


Fig. 32 Miletus, late antique context outside the Sacred Gate, pottery cat. 85–96 (cat. 85–90. 92–94. 96: scale 1 : 3; cat. 91. 95: scale 1 : 2)

90 1.6.3 (Fig. 32)
LRC or ESC/Çandarlı, dish Hayes form 1 or 4.
Pres. frgt. rim, eve: 6 %. D. 23. Fab. similar FW 1 (LRC) but less lime, 2.5YR-5.5/8. Surf. rather thick but dull slip all over ext. 1.25YR-5.5/8 and int. 1.25YR-5/8.
Par. see cat. 48.
Dat. third – late fourth cent.?

91 1.9.2 (Fig. 32)
LRC, dish/plate with stamped decoration, Hayes form 2 or 3.
Pres. frgt. base, eve 23 %. D. 11.6
Fab. FW 1, hard, 10R-6/7. Surf. slip all over, ext. thin 10R-6/8 and int. rather dense 10R-5/8. Dec. int. groove and rosette.
Par. similar Hayes 1972, fig. 72 no. 3C?
Dat. late fourth – late fifth cent.?

92 1.7.4 (Fig. 32)
LRC imitation, dish Hayes form 3H or 4.
Pres. frgt. rim, eve: 8 %. D. 24. Fab. FW 283, hard, 5YR-6/8. Surf. completely covered with sinter.
Par. Ladstätter – Sauer 2005, cat. 130.
Dat. fifth – sixth cent.

93 1.9.3 (Fig. 32)
ARS, bowl Hayes form 91B (size).
Pres. frgt. rim, eve: 11 %. D. 26. Fab. FW 151, hard – very hard, 10R-6/8. Surf. slip int. and ext. on rim 10R-6/8, ext. body plain 10R-6/8.
Par. Hayes 1972, fig. 26 no. 2 (but form 91A and smaller).
Dat. c. early – mid-fifth cent.

94 1.6.2 (Fig. 32)
ARS, bowl Hayes form 99A.
Pres. frgt. rim, eve: 8 %. D. 19.
Fab. FW 101, hard, c. 10R-5.5/8. Surf. slip all over 10R-5/8, int. somewhat brighter.
Par. Hayes 1972, fig. 28 no. 7.
Dat. c. late fifth – mid-sixth cent.

95 1.6.4 (Fig. 32)
ARS, dish/plate with stamped decoration Hayes a (iii).
Pres. frgt. base. D. pres. 11.4. Fab. FW 152, hard, 1.25YR-5/8. Surf. ext. plain, smoothed, 10R-6/8, int. slip 1.25YR-5.5/8. Dec. int. centre plain, two grooves, alternating grille patterns and chevrons.
Par. Hayes 1972, fig. 42 nos. 67. 69. 75.
Dat. early – third quarter fifth cent.

96 1.7.1 (Fig. 32)
LRD, dish Hayes form 2.
Pres. frgt. rim, eve 6 %. D. c. 30?
Fab. BPW 14, hard, 2.5YR-5.5/6. Surf. slip all over 1.25YR-6/8, but almost completely worn off. Dec. ext. crude vertical grooving.
Par. Hayes 1972, fig. 80 no. 2.
Dat. c. second half fifth cent.

N. S.

Late Roman and Byzantine Coins

The Miletus excavations payed little attention to late Roman and Byzantine coins until those periods became the focus of new research projects from 2006 onwards. The new projects included excavations of a late antique cemetery with an early Byzantine necropolis church, of the Baths of Faustina, a gate in the late Roman city walls east of Humeitepe, the Southern Baths, and the Bishop's Palace, where roughly two hundred and fifty late Roman and Byzantine coins were found and published[123]. Previously, 149 late Roman and Byzantine coins were recorded as having been found by the Miletus excavations between 1957 and 2003. Most coins are kept at the excavation depots; only the best preserved specimens have been removed to the Miletus Museum, in which case they have been assigned a separate Museum inventory number in addition to the excavation find number and the following catalogue lists both. I was able to study all of these coins in 2012, after they had been restored by Tanju Yıldırım in the same year (Figs. 33–35)[124]. The catalogue comprises these 149 coins that are here published for the first time. In addition, the Table 1 and Figure 36 to 39 also include the two hundred and fifty coins that were found since 2006 and have already been published elsewhere. Table 1 and Figure 36 to 39 thus provide an overview over all late Roman and Byzantine coins found in the Miletus excavations.

One third of the 149 newly published coin finds from 1957 to 2003 are stray finds that were picked up during conservation work at the Mosque with Forty Steps[125] and at the Nymphaeum[126] or by chance elsewhere in the ruins, at the Bouleuterion, in the area of the South Market, in the Theatre, on the Citadel Hill, on Zeytintepe, at the Heroon I, and elsewhere. The other two thirds were found during excavations in the church of St Michael[127], at the Temple of Athena[128], on Kalabaktepe[129], at Wiegand's old excavation depot from the early 20th century[130], at the Heroon III[131], to the west of the Bouleuterion[132], and at the Hellenistic city walls[133].

123 Niewöhner 2015a, 232–234; Niewöhner 2015b, 230 f. n. 242. 252; Niewöhner 2016a, 287–294. While new publications on the Baths of Faustina, excavations east of Humeitepe, and excavations in front of a cave sanctuary under the theatre are in preparation, Joachim Gorecki and Aylin Tanrıöver kindly made the coin lists available in advance for inclusion in the following statistics. In addition, a Half Centenionalis of Leo I. and Verina from A.D. 462–467, minted in Thessaloniki (parallels: LRBC 1883/Hahn 45/RIC X, 695–697) was found on the eastern slope of the Castle Hill, inv. OK06.2201.004, and kindly identified by Joachim Gorecki.
124 The restoration and my stay at Miletus were kindly financed by the German Archaeological Institute.
125 Müller-Wiener 1981.
126 Von Graeve 1992.
127 Müller-Wiener 1977/1978, 94; Niewöhner 2016a, 37.
128 For the late Roman and Byzantine layers excavated in the area of the former Temple of Athena see Niewöhner 2013, 175–181.
129 Von Graeve 1990; von Graeve – Senff 1991; Senff 1992; Senff 1995.
130 Panteleon 2005.
131 Weber 2004, 136 f.
132 Voigtländer 1981.
133 Kleiner 1979.

Fig. 33 Miletus, selected late Roman coins cat. 2–55 (scale 1 : 1)

Fig. 34 Miletus, selected late Roman coins cat. 57–130 and Byzantine coins cat. 131–140 (scale 1 : 1)

Fig. 35 Miletus, Byzantine coins cat. 141–148 (scale 1 : 1)

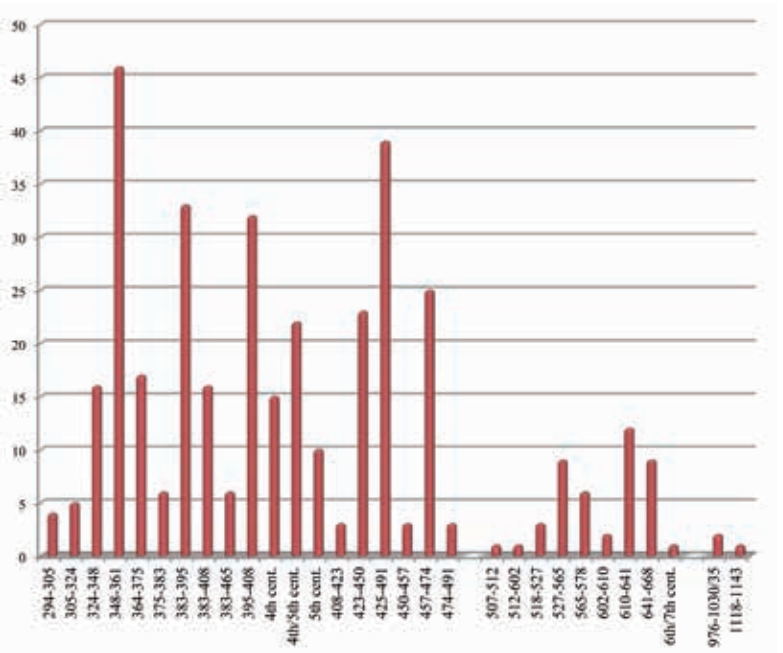


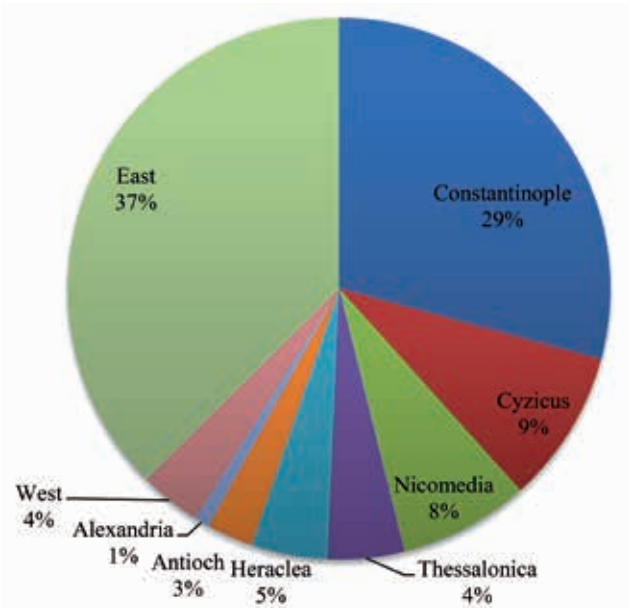
Fig. 36 Miletus, late Roman and Byzantine coins by year or century

The overall find spectrum is dominated by small Bronze coins (Fig. 38). Chronologically, four periods may be distinguished through a marked difference in the amount of coin finds: The Constantinian period yielded relatively few coins (Fig. 36). The second half of the fourth century and the fifth century until the reigns of Marcian (450–457) and/or Leo I (457–474) stand out through comparatively abundant coin finds. Their numbers dropped markedly in the sixth and seventh centuries, with the reign of Constans II (641–668) as a cut-off point. A goodly number of coins from around the middle of the seventh century may be related to the building of the Byzantine city walls[134]. Afterwards, the coin record lapses for more than 300 years, including the Arab invasions and most of the middle Byzantine period.

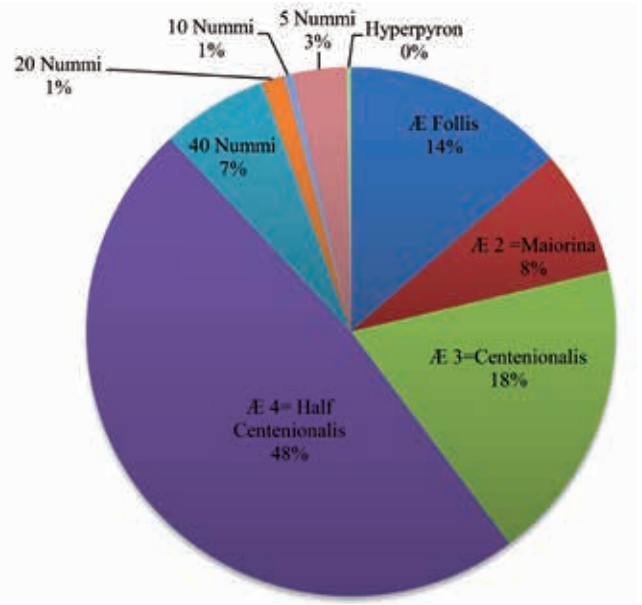
134 Niewöhner 2013, 181–189.

	Cemetery Church (KB)	Baths of Faustina (FT)	St Michael (M)	Temple of Athena (AT)	Southern Baths (B09)	East of Humei-tepe	Kalabak-tepe (K)	Wiegand's Depot (WD) and (W)	Mosque with Forty Steps (IB)	Nymphaeum (N)	Heroon III (H III)	Cave sanctuary under the theatre (NG)	Bouleuterion (B) and West of Bouleuterion (WB)	Bishop's Palace (BP)	Hellenistic City Walls (HS)	South Market (SM)	Theatre (T) and Castle Hill (OK06)	Zeytin-tepe (Z)	Heroon I (H I)	Stray finds (Str + S)	Total
294–305	1		1	1										1							4
305–324	1			1	1						1									1	5
324–348	4	5	2				2			1					1		1				16
348–361	15	2	8	6	1		2	3	1	2	2		1		1				1	1	46
364–375	8	5						3		1											17
375–383	1		2				2		1												6
383–395	4	2	9	5	1		4	1	2	2						1		1		1	33
383–408	7	9																			16
383–465	6																				6
395–408	4	9	5	1	3		4	2		1	1		1							1	32
4th cent.						11						2		2							15
4th/5th cent.	5	7			4	6															22
5th cent.	7				2							1									10
408–423	1			2																	3
423–450	7	8	2	1	1				3									1			23
425–491	21	16			2																39
450–457	1	1		1																	3
457–474	15	6	1		1			1									1				25
474–491	2			1																	3
507-512		1																			1
512-602	1																				1
518–527	2												1								3
527–565	1	4		2					1											1	9
565–578	3	1	1					1													6
602-610	1	1																			2
610–641	4	2	3		1							1								1	12
641–668	5		1	1			2														9
6th/7th cent.						1															1
970–1092											1									1	3
1118–1143			1																		1
Total	127	79	36	22	17	18	16	11	8	7	5	4	3	3	2	1	2	2	1	7	371

Tab. 1 Miletus, late Roman and Byzantine coins by find spot and date (where known)



37



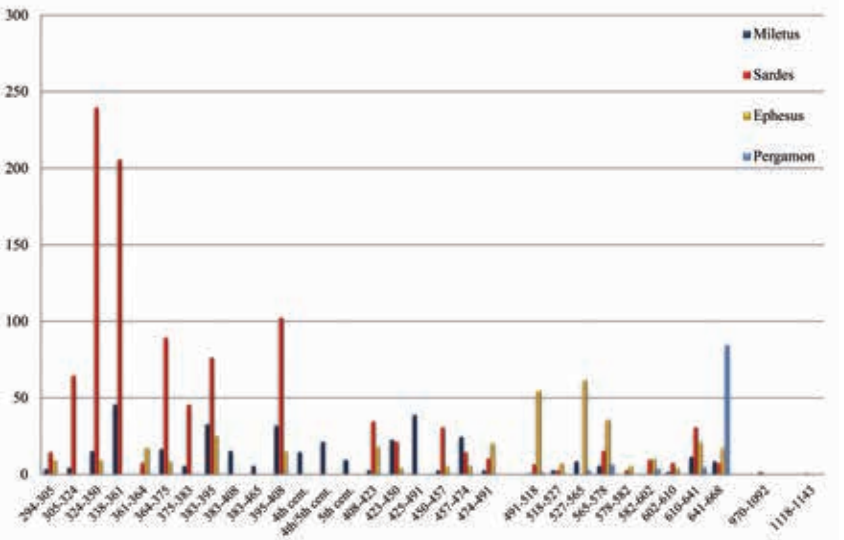
38

Miletus

Fig. 37 Late Roman and Byzantine coins by mint (where known)

Fig. 38 Late Roman and Byzantine coins by value

Fig. 39 Sardes (Bates 1971; Buttrey 1981), Ephesus (Schindel 2009), and Pergamon (Voegtli 1993), late Roman and Byzantine coins by year



39

The find spectrum from Miletus may be compared with those from Sardes, Ephesus, and Pergamon, because these cities are also located in western Asia Minor, have been excavated, and some coin records published (Fig. 39)[135]. The situation at Sardes compares most closely to Miletus. Ephesus stands out for numerous sixth-century finds, which may be attributed to its role as provincial capital and such attractions as the famous pilgrimage church of St John that was rebuilt on a grand scale by emperor Justinian I (527–565)[136]. Pergamon has yielded relatively few late Roman and early Byzantine coins, because the ancient city is occupied by the modern town of Bergama and mostly inaccessible to archaeological excavation; however, a great number of coins from the seventh century, when the excavated acropolis appears to have been re-fortified in the face of the Arab invasions[137], seems to confirm the same relation at Miletus as well as the cut-off point during the reign of Constans II

135 Bates 1971; Buttrey 1981; Voegtli 1993; Schindel 2009.
136 Ladstätter – Pülz 2007; Ladstätter 2010c; Pülz 2010.
137 Klinkott 2001; Klinkott 2010.

(641–668). The following hiatus during the Invasion Period and during most of the middle Byzantine period appears to have been a general phenomenon.

Catalogue

The following abbreviations are employed: Ex.: exercue; H.: hours; L.: left; Obv.: obvers; Par.: parallel; R.: right; Rv.: revers; Stg.: standing.

LATE ROMAN (Figs. 33. 34)

DIOCLETIANUS (A.D. 284–305)
Thessalonica
A.D. 298–299
Obv. IMP CC VAL DIOCLE-TIANVS PF AVG. Laureate head r.
Rv. GENIO POPVLI ROMANI. Genius stg. l., holding cornucopias and patera; TSA, in ex.
Par. RIC VI, 512 no. 19a.
1 Æ Follis, 27 mm.
Inv. AT02.72.2, Mus. Inv. 10429. Temple of Athena 2002.

MAXIMIANUS (A.D. 286–305)
Cyzicus
A.D. 295–299
Obv. IMP C MA MAXIMIANVS PF AVG. Radiant, draped, and cuirassed bust r.
Rv. [CONCORDIA MILITVM]. Prince stg. r. in military dress, receiving small Victory on globe from Jupiter stg. l., l. leaning on sceptre; between them, KA.
Par. RIC VI, 581 no. 15b. 16b.
2* Æ Follis, 2.69 g, 21 mm, 6 h.
Inv. M57.2.1. St Michael 1957.
A.D. 295–299
Obv. IMP C MA MAXIMIANVS PF AVG. Radiant and cuirassed bust r.
Rv. CONCORDIA MIL-ITVM. Prince stg. r. in military dress, receiving small Victory on globe from Jupiter stg. l., l. leaning on sceptre; between them, KΔ.
Par. RIC VI, 581 no. 16b.
3* Æ Follis, 3.52 g, 21.1 mm, 12 h.
Inv. BP70.1.48. Bishop's Palace 1970.

LICINIUS I (A.D. 308–324)
Nicomedia
A.D. 321–324
Obv. IMP C VAL LICIN LICINIVS PF AVG. Radiant, draped, and cuirassed bust r.
Rv. IOVI CONSERVATORI. Jupiter stg. l., chlamys across l. shoulder, leaning on sceptre with eagle, Victory on globe in r. hand; eagle holding wreath to l.; to r., captive on ground; X/III to r.; SMNA, in ex.
Par. RIC VII, 607 no. 44.
4* Æ Follis, 3.62 g, 20 mm, 12 h.
Inv. HIII.84.1. Heroon III 1984.

LICINIUS II (A.D. 317–324)
Cyzicus
A.D. 321–324
Obv. DN VAL LICIN LICINIVS NOB C. Helmeted cuirassed bust l. with spear and shield.
Rv. IOVI CONSERVATORI. Jupiter stg. l., chlamys across l. shoulder, leaning on sceptre with eagle, Victory on globe in r. hand; eagle holding wreath to l.; to r., captive on ground; X/III to r.; SMKB, in ex.
Par. RIC VII, 646 no. 18.
5 Æ Follis, 17 mm.
Inv. Str.02.1, Mus. Inv. 10435. Stray find 2002.

CONSTANTINUS I (A.D. 307–337)
Thessalonica
A.D. 312–313
Obv. IMP C CONSTANTINVS PF AVG. Laureate, draped, and cuirassed bust r.
Rv. IOVI CONSERVATORI AVGG NN. Jupiter stg. facing, head l., chlamys hanging from left shoulder, r. holding Victory on globe, l. leaning on sceptre; eagle with wreath in beak at feet to l.; dot TS dot E dot, in ex.
Par. RIC VI, 519 no. 61b.
6* Æ Follis, 3.39 g, 24.3 mm, 6 h.
Inv. AT00.11.2. Temple of Athena 2000.

DIVUS CONSTANTINUS I
Nicomedia
A.D. 347–348
Obv. DV CONSTANTI- [NVS PT AVGG]. Veiled bust r.
Rv. VN – MR. Emperor, stg. r., veiled, raising r. hand; SMNA, in ex. (LRBC I, VN-MR).
Par. RIC VIII, 474 no. 48.
7* Æ4, 1.38 g, 14.4 mm, 6 h.
Inv. W03.1.23.
Uncertain mint.
A.D. 347–348
Obv. [DV CONSTANTI-NVS PT AVGG]. Veiled bust r.
Rv. VN – MR. Emperor stg. r., veiled, raising r. hand (LRBC I, VN-MR).
Par. RIC VIII, 474 no. 48.
8* Æ4, 1.11 g, 13.2 mm, 6 h.
Inv. M59.2.8. St Michael 1959.

CONSTANTIUS II (Caesar A.D. 324–337 Augustus A.D. 337–361)
Constantinopolis
A.D. 330–335
Obv. FL IVL CONSTANTIVS NOB C. Draped and cuirassed bust with pearl diadem, r.
Rv. GLOR-IAEXERC-ITVS. Two soldiers helmeted, stg. facing one another, reversed spears in outer hands, inner hands on shields resting on ground; between them two standards; CONS, in ex. (LRBC I, GLORIA EXERCITVS, Type 2).
Par. RIC VII, 579. 581 no. 61. 75.
9* Æ Follis, 1.67 g, 18.1 mm, 12 h.
Inv. M57.2.2. St Michael 1957.
10* Æ Follis, 1.69 g, 16.8 mm, 12 h.
Inv. N91.21.1. Nymphaeum 1991.
A.D. 348–355
Obv. DN CONSTANTI-VS PF AVG. Draped and cuirassed bust with pearl diadem, l.
Rv. FEL TEMP REPARATIO. Virtus to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck; to r. field, dot S dot, to l. field ★; CONS, in ex. (LRBC II, FH 4).
Par. LRBC II, 86 no. 2037; RIC VIII, 453 f. 457 no. 84 f. 87. 89–91. 93 f. 115.
11* Æ2, 3.23 g, 19.1 mm, 12 h.
Inv. HI84.24.10. Heroon I 1984.
Cyzicus
A.D. 330–334
Obv. FL IVL CONSTANTIVS NOB C. Draped and cuirassed bust with pearl diadem, r.
Rv. GLOR-IAEXERC-ITVS. Two soldiers helmeted, stg. facing one another, reversed spears in outer hands, inner hands on shields resting on ground; between them two standards; SMK[ ], in ex. (LRBC I, GLORIA EXERCITVS, Type 2).
Par. RIC VII, 654 no. 69.

12★ Æ Follis, 2 g, 18.3 mm, 12 h.
Inv. HS71.1.6. Hellenistic City Walls 1971.

Antioch

A.D. 330–335
Obv. FL IVL CONSTANTI-[ ]. Draped and cuirassed bust with pearl diadem, r.
Rv. GLOR-IAEXERC-ITVS. Two soldiers helmeted, stg. facing one another, reversed spears in outer hands, inner hands on shields resting on ground; between them two standards; ANT[ ], in ex. (LRBC I, GLORIA EXERCITVS, Type 2).
Par. RIC VII, 693 no. 88.

13★ Æ Follis, 1.47 g, 16.2 mm, 12 h.
Inv. M69.4.8. St Michael 1969.

A.D. 348–350
Obv. DN CONSTANTI-VS PF AVG. Draped and cuirassed bust with pearl diadem, l.
Rv. FEL TEMP REPARATIO. Emperor in military dress stg. to l., holding standard with various ornaments on banner in r. hand and resting l. hand on shield; in front of emperor two captives kneeling; [ ]AN[ ], in ex. (LRBC II, FEL TEMP REPERATIO, Emperor and two captives).
Par. LRBC II, 99 no. 2614; RIC VIII, 522 no. 125. 127.

14★ Æ2, 4.77 g, 20 mm, 6 h.
Inv. M 59.2.3. St Michael 1959.

Uncertain mint

A.D. 348–361
Obv. draped bust with pearl diadem, r.
Rv. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck (LRBC II, FH 4).

15 Æ2, 1.81 g, 16.9 mm, 12 h.
Inv. AT00.6.4. Temple of Athena 2000.

16★ Æ2, 2.71 g, 17.4 mm, 6 h.
Inv. HS71.1.3. Hellenistic City Walls 1971.

17★ Æ2, 1.06 g, 16.8 mm, 12 h.
Inv. M59.2.10. St Michael 1959.

18★ Æ2, 2.14 g, 16.2 mm, 6 h.
Inv. Str.U.IX.3. Stray find.

A.D. 348–361
Obv. CONSTANTI-[VS PF AVG]. Draped bust with pearl diadem, r.
Rv. Illegible.

19 Æ4, 1.92 g, 15.3 mm, 6 h.
Inv. AT00.6.3. Temple of Athena 2000.

20 Æ4, 1.22 g, 11.8 mm, 6 h.
Inv. AT02.66.5. Temple of Athena 2002.

CONSTANS (Caesar A.D. 333–337 Augustus A.D. 337–350)

Heraclea

A.D. 333–336
Obv. FL I CONSTANS[ ]. Draped and cuirassed bust with pearl diadem, r.
Rv. GLOR-IA EXERC-ITVS. Two soldiers helmeted, stg. facing one another, reversed spears in outer hands, inner hands on shields resting on ground; between them two standards; SMH[ ] in ex. (LRBC I, GLOR-IA EXERC-ITVS 2).
Par. LRBC I, 23 no. 944; RIC VII, 560 no. 141.

21★ Æ Follis, 1.08 g, 16 mm, 11 h.
Inv. K90.1.56. Kalabaktepe 1990.

Uncertain mint

A.D. 330–336
Obv. FL CONSTANS[ ]. Draped and cuirassed bust with pearl diadem, r.
Rv. GLOR IAEXERC ITVS. Two soldiers helmeted, stg. facing one another, reversed spears in outer hands, inner hands on shields resting on ground; between them one standard (LRBC I, GLOR-IA EXERC-ITVS 3).

22★ Æ Follis, 1.45 g, 14.3 mm, 12 h.
Inv. T.o.J.12. Theatre, no year.

23 Æ Follis, 1.41 g, 16.4 mm, 12 h.
Inv. K90.1.42. Kalabaktepe 1990.

CONSTANTINIAN DYNASTY (uncertain emperor)

Heraclea

A.D. 351–361
Obv. draped bust with pearl diadem, r.
Rv. [FEL TEMP] REPARATIO. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck; SMHA, in ex. (LRBC II, FH 4).
Par. RIC VIII, 435 no. 79 f.

24★ Æ4, 2.48 g, 17.2 mm, 11 h.
Inv. M68.1.4. St Michael 1968.

Nicomedia

A.D. 348–351
Obv. draped bust with pearl diadem, r.
Rv. FEL TEMP] REPARATIO. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck; SMN[ ], in ex. (LRBC II, FH 4).
Par. RIC VIII, 475.

25★ Æ2, 2.91 g, 18.3 mm, 6 h.
Inv. M61.1.21. St Michael 1961.

A.D. 348–351
Obv. DN CONS[ ]. Draped bust with pearl diadem, r.
Rv. FEL TEMP] REPARATIO. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck; SMNB in ex. (LRBC II, FH 4).
Par. RIC VIII, 475.

26★ Æ2, 1.46 g, 19.3 mm, 12 h.
Inv. W02.25 (2).

Cyzicus

A.D. 348–350
Obv. draped and cuirassed bust with pearl diadem, r.
Rv. FEL TEMP RE[PA-RATIO]. Virtue, head turned back l., holding spear in l. hand, leading barbarian to r., points down to l. between virtue and barbarian; [SM]KA in ex. (LRBC II, FEL TEMP REPARATIO, Hut).
Par. LRBC II, 96 no. 2474 f. ; RIC VIII, 495 f., FH(b) no. 73 f. 79. 82. 86.

27★ Æ2, 2.43g, 20.8 mm, 6 h.
Inv. HIII84.2. Heroon III 1984.

Uncertain mint

A.D. 348–361
Obv. draped bust with pearl diadem, r.
Rv. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling from horse and raising arm behind him (LRBC II, FH 3).

28 Æ3, 1.61 g, 15 mm, 12 h.
Inv. AT02.37.1. Temple of Athena 2002.

A.D. 348–361
Obv. draped and cuirassed bust with pearl diadem, r.
Rv. [FEL TEMP REPARATIO]. Virtue to l., with shield on l. arm, spearing fallen horseman; horseman falling and clutching horse's neck (LRBC II, FH 4).

29 Æ2, 1.29 g, 14.4 mm, 6 h.
Inv. AT02.20.2. Temple of Athena 2002.

30 Æ2, 1.62 g, 14.6 mm, 6 h.
Inv. B01.4. Bouleuterion 2001.

31★ Æ2, 1.30 g, 14.2 mm, 6 h.
Inv. HIII.S.VI.26. Heroon III.

32★ Æ2, 1.07 g, 14.5 mm, 12 h.
Inv. K89.48.7. Kalabaktepe 1989.

33 Æ2, 0.74 g, 14.1 mm, 6 h.
Inv. K90.231.1. Kalabaktepe 1990.

34 Æ2, 1.94 g, 13.7 mm, 12 h.
Inv. M59.2.9. St Michael 1959.

35★ Æ2, 1.59 g, 15.2 mm, 6 h.
Inv. M68.1.6. St Michael 1968.

36★ Æ2, 2.88 g, 17.2 mm, 6 h.
Inv. N66.130.11. Nymphaeum 1966.

37 Æ2, 2.58 g, 16.9 mm, 6 h.
Inv. N91.18.1. Nymphaeum 1991.
38 Æ2, 2.60 g, 16.3 mm, 6 h.
Inv. W03.1.25.
A.D. 355–361
Obv. CONS[ ]. Draped bust with pearl diadem, r.
Rv. [ ] PVBLICE. Emperor helmeted in military dress stg. l., holding globe and spear (LRBC II, SPES REIPVBLICE).
39★ Æ2, 1.67 g, 16.2 mm, 6 h.
Inv. IB80.1.9. Mosque with Forty Steps 1980.
40★ Æ2, 2.04 g, 14.3 mm, 12 h.
Inv. M59.2.11. St Michael 1959.
A.D. 355–361
Obv. CONSTAN-[ ]. Draped bust with pearl diadem, r.
Rv. Unreadable.
41 Æ?, 2.40 g, 15.5 mm, 6 h.
Inv. AT02.66.3. Temple of Athena 2002.

VALENS (A.D. 364–378)
Thessalonica
A.D. 364–367
Obv. DN VALEN-S PF AVG. Draped bust with pearl diadem, r.
Rv. SECVRITAS REI-PV-BLICAE. Victory to l., holding wreath and palm; TESA, in ex. (LRBC II, SECVRITAS REI-PV-BLICAE).
Par. LRBC II, 79 no. 1726; RIC IX, 176 no. 18b.
42★ Æ3, 2.36 g, 17.8 mm, 12 h.
Inv. WD97.1.75. Wiegand's Depot 1997.

GRATIANUS (A.D. 367–383)
Alexandria
A.D. 367–375
Obv. DN GRATIA [NVS PF AVG]. Draped bust with pearl diadem, r.
Rv. SECVRITAS REI-PV-BLICAE. Victory to l., holding wreath and palm; ALEΓ, in ex. (LRBC II, SECVRITAS REI-PVBLICAE).
Par. LRBC II, 104 no. 2864; RIC IX, 299 no. 5c.
43★ Æ3, 2.05 g, 16.3 mm, 12 h.
Inv. N66.130.14. Nymphaeum 1966.

VALENTINIANUS II (A.D. 375–392)
Uncertain mint
A.D. 383–392
Obv. DN VALENTI[NIANVS PF AVG]. Draped bust with pearl diadem, r.
Rv. Victory to l., trophy on shoulder, dragging captive (LRBC II, SALVS REI-PVBLICAE 2).
44 Æ4, 1.72 g, 15 mm, 12 h.
Inv. AT02.66.2. Temple of Athena 2002.
45 Æ4, 0.89 g, 12.5 mm, 6 h.
Inv. IB80.1.82. Mosque with Forty Steps 1980.
46★ Æ4, 1.31 g, 12.7 mm, 6 h.
Inv. SM98.5.3. South Market 1998.

THEODOSIUS I (A.D. 379–392)
Heraclea
A.D. 378–383
Obv. DN THEODO-SIVS PF AVG. Draped bust with pearl diadem, r.
Rv. VOT / X / MVLT / XX; within wreath; SMHΓ, In ex.
Par. LRBC II, 98 no. 2558; RIC IX, 196 no. 19c.
47★ Æ4, 1.33 g, 14.9 mm, 6 h.
Inv. M63.1.4. St Michael 1963.
Constantinopolis
A.D. 378–383
Obv. DN THEODO-SIVS PF AVG. Draped bust with pearl diadem, r.
Rv. VOT / X / MVLT / XX; in four lines within wreath; CON, in ex.
Par. LRBC II, 98 no. 2557; RIC IX, 229 no. 63b.
48★ Æ4, 0.81 g, 13.3 mm, 6 h.
Inv. IB80.1.105. Mosque with Forty Steps 1980.
Cyzicus
A.D. 378–383
Obv. DN THEODO-SIVS PF AVG. Draped bust with pearl diadem, r.
Rv. VOT / X / MVLT / XX; in four lines within wreath; SMKA, in ex.
Par. LRBC II, 98 no. 2557; RIC IX, 244 no. 21c.
49★ Æ4, 1.19 g, 14.8 mm, 6 h.
Inv. M68.1.5. St Michael 1968.
50★ Æ4, 0.77 g, 14.9 mm, 6 h.
Inv. K91.194.19. Kalabaktepe 1991.
A.D. 378–383
Obv. DN THEODO-SIVS PF AVG. Draped head with pearl diadem, r.
Rv. VOT / XX / MVLT / XXX; in four lines within wreath; SMKΓ, in ex.
Par. LRBC II, 98 no. 2554; RIC IX, 244 no. 22c.
51★ Æ4, 1.60 g, 15.8 mm, 6 h.
Inv. K90.1.41. Kalabaktepe 1990.
Antioch
A.D. 383–388
Obv. DN THEODO-SI[VS PF AVG]. Draped bust with pearl diadem, r.
Rv. VOT / XX / MVLT / XXX; in four lines within wreath; SMAN[ ], in ex.
Par. LRBC II, 101 no. 2739; RIC IX, 292 no. 66.
52★ Æ4, 1.11 g, 16.5 mm, 12 h.
Inv. M59.2.7. ST Michael 1959.

AELIA FLACCILLA (wife of Theodosius I)
Uncertain mint
A.D. 383–392
Obv. draped bust r., in elaborate headdress, necklace, and mantle.
Rv. SALVS REI-PVBLICAE. Victory advancing to l., with r. hand carrying trophy over shoulder and with l. dragging captive (LRBC II, SALVS REI-PV-BLICAE 2).
53★ Æ4, 1.50 g, 11.6 mm, 6 h.
Inv. AT99.7.1. Temple of Athena 1999.

ARCADIUS (A.D. 383–408)
Constantinopolis
A.D. 395–401
Obv. DN ARCADI-VS PF AVG. Draped bust with pearl diadem, r.
Rv. VIRTVS EXERCITI. Emperor stg. l., head r., holding spear and resting l. hand on shield; Victory crowns him holding palm in l. hand; CONSA, in ex. (LRBC II, VIRTVS EXERCITI 2).
Par. LRBC II, 90 no. 2205; RIC X, 246 no. 60.
54★ Æ3, 1.89 g, 17 mm, 5 h.
Inv. M57.2.8. St Michael 1957.
Cyzicus
A.D. 395–401
Obv. DN ARCADI-[VS PF AVG]. Draped bust with pearl diadem, r.
Rv. VIRTVS EXERCITI. Emperor stg. l., head r., holding spear and resting l. hand on shield; Victory crowns him holding palm in l. hand; SMKA, in ex. (LRBC II, VIRTVS EXERCITI 2).
Par. LRBC II, 98 no. 2581; RIC X, 247 no. 66 f.
55★ Æ3, 2.68 g, 19 mm, 11 h.
Inv. W00.1.3.
Uncertain mint
A.D. 383
Obv. DN ARCADI-VS PF AVG. Draped bust with pearl diadem, r.
Rv. VOT / V; within wreath.
LRBC II, 110.
56 Æ4, 1.33 g, 14 mm, 1 h.
Inv. M61.1.22. St Michael 1961.
A.D. 388–392
Obv. DN ARC[ADI-VS PF AVG]. Draped bust with pearl diadem, r.
Rv. SALVS REI-PVBLICAE. Victory advancing to l., with

r. hand carrying trophy over shoulder and with l. dragging captive (LRBC II, SALVS REI-PVBLICAE 2).

57* Æ4, 1.17 g, 14.5 mm, 6 h. Inv. S96.78.3. Stray find 1996.

58 Æ4, 1.01 g, 11.8 mm, 11 h. Inv. M69.2.1. St Michael 1969.

59* Æ4, 0.70 g, 13.2 mm, 6 h. Inv. Z92.63.2. Zeytintepe 1992.

60* Æ4, 0.81 g, 13.2 mm, 6 h. Inv. W03.1.29.

61 Æ4, 1.02 g, 13.9 mm, 12 h. Inv. K88.112.1. Kalabaktepe 1988.

A.D. ?404–406

Obv. DN ARCADI-[VS PF AVG]. Draped bust with pearl diadem, r.
Rv. cross (LRBC II, CONCORDIA AVG 3).

62 Æ4, 0.56 g, 09.7 mm, 12 h. Inv. K92.334.1. Kalabaktepe 1992.

A.D. ?406–408

Obv. DN ARCADI-[VS PF AVG]. Draped bust with pearl diadem, r.
Rv. Illegible.
Par. RIC X, 249–251 no. 106–138.

63 Æ?, 1.46 g, 13.5 mm. Inv. M59.2.6. St Michael 1959.

64 Æ?, 1.16 g, 11.5 mm. Inv. M67.1.4. St Michael 1967.

65 Æ?, 1.85 g, 15.5 mm. Inv. M69.4.14. St Michael 1969.

AELIA EUDOXIA (wife of Arcadius, A.D. 400–404)

Uncertain mint

A.D. 400

Obv. draped bust with pearl diadem, r.
Rv. empress enthroned, facing, hands folded over breast, crowned by the Hand of God; cross in field r. or l. but uncertain (LRBC II, GLORIA ROMANORVM 24) .
Par. RIC X, 247–251 no. 77–81. 83 f.

66 Æ3, 1.16 g, 13 mm, 12 h. Inv. W03.1.21.

HONORIUS (A.D. 393–423)

Constantinopolis

A.D. 395–401

Obv. DN HONORIVS PF AGV. Draped bust with pearl diadem, r.
Rv. VIRTVS EXERCITI. Emperor stg. l., head r.; holding spear and resting l. hand on shield; Victory holding palm in l. hand, crowns him; CON[ ] in ex.
Par. RIC X, 246 no. 61.

67* Æ3, 1.94 g, 16.9 mm, 12 h. Inv. FT94.5 (2). Baths of Faustina 1994.

Cyzicus

A.D. 401–403

Obv. DN HONORIVS PF AVG. Helmeted, draped bust with pearl diadem, cuirassed, facing, with spear and shield
Rv. Constantinopolis enthroned facing, head helmeted r., holding long sceptre and Victory on globe; beneath r. foot a prow; SMKA in ex. (LRBC II, CONCORDI-A AVGG).
Par. LRBC II, 98 no. 2587; RIC X, 248–251 no. 95. 106–138.

68* Æ3, 2.04 g, 22.3 mm, 6 h. Inv. HIII84 (3). Heroon III 1984.

Uncertain mint

A.D. 395–401

Obv. DN HONORI-VS PF AVG. Draped bust with pearl diadem, r.
Rv. VIRTVS EXERCITI. Emperor stg. l., head r., holding spear and resting l. hand on shield; Victory crowns him holding palm in l. hand; SM[ ], in ex. (LRBC II, VIRTVS EXERCITI 2).
Par. RIC X, 246 f. no. 57. 61. 63. 65. 68 f. 72 f. 76.

69* Æ3, 2.38 g, 17.8 mm, 11 h. Inv. WB81.Nord49. West of Bouleuterion 1981.

70* Æ3, 1.54 g, 16.8 mm, 1 h. Inv. N66.130.25. Nymphaeum 1966.

THEODOSIUS II (408–450)

Heraclea

A.D. 425–450

Obv. bust with pearl diadem, r.
Rv. no legend. Cross in wreath; SMH[] in ex.
Par. LRBC II, 85 no. 2004; RIC X, 275 no. 441 f.

71* Æ4, 0.90 g, 11.7 mm, 6 h. Inv. M69.4.23. St Michael 1969.

72* Æ4, 1.18 g, 11.5 mm, 6 h. Inv. M59.2.12. St Michael 1959.

73* Æ4, 1.03 g, 13.2 mm, 12 h. Inv. IB80.1.1. Mosque with Forty Steps 1980.

Uncertain mint

A.D. 425–450

Obv. DN THEODO[ ]. Draped bust with pearl diadem, r.
Rv. VOT / X / MVLT / XX; in four lines within wreath.
Par. RIC X, 272 no. 419.

74* Æ4, 0.80 g, 11.7 mm, 6 h. Inv. Z94.100.14. Zeytintepe 1994.

VALENTINIANUS III (425–455)

Rome

A.D. 425–435

Obv. draped bust with pearl diadem, r.
Rv. Victory advancing to l., holding wreath and palm (LRBC II, VICTORIA AVGG 1).
Par. LRBC II, 63 no. 865; RIC X, 377 no. 2121 f.

75* Æ4, 0.81 g, 10.6 mm, 12 h. Inv. AT00.0.3. Temple of Athena 2000.

76 Æ4, 1.55 g, 13.8 mm, 11 h. Inv. IB80.1.11. Mosque with Forty Steps 1980.

77 Æ4, 0.98 g, 12.2 mm, 12 h. Inv. IB80.1.131. Mosque with Forty Steps 1980.

VALENTINIANUS II – THEODOSIUS I – ARCADIUS (uncertain emperor)

Thessalonica

A.D. 383–388

Obv. draped bust with pearl diadem, r.
Rv. VICTORIA AVG. Two Victories facing each other, holding wreath (LRBC II VICTORIA AVG 4).
Par. RIC X, 187 no. 63a-c.

78* Æ4, 1.16 g, 13.7 mm, 6 h. Inv. M63.1.7. St Michael 1963.

ARCADIUS – HONORIUS (uncertain emperor)

Heraclea

A.D. 395–401

Obv. [ ]-VS PF AVG. Draped bust with pearl diadem, r.
Rv. emperor stg. l., head r., holding spear and resting l. hand on shield; Victory crowns him holding palm in l. hand; SMHΓ, in ex. (LRBC II, VIRTVS EXERCITI 2).
Par. RIC X, 246 no. 56–59.

79* Æ2, 2.12 g, 18.2 mm, 6 h. Inv. K82.VIII.50. Kalabaktepe 1982.

THEODOSIUS – ARCADIUS – HONORIUS (uncertain emperor)

Nicomedia

A.D. 392–395

Obv. draped bust with pearl diadem, r.
Rv. GLORIA ROMANORVM. Emperor stg. facing, head r., holding standard and globe; SMNE, in ex. (LRBC II, GLORIA ROMANORVM 18.
Par. RIC IX, 263 no. 46a-c.

80* Æ2, 3.86 g, 20.1 mm, 12 h. Inv. M61.1.24. St Michael 1961.

VALENTINIANUS I – VALENS – GRATIANUS (uncertain emperor)
Uncertain mint
A.D. 364–375
Obv. draped bust with pearl diadem, r.
Rv. emperor advancing r., with r. hand dragging captive and holding labarum in l. (LRBC II, GLORIA ROMANORUM 8).
81 Æ3, 1.07 g, 13.4 mm, 12 h.
Inv. WD97.1.65. Wiegand's Depot 1997.
82 Æ3, 1.05 g, 13.4 mm, 12 h.
Inv. WD97.1.67. Wiegand's Depot 1997.

VALENTINIANUS II – THEODOSIUS I (uncertain emperor)
Uncertain mint
A.D. 366–375
Obv. draped and cuirassed bust with pearl diadem, r.
Rv. VOT / X / MVLT / XX; in four lines within wreath.
83★ Æ4, 1.21 g, 13.1 mm, 6 h.
Inv. K90.1.51. Kalabaktepe 1990.

GRATIANUS – THEODOSIUS I (uncertain emperor)
Uncertain mint
A.D. 383
Obv. draped bust with pearl diadem, r.
Rv. VOT / XX / MVLT / XXX; in four lines within wreath.
84 Æ4, 1.03 g, 15.1 mm, 11 h.
Inv. IB80.1.114. Mosque with Forty Steps 1980.
85★ Æ4, 1.28 g, 14 mm, 6 h.
Inv. K90.1.46. Kalabaktepe 1990.
86★ Æ4, 1.24 g, 14.9 mm, 6 h.
Inv. M59.2.4. St Michael 1959.
87 Æ4, 1.46 g, 13.7 mm, 12 h.
Inv. N66.130.24. Nymphaeum 1966.
88 Æ4, 1.49 g, 14 mm, 6 h.
Inv. N66.130.29. Nymphaeum 1966.

VALENTINIANUS II – THEODOSIUS I – ARCADIUS (uncertain emperor)
Uncertain mint
A.D. 388–392
Obv. draped bust with pearl diadem, r.
Rv. SALVS REI-PVBLICAE. Victory advancing to l., with r. hand carrying trophy over shoulder and dragging captive with l. (LRBC II, SALVS REI-PVBLICAE 2).
89 Æ4, 1.16 g, 12 mm, 11 h.
Inv. AT02.14.2. Temple of Athena 2002.
90 Æ4, 1.99 g, 13.5 mm, 12 h.
Inv. AT02.66.4. Temple of Athena 2002.
91 Æ4, 0.96 g, 14.6 mm, 5 h.
Inv. AT02.72.5. Temple of Athena 2002.
92★ Æ4, 0.56 g, 11.7 mm, 12 h.
Inv. K91.309.2. Kalabaktepe 1991.
93★ Æ4, 1.33 g, 13.7 mm, 12 h.
Inv. M57.2.5 St Michael 1957.
94★ Æ4, 0.87 g, 14.1 mm, 6 h.
Inv. M63.1.3 St Michael 1963.
95 Æ4, 1.42 g, 13.3 mm, 12 h.
Inv. M63.1.6 St Michael 1963.

ARCADIUS – HONORIUS (uncertain emperor)
Uncertain mint
A.D. 395–401
Obv. DN HONORI-VS PF AVG. Draped bust with pearl diadem, r.
Rv. VIRTVS [ ]. Emperor stg. l., head r., holding spear and resting l. hand on shield; Victory crowns him and holds palm in l. hand (LRBC II, VIRTVS EXERCITI 2).
96 Æ3, 1.55 g, 17.9 mm, 6 h.
Inv. AT02.36.1. Temple of Athena 2002.
97 Æ3, 0.61 g, 14 mm, 6 h.
Inv. K91.118.1. Kalabaktepe 1991.
98 Æ3, 2.03 g, 17 mm, 6 h.
Stray find.

ARCADIUS – HONORIUS – THEODOSIUS II (uncertain emperor)
Uncertain mint
A.D. 406–408
Obv. draped bust with pearl diadem, r.
Rv. GLORIA ROMANORVM. Three emperors stg. facing; the two outermost are generally taller, hold spear, rest hand on shield, and turn towards each other; the centre figure is generally smaller, holds spear and sometimes a globe; his head is turned r. (LRBC II, GLORIA ROMANORVM 21).
99★ Æ3, 1.44 g, 16 mm, 12 h.
Inv. M59.2.5. St Michael 1959.

HONORIUS – THEODOSIUS II (uncertain emperor)
Uncertain mint
A.D. 408–423
Obv. head with pearl diadem.
Rv. two emperors stg. facing, heads turned r. and l., holding spear and supporting between themselves a globe (LRBC II, GLORIA ROMANORVM 23).
Par. RIC X, 272 no. 407–418.
100★ Æ3, 0.67 g, 10 mm, 12 h.
Inv. AT99.59.2. Etütlük 4. Temple of Athena 1999.
A.D. 408–423
Obv. draped bust with pearl diadem, r.
Rv. two emperors stg. facing, heads turned r. and l., each holding a spear and resting other hand on shield (LRBC II Type GLORIA ROMANORVM 22).
Par. RIC X, 271 no. 395–406.
101 Æ3, 1.06 g, 13.5 mm, 5 h.
Inv. AT00.11.3. Temple of Athena 2000.

MARCIANUS (A.D. 450–457)
Uncertain mint
Obv. bust with pearl diadem, r.
Rv. monogram of Marcian within wreath.
Par. LRBC II, 110 monogram 5; RIC X, 282 no. 535. 537 f. 550.
102★ Æ4, 1.02 g, 12 mm, 7 h.
Inv. AT02.46.2. Temple of Athena 2002.

LEO I (A.D. 457–474) – LEO II (A.D. 474)
Constantinopolis
A.D. 474
Obv. DN LEO. Draped bust with pearl diadem, r.
Rv. b-E. Empress stg. facing, holding cross on globe and transverse sceptre.
Par. LRBC II, 2275; RIC X, 295 no. 713–718.
103★ Æ4, 0.91 g, 12 mm, 12 h.
Inv. M57.2.6. St Michael 1957.
104★ Æ4, 1.30 g, 11.4 mm, 12 h.
Inv. WD97.1.84. Wiegand's Depot 1984.

ZENO (second reign A.D. 476–491)
Constantinopolis
Obv. bust with pearl diadem, r.
Rv. monogram of Zeno within wreath.
Par. LRBC II, 110 monogram 3; RIC X, 314 no. 960.
105 Æ4, 0.49 g, 8 mm, 12 h.
Inv. AT02.62.4. Temple of Athena 2002.

UNCERTAIN EMPEROR, MINT, AND REVERSE TYPE
Obv. draped bust with pearl diadem, r.
Rv. VOT [ ]. Within wreath.
106 Æ, 1.52 g, 15.4 mm, 11 h.
Inv. M63.1.5. St Michael 1963.
Obv. draped bust with pearl diadem, r.
Rv. illegible.
107 Æ?, 0.98 g, 12.5 mm.

Inv. AT99.49.1. Etütlük 6. Temple of Athena 1999.

108 Æ?, 1.03 g, 12.6 mm.
Inv. AT00.3.3. Temple of Athena 2000.

109 Æ?, 0.94 g, 11.6 mm.
Inv. AT00.17.1. Temple of Athena 2000.

110 Æ?, 1.24 g, 11.2 mm.
Inv. AT02.17.2. Temple of Athena 2002.

111 Æ?, 1.32 g, 14.3 mm.
Inv. AT02.20.2. Temple of Athena 2002.

112 Æ?, 1.07 g, 12.1 mm.
Inv. AT02.36.2. Temple of Athena 2002.

113 Æ?, 0.63 g, 10.6 mm.
Inv. AT02.43.1. Temple of Athena 2002.

114 Æ?, 0.50 g, 09.5 mm.
Inv. AT02.44.14. Temple of Athena 2002.

115 Æ?, 0.38 g, 10.7 mm.
Inv. AT02.66.6. Temple of Athena 2002.

116 Æ?, 0.54 g, 13.2 mm.
Inv. HIII.T.IV.IV.V/17BI+VB. Heroon III.

117 Æ?, 2.42 g, 19.2 mm.
Inv. IB80.1.7. Mosque with Forty Steps 1980.

118 Æ?, 2.08 g, 18.7 mm.
Inv. IB80.1.127. Mosque with Forty Steps 1980.

119 Æ?, 1.36 g, 14.3 mm.
Inv. IB80.1.134 (1). Mosque with Forty Steps 1980.

120 Æ?, 1.76 g, 14.7 mm.
Inv. IB80.1.134 (2). Mosque with Forty Steps 1980.

121 Æ?, 1.26 g, 12.7 mm.
Inv. IB80.1.53. Mosque with Forty Steps 1980.

122 Æ?, 1.23 g, 15.4 mm.
Inv. K86.134.1. Kalabaktepe 1986.

123 Æ?, 1.34 g, 13.2 mm.
Inv. M57.2.9. St Michael 1957.

124 Æ?, 3.39 g, 19.4 mm.
Inv. M69.4.11. St Michael 1969.

125 Æ?, 1.70 g, 13.1 mm.
Inv. M90.1. St Michael 1990.

126 Æ?, 0.49 g, 11.6 mm.
Inv. M90.599. St Michael 1990.

127 Æ?, 0.76 g, 12 mm.
Inv. N66.130.10. Nymphaeum 1966.

128 Æ?, 1.59 g, 12.9 mm.
Inv. Z93.1.7. Zeytintepe 1993.

129 Æ?, 1.36 g, 14.3 mm.
Inv. WD97.1.69. Wiegand's Depot 1997.

130 Æ?, 0.98 g, 12.5 mm.
Inv. AT99.49.1. Etütlük 6. Temple of Athena 1999.

Byzantine (Figs. 34. 35)

IUSTINUS I (A.D. 518–527)
Constantinopolis
Half Follis/20 Nummi
A.D. 518–527
Obv. DNIVSTI-NVSPPAVC. Bust r. with diadem, cuirass, and paludamentum.
Rv. K; to l., long cross; above and below, stars; in field r., A.
Par. DOC I, 42, 15a.2.

131* Æ, 8.38 g, 24.9 mm, 6 h.
Inv. B99.1.1. Bouleuterion 1999.

IUSTINIANUS I (A.D. 527–565)
Nicomedia
Follis/40 Nummi
A.D. 539–540
Obv. DNIVSTINI-ANVSPPAVC. Bust facing, in helmet with plume, cuirass, and shield with horseman device. In r. hand cross-topped globe. In field r., cross.
Rv. M; to l., ANNO; above, cross; to r., date X / II / I; beneath off. letter, A; NIK[ ], in ex.
Par. DOC I, 113, 117a.4.

132* Æ, 22.44 g, 41.7 mm, 6 h.
Inv. S96.78.1. Stray find 1996.

Uncertain mint
Follis/40 Nummi
Obv. DNIVSTINI-ANVSPPAVC. Bust facing, in helmet with plume, cuirass, and shield with horseman device. In r. hand cross-topped globe. In field r., cross.
Rv. M; to l., star; above, cross; beneath off. letter, Γ; illegible, in ex.

133 Æ, 26 mm.
Inv. AT02.35.1, Mus. Inv. 10427. Temple of Athena 2002.

IUSTINUS I AND IUSTINIANUS I
Uncertain mint
Decanummium/10 Nummi
Obv. illegible.
Rv. I; illegible.

134 Æ, 3.91 g, 19.6 mm, 6 h.
Inv. AT02.8.2. Temple of Athena 2002.

Pentanummium/5Nummi
Obv. inscription illegible. Bust r.
Rv. ⁂; to l., E.

135* Æ, 2.55 g, 14.3 mm, 12 h.
Inv. IB80.1.10. Mosque with Forty Steps 1980.

IUSTINUS II (A.D. 565–578)
Nicomedia
Half Follis/20 Nummi
Obv. Illegible.
Rv. K; to l., A/N/N/O; beneath, NI; to r. date, illegible.

136* Æ, 6.08 g, 21.6 mm, 7 h.
Inv. W03.1.17. Wiegand's Depot 2003.

PHOCAS (A.D. 602–610)
Cyzicus
Half Follis/20 Nummi
Class 2
A.D. 603–604
Obv. bust facing, wearing consular robes and crown with cross; in r. hand, mappa, in l., cross.
Rv. XX; Above, cross; to r. date II; KYZA in ex.
Par. DOC II/1, 185, 79a.

137* Æ, 6.26 g, 24.7 mm, 7 h.
Inv. M94.1.1. St Michael 1994.

HERACLIUS (A.D. 610–641)
Constantinopolis
Follis/40 Nummi
Class 1
A.D. 612–613
Obv. Bust facing, bearded, wearing cuirass with shield and crown or helmet with pendilia; in r. hand cross-topped globe.
Rv. M; to l., A/N/N/O; above cross; to r. date II/I; beneath off. letter, A; CON In ex. ^
Par. DOC II/ 1, 276, 71a.1.

138* Æ, 9.59 g, 28.7 mm, 7 h.
Inv. M61.1.14. St Michael 1961.

Class 2
A.D. 614–615
Obv. to l., Heraclius, and to r., Heraclius Constantine, both stg. Each wears chlamys and crown with cross and holds a cross-topped globe in r. hand. Between heads, cross.
Rv. M, to l., A/N/N/O; to r., ϟ; beneath, A; CON in ex.
Par. DOC II/1, 283, 80a.1.

139* Æ, 10.47 g, 30.5 mm, 12 h.
Inv. M57.2.3. St Michael 1957.

Follis/40 Nummi
Class 5
A.D. 629–630
Obv. to l., Heraclius stg., with moustache and long beard, wearing military dress and crown with cross. He holds in r. hand long cross, l. hand on hip. To r. Heraclius Constantine stg., with short beard, wearing chlamys and crown with cross; in r. hand a cross-topped globe. Between heads, cross.
Rv. M; to l., A/N/N/O; above cross; to r. date X/X; beneath off. letter A; CON in ex.
Par. DOC II/1, 295, 105a.3.

140* Æ, 8.15 g, 31.5 mm 7 h.
Inv. M63.1.1. St Michael 1963.

A.D. 631–632
Obv. to l., Heraclius stg., with moustache and long beard, wearing military dress and crown with cross. He holds in r. hand long cross, l. hand on hip. To r. Heraclius Constantine stg., with short beard, wearing chlamys and crown with cross; in r. hand a cross-topped globe. Between heads, cross.
Rv. M; to l., A/N/N/O; above cross; to r. date II/II; beneath off. letter A.
Par. DOC II/1, 297, 107a.2.
141* Æ, 4.48g, 24 mm, 6 h.
Inv. S96.78.2. Stray find 1996.

CONSTANS II (A.D. 641–668)
Constantinopolis
Follis/40 Nummi
Class 4
A.D. 647–648
Obv. [ENTϑTO]NIKA. Constans stg., facing, beardless, wearing chlamys and crown with cross. In r. hand, long cross; in l. a cross-topped globe.
Rv. m; to l. illegible, to r., NЄOϚ; to l. ϞI, to. r. Γ, in ex.
Par. DOC II/2, 448, 66c.
142* Æ, 3.46 g, 20.7 mm, 6 h.
Inv. K90.1.39. Kalabaktepe 1990.
A.D. 647–648
Obv. Constans stg., facing, beardless, wearing chlamys and crown with cross. In r. hand, long cross; in l. a cross-topped globe.
Rv. M; to l. ANA, to r., illegible; to l. ϞI to r. B, in ex.
Par. DOC II/2, 448, 66b.
143* Æ, 2.51 g, 22.1 mm, 7 h.
Inv. AT02.0.1. Temple of Athena 2002.
Class 5
A.D. 653–654
Obv. Constans stg., facing, bearded, wearing chlamys and crown with cross. In r. hand, long cross; in l. a cross-topped globe.
Rv. M; above, cross or star; to l., and to r., illegible; beneath, Δ; XIII, in ex.
Par. DOC II/2, 451, 71c.
144* Æ, 3.68 g, 19.3 mm, 12 h.
Inv. M57.2.4. St Michael 1957.
Syracuse
Follis/40 Nummi
Class 3
A.D. 650–651
Obv. I ∏. Bust facing, with long beard, wearing chlamys and crown with cross on circlet. In r. hand a cross-topped globe.
Rv. M; to l., ANA; beneath, SCL.
Par. DOC II/2, 495, 178.4.
145* Æ, 3.70 g, 26.4 mm, 7 h.
Inv. K90.1.34. Kalabaktepe 1990.

ANONYMOUS FOLLES (A.D. 970–1092)
Class A2
A.D. 976 (?) – c. 1030/35
Obv. +EMMA NOVHΛ. Bust of Christ facing, bearded, with nimbus, cross, having two pellets in each arm, wearing tunic and himation. Raising r. hand in benediction; in l., book of Gospels with ornament of dots on cover. To l. and r., pellets.
A/ IhSЧS/ XRISTЧS/ BASILЄЧ/ BASILЄ.
Par. DOC III/2, 650–671, variation?
146* Æ, 11.82 g 30.4 mm 6 h.
Inv. HIII84 (1).
147* Æ, 08.29 g 27.8 mm 6 h.
Stray find.

IOANNES II KOMNENOS (A.D. 1118–1143)
Constantinopolis
Hyperpyron
Obv. IC-XC, Christ seated facing on throne with back, bearded, wears nimbus, tunic, and colobion. In l. hand, book of Gospel. In upper field l. and r., IC-XC.
Rv. Virgin crowns the emperor. Emperor wears stemma, divitision, loros, and collar-piece. In his r. hand a cross-topped globe. Virgin wears tunic and maphorion. Between their heads VΘ-MP.
Par. Hendy 1969, 103, pl. 9, 6. 7.
148* 5.26 g 29.3 mm 6 h.
Inv. M59.2.1. St Michael 1959.

UNIDENTIFIED
Obv. bust facing but illegible.
Rv. illegible.
149 Æ, 4.21 g, 21.8 mm.
Inv. AT02.2.1. Temple of Athena 2002.

H. S.

Environmental History of the Hinterland

Since its inception in the late nineteenth century, the Miletus archaeological project has been fortunate to also include a focus on the local environment. During the early decades of the excavations, this interest in environmental questions resulted in a study that describes and discusses the character of the ›Milesian Landscape‹ as well as its importance for the city's development in the Classical era[138]. More recently, a comprehensive scientific study of the Maeander River Delta has led to a better understanding of the alluvial landscape and how it affected the history of Miletus and its *chora*[139].

The aim of this contribution[140] is a detailed historical interpretation – concerning the Byzantine and later periods – of the palynological data from Lake Bafa, which is located just a few kilometres from the site of Miletus (Figs. 1. 40). The palynological data from this former marine embayment was published some years ago[141], its chronological interpretation is outdated, and its historical significance has not yet been fully recognised. As to chronology, although the final publication of the palynological research in Lake Bafa

138 Wiegand 1929.
139 Aksu et al. 1987; Müllenhoff et al. 2004; Brückner et al. 2006.
140 Research presented in this paper has been funded by the National Science Centre, Poland, through its postdoctoral fellowships scheme FUGA for the years 2012–2015 (DEC-2012/04/S/HS3/00226). I would like to thank Prof Neil Roberts (Plymouth) and Prof. Helmut Brückner (Cologne) for their advice.
141 Brückner et al. 2008.

Fig. 40 The acropolis rock of Priene on the Mykale mountain range on the far left, the white marble facades of Miletus' ancient theatre and Seljuk Ilyas Bey mosque as well as the city's brown Humeitepe hill in the middle distance, the silted Maeander Valley full of green cotton fields, blue Lake Bafa, and rocky Mount Latmos as seen from the modern village of Akköy on the second hill to the south of Miletus, looking northeast

appeared in 2008, the actual scientific work was carried out much earlier in the 1990s, and the age-depth models are based on the information available at that time rather than at the time of publication. Calibration procedures for raw radiocarbon ages have changed dramatically since the 1990s, and a new analysis of the pollen results from Lake Bafa greatly improves the chronology and their value for archaeologists and historians, as the following study shall show. It begins with a technical re-evaluation of the pollen data and ends with a new historical interpretation, according to which the countryside experienced a greater degree of continuity between late antiquity and the Byzantine period than previously assumed, until the local social-ecological model collapsed under Turkish rule, during a period of particularly unfavourable climatic conditions.

Pollen Data from Lake Bafa

A new age-depth model for core S6

The calendar dates presented in the original publication of the pollen data from Lake Bafa are based on the calibration curve Calib4 that was published in 1993[142]. In accordance with the procedures common in the 1990s, the sediment core was not provided with a complete age-depth model; there are no age estimates for samples that were not radiocarbon-dated. In order to account for the marine reservoir effect[143] and in the absence of information on the specific regional magnitude of that effect in the Mediterranean, 402 years were added to the dates obtained from specimens of Cerastoderma glaucum or lagoon cockle, a saltwater clam; the two key Byzantine dates were based on such a calculation from lagoon cockle[144].

Today, a special radiocarbon curve is available for dates obtained from marine carbonates such as lagoon cockle and other mollusc shells; the most recent version of this curve was published in 2013 along with an updated terrestrial calibration curve, and they are called Marine13 and IntCal13 respectively[145]. Two papers with estimates of the regional reservoir effect in the Mediterranean were published in the early 2000s[146]. In consequence, the age estimates assumed in the original publication of the pollen data from Lake Bafa require revision, and the following updated chronology is based on the Marine13 calibration curve with a regional correction of $\Delta R = 53 \pm 86$[147]. It is focused on core S6 because that is the only one which includes the Byzantine and Turkish periods.

142 Reimer – Stuiver 1993.

143 Reservoir effects in radiocarbon dating occur when a living organism that is the source of the dating specimen assimilated non-atmospheric radiocarbon that was older than the radiocarbon it would normally have consumed with air. For instance, reservoir effects occur in lakes with limestone in the catchment area, because limestone preserves old carbon that mixes with the lake water; or in marine environments where the surface water mixes with deep sea water that contains older carbon than the atmosphere.

144 According to Müllenhoff et al. 2004 the specimens come from Cerastoderma edule, i. e. common cockle.

145 Reimer 2013.

146 Siani et al. 2000; McCormac – Reimer 2002.

147 McCormac – Reimer 2002 offer several sub-regional and general ΔR calculations for the Mediterranean. The Eastern Mediterranean estimate (Tab. 2) seems best for the calculations presented in this paper.

Laboratory number	Sample depth	Radiocarbon age	Calibration: 2σ confidence intervals (95%)		
			Calib 4 (after Brückner et al. 2008, Table 2) minus 402 years	Marine 13 with ΔR=53±86	
				BP	A.D.
UtC 12125	296 cm	1755±35 C^{14} BP	571–711 cal A.D.	1560–1333 cal BP	390–617 cal A.D.
UtC 12126	332 cm	1925±41 C^{14} BP	371–591 cal A.D.	1803–1526 cal BP	147–421 cal A.D.

Tab. 2 Lake Bafa, comparison of old and new calibration results for dates falling into the first millennium A.D.

Parts of the core (boundaries in cm)	Estimated sediment accumulation rate (years/cm)	
	Marine 13 with ΔR = 53±86	IntCal13
332 cm 296 cm	5.58	5.68
296 cm 0 cm	4.97	5.71

Tab. 3 Lake Bafa, sediment accumulation rate estimates for the last two thousand years

Sample depth in cm	Marine 13 with ΔR = 53±86				IntCal13		
	Calibrated year A.D.	Minimum year A.D.	Maximum year A.D.	Potential under-estimation	Calibrated year A.D.	Minimum year A.D.	Maximum year A.D.
29	1830	1785	1880		1810	1764	1854
48	1736	1691	1785		1702	1656	1745
64	1656	1612	1703		1610	1564	1653
79	1582	1536	1630		1524	1477	1568
94	1507	1460	1557		1439	1390	1483
109	1432	1382	1485	114	1353	1300	1398
126	1348	1294	1404	104	1256	1197	1302
147	1244	1184	1304	91	1136	1071	1185
162	1169	1106	1234	82	1050	980	1102
184	1060	992	1133	68	924	847	983
197	995	924	1073	60	850	768	910
209	935	861	1018	53	782	694	845
220	881	804	968	46	719	628	786
236	801	720	895	37	627	530	699
253	716	630	818	26	530	425	607
280	582	485	694	10	376	262	460
296	503	399	621	N/A	284	164	374
316	391	292	490	N/A	171	97	245
332	302	149	431	N/A	80	-20	202
357	265	118	390	N/A	44	-53	160
360	261	114	385	N/A	39	-57	156

Tab. 4 Lake Bafa, age estimates and their confidence intervals for core S6. Potential underestimation in marine 13-calibrated ages may be due to differences in sediment accumulation rate (cf. Tab. 3)

The starting points for the construction of an age-depth model that covers the Byzantine and Turkish periods are the radiocarbon dates that fall into the first millennium A.D. They have been calibrated with the use of the most recent (2.2) version of the clam calibration code for the statistical software R[148]. Results of the calibration are given in Table 2. The next step is the calculation of an age-depth model for the top 360 cm of the core, using linear interpolation between the radiocarbon-dated samples and the surface. In this model, the youngest radiocarbon date at a depth of 296 cm is used after calibration as the basis for interpolating the ages of all samples above 296 cm and up to the surface at 0 cm, which should be roughly contemporaneous with the year of the coring, i. e. 1970±25 cal A.D.

It turns out that the sediment accumulation rate seems to have accelerated during the deposition of the last 296 cm (Tab. 3), but it is not clear at what depth or at which point in time this acceleration set in. It is thus possible that the interpolated ages for the first few samples above 296 cm are underestimated: the mistake may reach 5–15 years in the first 15–35 cm and up to 60–70 years at the middle of the sediment unit at ca. 135 cm below 0. In addition, the estimated dates are also subject to the error inherent in any radiocarbon dating. The confidence intervals of all age estimations as well as the maximum range of the potential underestimation due to the change in the sediment accumulation rate are given in Table 4.

The situation is further complicated by the continuous progradation of the Maeander River Delta that began to cut off the marine embayment that was later to become Lake Bafa from the sea towards the end of the first millennium B.C. (Fig. 1). The river thus started to discharge freshwater into the salt-water lake, which resulted in a high amount of indeterminate pollen and pre-Quaternary pollen taxa in the sediments between 911and 386 cm below 0, that is at the latest from the second or first century B.C. onwards[149]. Later, the river started to bypass Lake Bafa and emptied directly into the open sea. This change had already occurred in the first half of the first millennium A.D. Thus, the cockles that provide the radiocarbon dates for our age-depth model must have lived in a brackish-freshwater lake rather than in the open sea. Moreover, recent study of geochemical proxies from Lake Bafa sediments also indicate that already by the middle of the first millennium A.D. the lagoon was closed and became a lake[150]. This makes it likely that the carbon assimilated by the cockles may have come from rain and river water, i. e. from the atmosphere rather than from sea water, in which case the terrestrial calibration curve would be more appropriate than the marine curve. However, the $\delta^{13}C$-values of the lagoon cockles, on which the dating is based, are more typical of brackish organisms, and this may call the use of the terrestrial calibration curve into question[151]. It is certain, though, that the key radiocarbon sample (UtC 12125) comes from a period of transition, when Lake Bafa was in the making, hence both the marine and the terrestrial calibration curves shall be taken into consideration, in addition to other, independent dating indicators such as archaeological evidence.

The terrestrial calibration curve appears particularly appropriate in the case of the younger radiocarbon date (UtC 12125, at 296 cm) that forms the basis for the Byzantine and Turkish age estimations. Contrary to the Marine13-based age-depth model, the IntCal13-calibrated model is characterised by a stable sediment accumulation rate across the relevant parts of the core (Tab. 3). This agrees well with the lithology or geological composition of the core that also suggests relatively stable sedimentary conditions throughout the period in question, when the sediment consisted of »stratified clayey silts with a high content of organic matter«[152].

148 Blaauw 2010.

149 Müllenhoff et al. 2004.

150 S. Akçer Ön – A. Greaves – S. Manning – N Çağatay – M. Sakınç – B. Ön – C. Tunoğlu, When did the Gulf of Latmos Separate from the Aegean Sea? Geology versus Archaeology, Oral presentation at the 68th Geological Congress of Turkey (Ankara 2015). I would like to thank Sena Akçer Ön (Muğla University) for sharing her data with me and for discussing the complex formation of Lake Bafa.

151 Müllenhoff et al. 2004. The values are -3,7 for UtC 12125 and -4,8 for UtC 12126. I would like to thank Helmut Brückner for pointing this out to me.

152 Brückner et al. 2008, 368.

Additional confirmation of the terrestrial calibration is provided by an archaeological survey in the hinterland of Miletus, including the shore of Lake Bafa, where the finds indicate an expansion of rural settlement and an intensification of olive cultivation in late antiquity and the early Byzantine period, between A.D. 300 and 600[153]. This appears to be reflected by an increase in olive pollen at the depth of 253 cm, and the age estimate obtained with IntCal13 – 530 cal A.D. (425–607, 95 % confidence interval) – corresponds well with the archaeological evidence. In contrast, the estimate based on the marine calibration curve (716 cal A.D.; 630–818) seems irreconcilable with the findings of the archaeological survey and would be at least a hundred years too late. Consequently, the IntCal13-based age estimations are given preference in this paper, although Table 4 also lists the Marine13-based ages (including the relevant confidence intervals).

Pollen Distribution, the Catchment Area of Lake Bafa, and the Hinterland of Miletus

Any correlation between the pollen data from Lake Bafa and the hinterland of Miletus depends on the pollen catchment area of the lake, especially as regards the anthropogenic pollen taxa[154]. The distribution patterns of pollen differ from plant to plant and depend on the wind as well as on the relief[155]. Pollen of cereals and vine is primarily of local origin from within 2 to 3 km of the coring site. The same applies to walnut, but its pollen can also travel over larger distances up to 20 to 30 km, and low percentages of less than 1 % in the data from Lake Bafa may be due to such a greater distance. Olive pollen can arrive at a coring site from even bigger distances and may thus be considered of regional origin, unless there is other evidence for olive cultivation in the vicinity. However, in the case of Lake Bafa the percentages of olive pollen from the last two thousand years are so high in comparison to most other pollen sites in Anatolia that a local source seems highly probable.

Rumex or sorrel and *Plantago lanceolata* or ribwort plantain are secondary anthropogenic indicators, i. e. wild plants that are favoured by environmental conditions created by cultivation and, in particular, by grazing. Sorrel and ribwort are wind-pollinated, and their pollen may thus represent local as well as regional vegetation. The same applies to *Poaceae* or grasses, and a combination of the three often indicates forest-cutting or pasturing. Pine pollen can be transported over tens of kilometres, oak pollen travels less far, and in southwest Anatolia both trees typically occur as successional vegetation, which means that their expansion after a period of intensive agriculture almost always indicates a decrease in cultivation or pasturing.

All figures are based on the pollen diagram of core S6 as in the original publication of the pollen data from Lake Bafa[156]. Since raw pollen counts are not available in the European Pollen Database, the diagram was digitised with the Engauge Digitizer software[157], and the resulting percentage values are presented in Figure 41 and 42. Since the values for vine (*Vitis*), walnut (*Juglans*), cereals (*Cerealia*), and hop or hemp (*Humulus* or *Cannabis* – their pollen cannot be distinguished) were low and difficult to digitise, only their presence has been recorded, with a distinction between weak and strong presence in the cases of cereals and hemp or hop.

Lake Bafa is a relatively large lake, the core S6 was taken from the centre of the lake basin, and the pollen data should thus represent regional rather than local vegetation[158]. In addition, the dominant wind directions in spring, which is the pollination season of most plants, are west and southwest; this has been noticed by K. Krause, a member of the Miletus excavation, in the

153 Lohmann 2004.

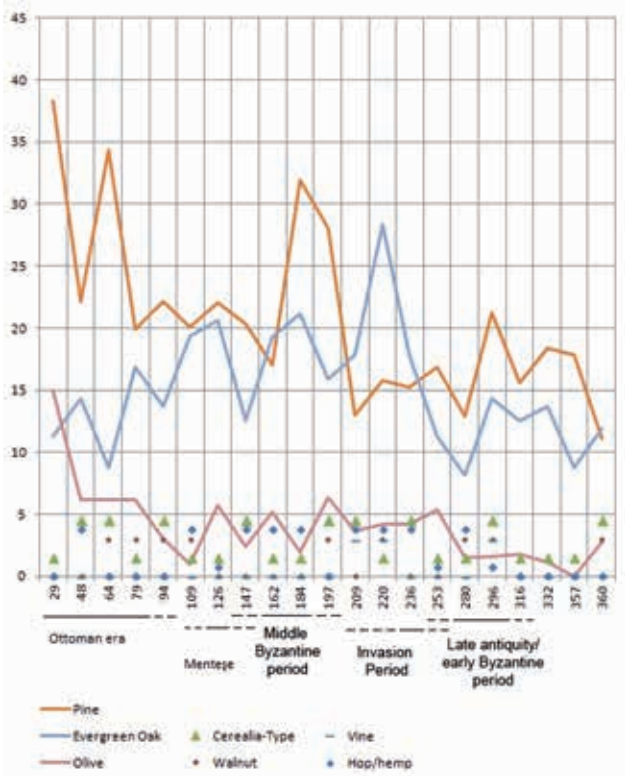
154 Since it is often impossible to identify pollen grains at the species level, but at the level of genus or even family, the standard word when referring to a plant or a group of plants represented in the pollen data by a single botanical category is »taxon«.

155 Behre 1981; Bottema – Woldring 1990.

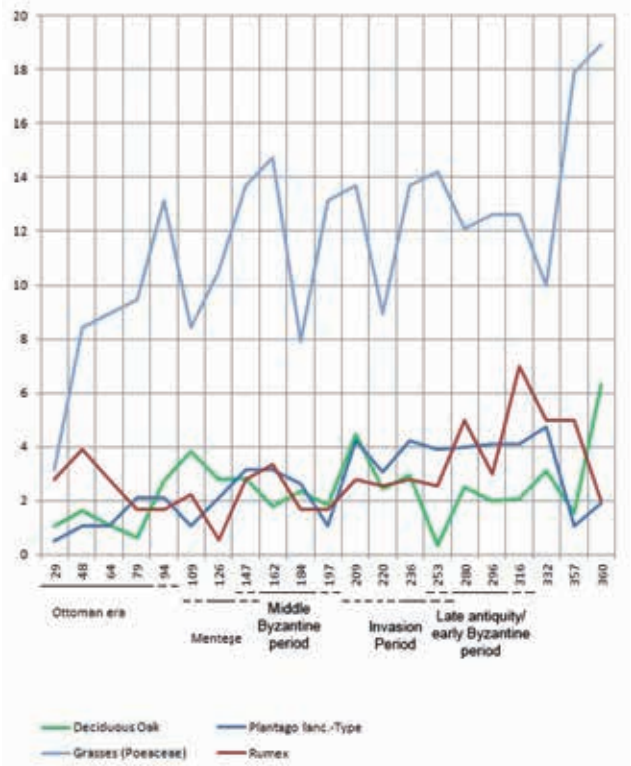
156 Brückner et al. 2008, fig. 5.

157 <http://markummitchell.github.io/engauge-digitizer> (14.02.2017).

158 Cf. Sugita 1993.



41



42

Lake Bafa, core S6

Fig. 41 Percentage pollen diagram of pine, evergreen oak, and olive, with information on weak or strong presence of *Cerealia*-type, walnut, and vine (calendar years A.D.)

Fig. 42 Percentage pollen diagram of grasses (*Poeaceae*), deciduous oak, and secondary anthropogenic indicators, i. e. sorrel (*Rumex*) and ribwort plantain (*Plantago lanceolata*) (calendar years A.D.)

first half of the 20th century[159], and has since been confirmed by decades of meteorological observations on Turkey's Aegean coast that also note the particular strength of spring winds[160]. This means that Lake Bafa receives most of its pollen load from the Milesia, the former peninsula that constituted the hinterland of Miletus, and from the Maeander River Delta that came to form the lake's north-western shore and was successively integrated into the city's territory, as the delta became landfast, was irrigated, and used for agriculture[161]. It is thus justified to interpret the vegetation history recorded in the pollen data from Lake Bafa in the light of archaeological evidence from the Milesia and of written sources that describe Byzantine settlements around the lake and in the delta.

Vegetation History of the Milesia as Recorded in Core S6 from Lake Bafa

After the Roman period, the first major vegetation change occurred between 296 and 253 cm. Already between 360 and 332 cm, grasses had decreased, which is potentially indicative of intensified grazing, and sorrel as well as ribwort plantain, the secondary anthropogenic indicators, had increased. At 296 cm, there was a rise in cereals, walnut, vine, and hop or hemp, which had been virtually absent from the pollen data in the previous periods. In the next sample, pine and evergreen oak decreased whilst sorrel increased, which may signal an opening of land for pastures; the values of hop or hemp continued to rise, whereas the presence of cereals became weaker. At 253 cm, olive and grasses increased whilst deciduous oak, sorrel, hop or hemp, and walnut decreased. Taken together, all these gradual vegetation changes probably reflect an increase in agricultural activities and certainly indicate a growing focus on olive cultivation. The high values of olive continued without interruption until 197 cm, i. e. at least for the next 250 to 300 years.

159 Wiegand 1929, 28 (K. Krause).
160 Aksu et al. 1987, 231.
161 Thonemann 2011, 306–314.

As to absolute dates, there are substantial differences between the Marine13 and IntCal13-based age-depth models (Tab. 4). According to the first calibration method, the sequence of vegetation change between 296 and 253 cm should date from 503 to 716 cal A.D., whilst the second model leads to an earlier date range between 284 and 530 cal A.D. Given these estimations, one can conclude that the entire process lasted some 150 to 200 years and took place during the early Byzantine period, sometime around the fifth century A.D.

The next outstanding phenomenon in the pollen record are peaks in successional trees, one in evergreen oak at 220 cm and one in pine at 197 to 184 cm. The oak signal was accompanied by a decrease in grasses and ribwort plantain, whilst most primary anthropogenic indicators, that is olive, vine, walnut, and hop or hemp, remained more or less constant. Thus, the additional oaks seem to have replaced grass rather than any plantation, which suggests a reduction in pasturing, but not in agriculture. At 209 cm, half way between the peaks of oak and pine, the values for ribwort plantain and grasses increased again, suggesting that one may have returned to pasturing once more.

The oak maximum at 220 cm dates from the eighth or ninth century, the pine maximum at 197 to 184 cm from the tenth to eleventh centuries. The latter, too, was at first accompanied by high levels of anthropogenic indicators; olive even reached its medieval maximum at 197 cm; only hop or hemp was absent. Later, at 184 cm, some of the cultivated plants and grasses decreased and evergreen oak increased. Note that according to both age-depth models the likelihood that this reflected the late eleventh-century arrival of the Turks in western Asia Minor is very small.

162 cm saw changes in several taxa that more or less directly reflect human activity: sorrel, ribwort plantain, and grasses increased, which points to pasturing and opening of the landscape; olive also increased, whilst pine and oak decreased. These changes may have occurred in the late eleventh or in the twelfth century. They were followed by some decrease in olive cultivation and a rise in pine and deciduous oak as well as in cereals, but these appear to have been minor fluctuations, whilst the general focus on olive cultivation persisted. This changed only at 126 cm, when the presence of olive became weak and remained so for some 200 years, probably the 13th and 14th centuries, after which it recovered again. Shortly after the decline of the olive, hop or hemp also decreased notably, after having been popular throughout the Byzantine period, when olive and hop or hemp showed a negative correlation: a peak in olive pollen almost always correlated with a decrease in hop or hemp; this suggests that they were parts of alternative agricultural strategies. Finally, in the early modern period, from the later part of the 16th century onwards, olive cultivation, pasturing, and forestry all increased again and expanded beyond the Byzantine levels.

Environmental Micro History: Contextualizing the Vegetation Change

Late Antiquity and the Early Byzantine Period (Fourth to Sixth Centuries)

The hilly landscape to the west of Lake Bafa formed the hinterland of Miletus and as such was subject to a detailed archaeological survey[162] that has yielded abundant evidence for an expansion of rural settlement activity during late antiquity and the early Byzantine period. According to the surface remains, several places that show no signs of occupation in Roman times became inhabited thereafter. The result was a complex settlement network that consisted of single farms, estates, monasteries, villages of various sizes, and towns such

162 Lohmann 1995; Lohmann 1999; Lohmann 2004; Niewöhner 2007b.

as Assesos close to Lake Bafa[163]. Several of the larger sites had churches, and their relatively sophisticated construction and decoration with carved marbles confirms increased rural prosperity[164]. More than 100 estates, almost all of which contained oil presses, have also been assigned to late antiquity or the early Byzantine period[165] and suggest some degree of specialisation in the production of olive oil for an export market. This would have been similar to the 21st century that is also currently witnessing a marked increase of olive plantations and numerous new oil ›factories‹, which produce and export olive oil on an industrial scale.

The pollen data from Lake Bafa appears to confirm such a scenario for late antiquity and the early Byzantine period. In comparison to the High Imperial period at 360 to 332 cm, during which the predominant agricultural activity was probably pasturing, the later period was characterised by more intensive cultivation. Next to olive, this also included vine, walnut, cereals, and hop or hemp, which was a new cultivar and characterised the Byzantine period in the Milesia[166]. The pollen data also shows that the specialisation in olive oil production was a long process that took more than a century. Thus, the archaeological survey of the *chora* with all its production facilities may have documented the final stage in the development of the social-ecological system.

Invasion Period (Seventh to Ninth Centuries)

The Invasion Period, when from the seventh to the ninth centuries the Byzantine empire fell prey to Persian and Arab incursions and lost its grip on the Mediterranean Sea, is as yet poorly attested in archaeological surveys of the Anatolian countryside[167]. Their essentially negative results appear to be confirmed by some pollen records that testify to a virtual disappearance of agriculture for several decades or centuries, whilst other pollen records, in particular from Pisidia and from northern Bithynia, attest to a continuation of the early Byzantine agricultural strategy[168]. The pollen record from Lake Bafa is a case in point; the vegetation seems to have undergone only minor changes from one century to another, resulting in slightly different pollen assemblages, whilst the core vegetation structure, that is the anthropogenic indicators associated with local agriculture, remained stable, with no identifiable long-term effect of the Persian and Arab invasions. Only the eighth or ninth-century increase in oak pollen at 220 cm may signal the succession of wild vegetation onto fields and pastures somewhere in the wider region, not necessarily in the immediate hinterland of Miletus.

In contrast, the archaeological survey of the Milesia did not identify any evidence for continuation of the early Byzantine settlement pattern beyond the seventh century. The archaeologists thus advanced the hypothesis that intensive cultivation ended due to the collapse of Byzantine rule and economy in the eastern Mediterranean and, consequently, the disappearance of an export market for olive oil[169]. However, an extensive survey such as the one of the Milesia is likely to miss periods that basically continued the previous settlement pattern[170]. This seems to have been the case with the transition from the early to the later Byzantine periods: The surveyors deduced the collapse of the early Byzantine settlements from a disappearance of Late Roman Red-Slip Ware ceramics, which they dated to the seventh century[171]. In the meantime, the date range of the pottery type in question is being revised, the ceramic ware appears to have been produced beyond the seventh century, and other, newly identified wares are understood to have continued throughout the Invasion Period[172]. All of this was unknown at the time of the survey in the Milesia. It should thus be maintained that from an archaeological point of

163 Lohmann 1995, 323–328.
164 Niewöhner 2007b.
165 Lohmann 1999, 465; cf. Lohmann 2004, 348–354.
166 Cf. Lohmann 2004, 348–354.
167 With the exception of the Sagalassos, Balboura, and Kyaneai surveys: Vanhaverbeke et al. 2009; Coulton 2012, vol. 1, 163–184; Kolb 2008.
168 Izdebski 2013, 145–215.
169 Lohmann 1995, 323–328; such a process has been demonstrated for the area around Kyaneai in Lycia, see Kolb 2008, 406–417.
170 Kowalewski 2008.
171 Lohmann 1995; Lohmann 2004.
172 Cf. Vroom 2003; Armstrong 2006; Poblome et al. 2009.

view the eight to tenth centuries are »covered in complete darkness«, to use the surveyors' own words[173]. The lack of archaeological findings should not be taken to discredit the evidence of the pollen, according to which cultivation continued uninterrupted throughout the Invasion Period. It seems more likely that rural settlement patterns remained largely unaltered in the hinterland of Miletus, which would confirm similar observations in other parts of western Asia Minor[174].

Middle Byzantine Period and the Arrival of the Turks (Tenth to Twelfth Centuries)
The middle Byzantine period lasted from the tenth through the eleventh century, until the arrival of the Turks, but the relatively low chronological resolution of the pollen data makes it impossible to distinguish the latter from the former. The middle Byzantine period is generally known for agricultural expansion[175], which is relatively well attested in palynological data from various places throughout the empire[176]. In the Milesia, the pollen data is supplemented by some archaeological evidence in the shape of marble carvings from rural churches[177] and by written sources. The oldest text dates from A.D. 987 and contains an agreement between two monasteries, one of which was located on Mount Latros or Latmos, on the shore of Lake Bafa[178]. The latter monastery bought a considerable number of female buffaloes in order to derive profit from their produce[179]. P. Thonemann interprets this as an effort to specialise in milk production and concludes that the local pastoral economy was expanding[180]. This interpretation is supported by the pollen record from Lake Bafa, according to which pasturing played an important part in the middle Byzantine vegetation history, sometimes more and sometimes less, as the focus seems to have alternated between either pasturing or cultivation of mainly olives or cereals or both. A rise in ribwort plantain at 184 cm could indicate a growing significance of pastoral activities in the tenth century according to the IntCal13 calibration.

Another relevant text is called *praktikon* and was drawn up by a certain Adam, an official responsible for the management of imperial domains[181]. In A.D. 1073 Adam received orders to transfer imperial landholdings in the Maeander Delta to Andronikos Doukas, a relative of the emperor. The document contains a detailed description of the estate, its fields, its revenues, and its villages[182]. Plants cultivated on the estate included cereals, olive, and vine – the three major cultivars in the pollen record from Lake Bafa – as well as other crops that are not represented in pollen data, such as various types of vegetables. The *praktikon* describes a network of villages and at least one large domain that included a country house or mansion. The latter was uninhabited and in a state of disrepair since the formerly private domain had become part of the imperial estate. The *praktikon* also mentions other, similar estates in the delta as well as new land that had been brought under cultivation recently, which could indicate agricultural expansion.

However, the pollen record from Lake Bafa does not contain any signs of major agricultural expansion, i. e. transformation of previously uncultivated lands into fields or pastures. The vegetation structure of the micro-region represented in the sediments of Lake Bafa seems to have remained stable throughout the Byzantine period. The prosperity attested in the middle Byzantine written sources appears to have been upheld constantly since late antiquity, including the Invasion Period. The middle Byzantine prosperity did not take the form of agricultural expansion, because cultivation had never lapsed. In this light, the new land that the *praktikon* reports as having been brought under cultivation recently should be interpreted as a local phenomenon specific to

173 Lohmann 2004, 348–357.
174 Izdebski 2013, 99–106.
175 Harvey 1989.
176 England et al. 2008 (case study); Izdebski et al. 2015 (overview).
177 Niewöhner 2013, 190–205.
178 Mikolich – Müller 1871, 310 lines 8–12.
179 Mikolich – Müller 1871, 310 lines 8–12.
180 Thonemann 2011, 183.
181 Nystazopoulou-Pelekidou 1980, document 50; the entire dossier is summarised by Lemerle 1979, 209–211 and analysed by Thonemann 2011, 259–270.
182 Nystazopoulu-Pelekidou 1980, document 50 lines 66–327; cf. Thonemann 2011, 259–270.

the delta area, where new alluvial land was constantly created by the accumulation of sediments from the Maeander River.

Similarly, the arrival of the Turks from the late eleventh through the 13th century[183] did not cause any recognisable change in the pollen record. This may in part be due to the chronological resolution of the data that is insufficient for the registration of short term changes[184]. In the archaeological record, the most notable change was the building of numerous defences, all of which appear to date from the twelfth and 13th centuries[185]. The *praktikon* of Adam that was drawn up in A.D. 1073, two years after the Byzantine defeat at Manzikert and the first large-scale Tuskish invasion of Anatolia, did not yet contain any mention of fortifications in the delta region[186], and the archaeological survey of the Milesia did not record any sign of Turkish presence before the 13th century[187]. The late antique-Byzantine social-ecological system in the Milesia appears to have been little affected by the turbulent political developments elsewhere in Anatolia.

The Beylik of Menteşe and the Ottoman conquest (13th to 15th centuries)

The Byzantine order on the Lower Maeander collapsed in the 13th century. From a political and military point of view, the region was lost in the 1260s, but the social system started to disintegrate already soon after A.D. 1204, when Constantinople was occupied by the Fourth Crusade. In this part of Western Anatolia, substantial amounts of land were owned by individuals and institutions that were based in Constantinople[188]. The fall of the capital empowered local elites, who wielded power at will and appear to have organized their own local defences against advancing Turkish tribes. The landscape became dominated by strongholds, some of which housed local elites, whilst others belonged to monasteries that could also control large landholdings. This structure paved the way for Turkish rule, as the new lords, the Beys of Menteşe, could simply replace the old Byzantine elites, whilst the rest of the population would have carried on, without need for a new power structure or administration[189]. Thus, the Turkish take-over does not seem to have affected the social-ecological system of the Milesia. According to the pollen record, cultivation continued without interruption.

This is exemplified by a sample at 126 cm in depth, which most probably reflects the vegetation structure during the Menteşe period. Increased amounts of pine and oak pollen could indicate a decrease of agricultural activities on the regional level, but locally, in the Milesia, agriculture seems to have been in good condition; a decline in pastoral indicators like ribwort plantain, sorrel, and grasses was compensated by an increase in olive and cereals. A relatively smooth transition from Byzantine to Turkish rule is also suggested by the Menteşe architecture that appears to have continued Byzantine traditions[190].

All this changed fundamentally only after the Ottoman conquest of Western Asia Minor in the 14th and 15th centuries. What followed was a long period of agricultural decline (notwithstanding the re-appearance of walnut at 109 cm, in the 14th century) and the collapse of the social-ecological model that had prevailed since late antiquity for almost a millennium. High-resolution palaeoclimate data available for the Ottoman period makes it possible to link the decline with adverse climatic conditions: According to the tree-rings, May-June precipitation was below average for 70 consecutive years from 1434 to 1503 A.D.[191]. Temperature reconstructions based on the same methodology suggest that the frequency of years with unusually cold springs was higher in the first half of the 15th century than in the preceding hundred years[192]. While late springs are of little significance for cereal cultivation, they are crucial for

183 For the impact of the early phase of the Turkish conquests and migrations, see Cahen 1948; Cheynet 1998.

184 The only annually-resolved pollen record in Anatolia, that of Lake Nar in Cappadocia, does indicate short-term medium-scale decrease in cultivation following the arrival of the Turks: England et al. 2008.

185 Müller-Wiener 1961; Müller-Wiener's results were later confirmed by Lohmann 1995.

186 Thonemann 2011, 261.

187 Lohmann 1995. A few years later, after the survey had been completed, the archaeologists mention just one Seljuk find from the entire Milesian countryside: Lohmann 1999.

188 Thonemann 2007.

189 For a detailed account, see Thonemann 2011, 271–278.

190 Arel 1995; Arel 2004.

191 Touchan et al. 2007.

192 Heinrich et al. 2013.

the pollination and growth of olives and vine[193]. Consequently, the harsh climatic conditions of the fifteenth century undermined the very basis of the Byzantine social-ecological system in the Milesia, namely the olive and vine cultivation, and would have made it difficult to maintain the previous levels of economic complexity and intensive land use in this micro-region. The climate change could possibly have been compensated by a prosperous and flexible economy, but this does not appear to have been the case under early Ottoman rule, and the scale and complexity of land use declined.

Summary

The pollen record from Lake Bafa confirms results of an archaeological survey by providing independent evidence for agricultural expansion in late antiquity and the early Byzantine period. Thus, we can be sure that the hinterland of Miletus participated in the widespread economic prosperity of the Eastern Mediterranean countryside during the final centuries of Roman rule. What is special about the Milesia, however, is the continuation of the late antique social-ecological system beyond the seventh century A.D., through the Persian and Arab invasions, the middle Byzantine period, and the Turkish conquest. Notwithstanding various fluctuations and partial shifts of focus from one form of agriculture to another, on the basic level the rural economy that developed in late antiquity persisted without major interruption until as late as the 14th century, when the area had become part of the Turkish Beylik of Menteşe. Significant economic discontinuity occurred only in the 14th or 15th century, when the Byzantine to Beylik system was replaced by the early modern administration of the Ottoman empire[194]. While the earlier system had been resilient to political changes, economic transformations, and military threats, it proved vulnerable to prolonged adverse climatic conditions that set in at the time of the Ottoman takeover. Drier and cooler springs that prevailed for several decades in the fifteenth century made it difficult for the local population to rely on intensive vine and olive cultivation, which must have contributed significantly to the overall social-environmental change.

A. I.

Conclusions

Each single finding presented in this paper is unspectacular, a fragmented scrap from the dung heap of history, but taken together and in combination with what is already known about Byzantine Miletus, they provide significant new evidence for the Byzantine settlement history of the city and the surrounding countryside. The early fifth century renovation of the *insula* in the southern part of Miletus confirms general prosperity during the Theodosian period. This last urban building boom included outlying quarters, as has recently been confirmed also for Humeitepe, the north-eastern most district of the city (Fig. 2), where excavations next to the East Harbour and the adjacent gate yielded ample finds from the late fourth and early fifth century[195]. Around A.D. 400, Miletus would still have been similarly populous as in the third century, when the late Roman city walls surrounded all of the ancient city. The late antique context outside the Sacred Gate of the city walls appears to confirm this. The same is reflected in the coin record that also peaked in the Theodosian period (Tab. 1 and Fig. 36).

193 Xoplaki et al. 2016.

194 The same has been observed elsewhere in the eastern Mediterranean and on the Balkans: Izdebski et al. 2015.

195 The excavations were conducted by Helga Bumke and Aylin Tanrıöver. For a first preliminary report see Bumke – Tanrıöver 2010/2011. I would like to thank the excavators for sharing their late antique and early Byzantine findings in advance of the final publication.

The situation seems to have changed fundamentally by the sixth century A.D., when the *insula* in the southern part of the city appears to have been deserted, the area outside the Sacred Gate was given up, and the coin record dropped dramatically. This suggests that the likely Christian basilica next to the deserted *insula* (Fig. 2) came to be built there, because the southern part of the city had started to empty out and was underused. This would also explain the newly found burials to the south of the likely basilica and the round church of St Mary at the southern edge of the city. It follows that the small circuit of the seventh-century fortifications probably reflected the reduced size of the shrunken city. The exceptional preservation of the ancient city centre throughout the early Byzantine period, the numerous sixth-century inscriptions, and the antiquarianism apparent in the preservation of ancient marble statues, the ancient stylisation of the Great Church and of St Michael, and the re-use of ancient facades for the gates of the seventh-century fortifications did thus not reflect urban size and population but rather the great past of Miletus, the civil pride and conservative attitudes of the city's leading families, and Miletus' role as seat of an archbishop.

In contrast, the hinterland developed differently from the city, with agriculture, the number and size of settlements, and the rural population all expanding during the early Byzantine period. The countryside may have profited from the reduction in urban size, population, and spending, possibly due to changes in the tax regime that now bypassed the cities, depriving them of an opportunity to siphon off rural surpluses and leading to lower tax rates for the countryside[196]; this would have enabled more country dwellers to live off the land and to cultivate less fertile ground that yielded a smaller surplus, too little for the high taxes of the Roman Imperial period, but enough for the lower dues of early Byzantine times.

The parting of the ways between city and countryside is confirmed by what happened next, during the middle Byzantine period. Whilst the countryside appears to have survived the Persian and Arab invasions without any major disruption, as is indicated by the pollen record, and rural settlements experienced renewed prosperity during the middle Byzantine period, when they were decorated with numerous fine marble carvings[197], the city of Miletus was destroyed and abandoned, its ruins buried and hidden by sedimentation, and its ancient name forgotten[198]. The site was resettled only once the Turks started to arrive in the region from the late eleventh century onwards, which led to a renovation of the citadel above the theatre and the establishment of a completely new fortified settlement on the adjacent hill, without any relations to ancient Miletus and with a new name, Ta Palatia, apparently a reference to the palatial ruins of the Roman city in the plain below (Fig. 2)[199].

The Turkish conquest in the 13th century was followed by a building boom in the area of the ancient city centre, around the main harbour, because Balat, as Miletus was now called, served as main commercial harbour for the Beylik of Menteşe[200]. The renewed prosperity collapsed again, when the Beylik fell prey to the Ottomans in the 15th century, probably because the latter had already established alternative trading routes elsewhere in western Asia Minor. Agriculture appears to have remained largely unaffected by the Turkish conquest and the urban revival under Beylik rule. This changed only, once the region became integrated into the Ottoman empire as well as being struck by detrimental climate change; now the agricultural hinterland followed the same downward trajectory as the urban harbour.

Overall, the case of Miletus demonstrates that city and countryside did not necessarily share the same fate in Byzantine Anatolia; this had already been

196 Bandes – Haldon 2000; Liebeschuetz 2001, 104–109; Niewöhner 2011a.
197 Niewöhner 2013, 190–205.
198 Niewöhner 2013, 228; Niewöhner 2016b.
199 Niewöhner 2013, 226–228.
200 Sarre et al. 1935; Kayhan Elbirlik – Baha Tanman 2011.

established for the fifth to seventh centuries[201] and has now been shown to also apply to the middle Byzantine period. Thus, the urban collapse and rural prosperity of middle Byzantine Miletus may have been the continuation and conclusion of the same ruralisation that characterised Anatolia in the fifth to seventh centuries. The Persian and Arab invasions of the seventh to ninth centuries would have held up and delayed this development temporarily through renewed investments in urban defences and the provisioning of the army[202], but any such urban boost appears to have waned quickly, once peace was re-established in the later ninth century.

Middle Byzantine prosperity was a rural phaenomenon that happened in the hinterland, without relation to the deserted city of Miletus. It follows that prosperity cannot a priori be taken to indicate urbanism in middle Byzantine Anatolia[203], to the contrary, the case of Miletus indicates the opposite. It also follows that the Turkish conquest in the 13th century or the many minor battles and skirmishes that preceded it since the late eleventh century cannot be blamed for a general de-urbanisation of the region[204], as ancient Miletus was deserted and destroyed already before the arrival of the Turks. The archaeology of Byzantine Miletus reveals that the current notion of Anatolian settlement history is largely unfounded; it will need to be revised on the basis of more archaeological evidence from other cities, as and when this becomes available.

201 Niewöhner 2007a.
202 Haldon 2012; Lightfoot 2012.
203 This appears to have been different in Greece, see Bouras 2002; Sanders 2002; Bouras 2010; Albani – Chalkia 2013.
204 Sarre et al. 1935, 12.

Abstract

Philipp Niewöhner, The Byzantine Settlement History of Miletus and Its Hinterland – Quantitative Aspects. Stratigraphy, Pottery, Anthropology, Coins, and Palynology

The Byzantine settlement history of Miletus, an ancient harbour city on the west coast of Asia Minor, was long obscured by a lack of quantitative data. This paper provides such data and fills in some crucial gaps in our knowledge of the urban development and in our understanding of the rural hinterland. The city appears to have lost much of its former population by the 6th century A.D., which was a particularly prosperous time for the surrounding villages. Thereafter, agriculture continued relatively undisturbed throughout the Persian and Arab invasions, the middle Byzantine period – with considerable prosperity at rural sites – and the Turkish conquest. The city, in contrast, was deserted during the middle Byzantine period. Middle Byzantine prosperity turns out to have been a rural phenomenon of the agricultural hinterland, and urbanism was dead long before the arrival of the Turks, who had to rebuild Miletus under the new name of Balat.

Keywords
Beylik of Menteşe • environmental history • Invasion Period • late antiquity • ruralization

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Sources of illustrations
Fig. 1: H. Brückner et al., On the Lion Harbour in Miletos, ProcDanInstAth 7, 2014, 62 fig. 11 • Fig. 2: Ph. Niewöhner – B. Weber • Fig. 3: H. Stümpel • Figs. 4. 7. 9. 11. 13. 15. 16. 18. 20. 22. 24. 40: Ph. Niewöhner • Fig. 5: D. Göcmen – Ph. Niewöhner – H. Stümpel • Fig. 6: Ph. Niewöhner – H. Stümpel • Figs. 8. 10. 12. 14. 17. 19. 21. 23. 25: E. Giagtzoglou – D. Leitold – Ph. Niewöhner – D. Priß – S. Rühl • Figs. 26–32: L. Dziobaka – E. Giagtzoglou – S. Rühl – N. Schwerdt – G. Teltsch – N. Ullrich • Figs. 33–35. 39: H. Sancaktar • Figs. 36–38: Ph. Niewöhner – H. Sancaktar • Figs. 41. 42: A. Izdebski
Tab. 1: Ph. Niewöhner – H. Sancaktar • Tab. 2–4: A. Izdebski

Abbreviations

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