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ARCHAEOLOGICAL INVESTIGATIONS AT ZIYARET TEPE 2003 – 2004

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Introduction

The seventh and eighth seasons of archaeological fieldwork at Ziyaret Tepe in the Diyarbakır province of southeastern Turkey [Fig. 1] were conducted between July and September of 2003 and 2004.[1] Dr. Timothy Matney (University of Akron) is the director and Dr. Lynn Rainville (Sweet Briar College) is the assistant director of the Ziyaret Tepe archaeological project. Ziyaret Tepe is thirty-two hectare site on the southern bank of the Tigris River comprising a multi-period high mound of three hectares and a surrounding lower town of twenty-nine hectares [Fig. 2]. The high mound has a long period of occupation ranging from the beginning of the Early Bronze Age to the end of the Assyrian Empire. The lower town was fully occupied only in the Middle and Late Assyrian periods when the city achieved urban status.

In 2003 and 2004, our work was guided by nine primary objectives. First, we planned to complete the stratigraphic step trench through the high mound at Ziyaret Tepe in Operation E giving a stratigraphic sequence spanning the Early Bronze Age through the Late Assyrian period (c. 3000 BC to 600 BC). This work was directed by Prof. Dr. Michael Roaf (University of Munich). Second, we continued the excavation of a complex of major Late Assyrian buildings in the lower town in Operation G where previous work

[1] Acknowledgements: As in previous seasons, we worked in close cooperation with the director of the Diyabakır Museum, Necdet İnal, and his staff. We were also assisted by our government representatives, Sema Dayan (2003) and Nurhan Turan (2004) of the Ministry of Culture and Tourism's General Directorate in Ankara, both of whom played invaluable roles in the running of the excavations and surveys. We are especially grateful to Necmi Yaşar and Mustafa Kılıçal, our hard-working cook and driver, respectively. Our work over the two years covered in this report was sponsored and funded by a number of universities, federal foundations, private foundations and donors. In particular, the academic sponsorship for the Ziyaret Tepe project in 2003 and 2004 came from the University of Akron (USA), Sweet Briar College (USA), University of Munich (Germany), Cambridge University (UK), and the University of Helsinki (Finland). Our principal financial sponsors included the National Science Foundation, the National Endowment for the Humanities, the Wenner-Gren Foundation for Anthropological Research, the Deutsche Forschungsgemeinschaft, the British School of Archaeology in Iraq, the University of Oxford Wainwright Fund, the British Institute of Archaeology in Ankara, the University of Cambridge McDonald Institute for Archaeological Research, the British Academy, the Headley Trust, the Curtiss T. and Mary G. Brennan Foundation, the Mednick Grant from the Virginia Foundation of Independent Colleges, The Royal Society, The University of Minnesota Duluth, the University of Akron, Sweet Briar College, and private donors.

had recovered substantial mudbrick walls, a well preserved pebble mosaic pavement, and a small archive of unbaked cuneiform tablets. Dr. John MacGinnis (Cambridge University) directed these excavations and Prof. Dr. Simo Parpola (University of Helsinki) is studying the cuneiform archive. Third, we opened a new trench at the southern edge of the lower town (Operation K) where magnetic gradiometry survey in 1998 identified the location of the city's fortification wall. An initial slit trench excavated in 2003 by Dr. John MacGinnis was considerably expanded in 2004 by Dr. Kemalettin Köroğlu (Marmara University) to reveal details of the city's fortifications during the Late Assyrian period. Fourth, we conducted an exploratory excavation on the high mound in 2004 in Operation L. Mr. Jeffrey Szuchman and Ms. Sara Kayser supervised this work. Fifth, in all of these Operations micro-archaeological samples were taken to better recover artefacts from everyday life in the ancient city. Dr. Lynn Rainville directed this work.

In addition to the excavations noted above, our team also conducted two surveys during 2003 and 2004. Our sixth overall objective was to continue a subsurface geophysical survey in the lower town at Ziyaret Tepe. Using the established technique of magnetic gradiometry, three previous seasons of geophysical mapping at Ziyaret Tepe (1998, 1999, and 2002) had produced a magnetic gradiometry map, which covered approximately half of the testable surface of the site. In 2003, additional magnetic gradiometry survey covered a large area, making our composite coverage of the site over 70%. While the results were generally very good in the lower town (see below), in 2004 we decided to test a new technique of geophysical mapping using an electrical resistance meter in the lower town, near the location of Operation K. The purpose of shifting to a new technique was to increase the resolution and detail provided by the geophysical survey. Additionally, we cut a narrow trench (Operation M) through a long magnetic anomaly discovered in the 1999 season in the lower town in order to ground-truth the cause of the anomaly and to aid in our overall interpretation of the site.

In 2004, geomorphological study at Ziyaret Tepe and its surrounding environs continued, with an overarching goal to understand the context of the Tigris River landscape during antiquity. A seventh objective, addressed in the 2004 season, was to use ground-penetrating radar methods to map subsurface features on the tell and in the Tigris floodplain, complementing our initial reconaissance survey results from 2002. This work was directed by Dr. Timothy M. Demko (University of Minnesota Duluth) and Dr. Kathleen Nicoll (University of Oxford). Our eighth objective was a two-year effort to conserve a hoard of copper and iron vessels and other artefacts from the Late Assyrian period recovered from secure contexts in Operation A on the high mound in previous seasons. Our conservation staff, comprising Mr. Philipp Schmidt and Ms. Mandy Reimann (FHTW-Berlin) has been in charge of the conservation project. And, finally, our ninth objective was to study the ceramic composition of several dozen sherds using ceramic petrography and X-ray diffraction techniques. This work was conducted by Dr. Timothy Matney with the assistance of Dr. Lisa Park (University of Akron).

What follows are preliminary assessments of work done towards each of these nine principal objectives to date.[2]

Excavations in Operation E
Michael Roaf

Operation E, the step trench towards the northern end of the eastern slope of the high mound [see Fig. 2], is directed by Michael Roaf of the Institut für Vorderasiatische Archäologie of the University of Munich and its excavation is part of the research project, the Northern Frontiers of Mesopotamia, funded by the Deutsche Forschungsgemeinschaft, as are the excavations at Giricano [see Fig. 1] on the north bank of the Tigris about 4km upstream from Ziyaret Tepe (Schachner et al. 2002, Radner et al. 2004). An initial season of excavation in 2000 at the top of the slope in Operation E revealed occupation layers dating from the Islamic period to the Middle Assyrian including a large Early Iron Age pit (see the following report on the pottery from this pit by Ms. Helen McDonald). The excavation of this pit was completed in 2001 and the excavation was extended down the slope uncovering layers belonging to the Mittani period, a Middle Bronze Age building destroyed by a violent fire which we called the Brightly Burned Building, and layers dating to the end of the third millennium BC (Matney et al. 2003: 183-186). The 2002 excavations were concentrated in the Middle Assyrian levels at the top of the slope and at the same time the step trench was continued down the slope in a series of ten 2.5m wide steps, revealing occupational layers some 14m deep all belonging to the third millennium BC (Matney et al. 2003: 177-183).

In 2004 we conducted a final season of excavations in Operation E [Fig. 3] exposing more of the remarkable Brightly Burned Building and exploring parts of the long third millennium sequence.

The area of the Brightly Burned Building (BBB)

The initial excavation of the BBB had exposed parts of two rooms in Area 9C. This year, under the supervision of Dr. Diana Stein and Mr. Peter Bartl, the area of excavation was extended 2.5m to the west and 5m to the north and to the south. The levels above the Brightly Burned Building are dated by the pottery, which is typical of the Mittani period throughout northern Mesopotamia (Pfälzner 1995: Taf. 1-66, Oates et al. 1997: 67-77). Since the pottery found in the BBB shows virtually no connections with this standard Mittani assemblage (Matney et al. 2003: 183-186, 207-209, Figs. 5-8), it seems likely that there was a gap in occupation at this point of the site. Nevertheless the upper parts of the hard fired walls of the BBB were still standing above ground when the site was re-occupied. A carbon sample from the collapse of the building (E-071)

[2] In addition to the named authors and excavators listed in this report we would like to thank the hard-working 2003 and 2004 house staff. Those individuals include Mr. Birger Helgestad (Registrar), Dr. Paola Pugsley (Illustrator), Ms. Azer Keskin (Assistant Ceramicist), Dr. Britt Hartenberger (Lithic Specialist), Dr. Haskel Greenfield (Zooarchaeologist), and Mr. Adam Allentuck (Zooarchaeologist).

processed by the NSF-Arizona AMS Laboratory (sample AA60269) has yielded a radiocarbon age of 3,309 ± 40 with a calibrated range of 1688 to 1500 cal BC (2 sigma).

The excavated part of the Brightly Burned Building consisted of two rooms and part of an enclosed courtyard [Fig. 3b]. Exterior surfaces to the north and east were also investigated. The line of the eastern wall of the BBB could be established but the western face of the wall was not preserved. No entrance was found into the northern room. The entrance to the southern room was in the southeastern corner and was partly destroyed by a later pit. The floors in the excavated rooms slope considerably. The floor of the southern room was covered with layers of differently coloured ash that may derive from the burning of straw. Since these layers are up to 50cm high, the amount of material that had burnt was considerable and it may be that this room was used for the storage of straw. In the micro-debris from above the floor of this room, analysed by Lynn Rainville numerous burnt bones of mice that were living in the room at the time of the fire were recovered.

The two rooms were filled with burnt debris. That in the northern room consisted of the collapse of the ceiling made out of straw and pebble tempered clay in which the impressions of the beams were preserved; above this were numerous fragments of a large unbaked clay container that got partly fired in the conflagration. The straw tempered clay ceiling and upper floor of the southern room was also fired and had collapsed as a unit. The lower side showed the impressions of reeds that had been resting on the beams that supported the floor. On this floor were found numerous pottery vessels (for a selection see Matney et al. 2003: Figs. 5-8) and, in the southwest corner, a bin made out of mudbricks. An interesting object found when cleaning the surface but probably coming from the southern room of the BBB is a baked clay female figurine with a belt and necklace [Fig. 3c].

South of the southern room was an open area, limited on the west, north, and east by mudbrick walls. It seems that the lower floor rooms were cellar rooms used for storage, while the upper rooms were used as living rooms.

The contemporary external surface to the north of the BBB was at a higher level and was covered with much less burnt debris (c. 20-30cm). It was eroded to the east and cut away to the north by the foundation for a later building. At the bottom of this cut the multiple white plaster layers on the walls of an earlier building could be observed. Further east the stepped entrance of the building was excavated. This building too was destroyed by fire and in the destruction debris was much burned debris, large pottery sherds, and burned brick fragments, several of which have unusual carved patterns in their surfaces. This building dates to an earlier phase of the Middle Bronze Age.

The third millennium deposits

In the third millennium levels three areas were selected for more detailed study under the supervision of Ms. Çiğdem Maner and Mr. Josef Heigermoser [Fig. 3a].

Below the BBB were a series of pebble floors and surfaces associated with a mudbrick wall. The most characteristic potsherds found in these layers are hemispherical Dark Rimmed Orange Bowls, which are most common in the Upper Tigris region but are

also found at several sites in northeast Syria (Oates et al. 2001: 161-162, Lebeau 2000: 174 and Table V on p. 188).

In the middle section of the lower part of the step trench (Areas 0B and 0C) the excavation of several pits yielded a valuable collection of Early Bronze Age ceramic as well as faunal and botanical remains.

In Area 1A the earlier occupation levels were cut by the foundation for a thick mudbrick wall. This wall was more than 5m wide: the eastern face of the wall and the contemporary surfaces both inside and outside the wall were eroded away. This wall was probably an encircling wall for the citadel. The bulk of the pottery found in the wall dates to the early Early Bronze Age. Cut by this wall is an ashy floor with smashed pots and three firedogs (andirons). The pottery includes pedestal bowls and sherds with pattern-burnish and many other types of surface decoration, dating to the early Early Bronze Age. From an almost contemporary pit cutting this floor came much early EBA pottery and a stone cylinder seal with a geometric design [Fig. 3d].

The lowest steps of Operation E consist of wash derived from higher up the slope. From these layers comes the only fragment of a bevelled rim bowl found at Ziyaret Tepe. It is likely that there was no substantial settlement at Ziyaret Tepe in the Late Uruk period and that its origins date back to the beginning of the Early Bronze Age.

Pottery from the Early Iron Age Pit (E-032)
Helen McDonald

Pit E-032 was excavated in the 2000 and 2001 seasons (Matney et al. 2002: 66-67, Figs. 22-23). The pit had slightly sloping sides, 3m wide by 2m deep, and had been cut into the Middle Assyrian levels from a surface that no longer survives. Initially it was probably a grain storage pit and was only later filled with sherds and other debris. It was subsequently cut by a rectangular pit lined with mudbrick walls that contained Neo-Assyrian pottery. Thus Pit E-032 is stratified between the Middle and Late Assyrian periods.

The two most distinctive groups of diagnostic pottery in the pit are sherds from predominantly handmade vessels of the Early Iron Age (169 sherds) and residual sherds from second millennium wheelmade vessels including Middle Assyrian and Mittani (130 sherds).

The grooved and associated Early Iron Age pottery seems to fall into six fabric groups.

1. The most common fabric in the pit has pink/yellow surfaces and paste from common to abundant fine white mineral and fine vegetal inclusions, sometimes with larger white mineral inclusions. Grooved sherds with similar inclusions and colour occur on a number of nearby sites north of the Tigris (Köroğlu 1998: 72, Fig. 16).

2. The second fabric type has similar inclusions to the previous but the colour is grey-brown or yellowish-brown (possibly a sub-type of Fabric 1).

3. A gritty brown or orange fabric with either no vegetal inclusions or sparse/ occasional medium sized vegetal inclusions.

4. The fourth fabric type has inclusions similar to those of Fabric 1 but finer and less frequent. It is pink/brown in colour with a reduced core and heavily burnished surfaces.

5. A cooking fabric broadly similar to the fabric of cooking pots at other periods. Black or brown surfaces with common to abundant medium white mineral inclusions and a burnished exterior.

6. A fabric with fine mineral inclusions only. The colours vary from orange/brown to pink or buff and some have a reddish or brown paint applied in bands, zigzags, and splodges. The vessels in this fabric group are almost all wheelmade. The association of wheelmade painted vessels together with handmade vessels is most clearly demonstrated by the warrior's grave at nearby Grê Dimsê in which complete examples of a handmade grooved bowl and wheel-made painted jar were found (Karg 2001: 670, Fig. 9).

Forms in Fabric 1

This is the most common fabric with 111 diagnostic sherds, about half of which have grooved decoration.

A. The grooved vessels divide as follows:

i. Hemispherical bowls with simple, sometimes slightly inturned, rims and one or two grooves (nine examples, six with a slight burnish) [Fig. 4.2]. Diameters mostly fall between 11 and 15cm with one example at 18cm. This shape occurs the nearby sites of Giricano and Köpekli and Habibuşağı in the Elaziğ area (Köroğlu 1998: 72, Fig.16:5; Köroğlu 2003: 234, Fig.2:11,12; Schachner 2003: 159, Fig 6c).

ii. Bowls with a simple rounded rim and usually two or (less commonly) three grooves (14 examples, ten burnished) [Fig 4.4]. Four have diameters of between 34 and 36cm and three others range between 16 and 22cm, the smallest is illustrated in Fig 4.7 with a diameter of 11cm.

iii. Bowls with an internally bevelled rim and two or three grooves on the exterior (12 examples, seven burnished; Fig. 4.1 and 4.5). It is only the sharpness of the bevel that distinguishes this group from the previous one and only the angle of the rim that distinguishes it from the following group.

iv. Bowls with a flat ledge rim and two or three grooves (four examples, two burnished). Where the diameter can be measured it is either 21cm or around 30cm.

v. Carinated bowl with three grooves above the carination. There is only one example in this fabric [Fig. 4.3], while the same form is also found in Fabric 4. The same shape occurs at Köpekli (Köroğlu 1998: 72, Fig.16:2).

vi. A single example of a small, deep bowl or cup with one groove and a carination [Fig 4.6].

vii. Hole mouth vessels. There are three fragmentary examples in this fabric and each is different. In addition to the above, the pit has six grooved rim fragments that could be from either bowl type i or type ii and six body sherds that could go with type ii or type iii bowls.

B. Bowls without grooves (25 examples, nine burnished).

i. The majority have simple slightly out-turned rims and seem to fall into two size groups. The larger vessels have diameters that vary from 18 to 36cm and half are

burnished [Fig. 4.9 and Fig. 4.12]. Of the smaller bowls only two have readable diameters (14 and 16cm). One of the smaller vessels is heavily over-fired, almost a waster, perhaps indicating it was made at the site [Fig. 4.8].

ii. Two bowls have flat top rims. One of these is the most heavily burnished rim in this fabric, otherwise burnishing is subtle or slight [Fig. 4.11].

iii. A plain carinated bowl is the single example of this sort in the pit.

C. Jars, with simple out-turned rims and a gentle slope between neck and shoulder (14 examples, five burnished). Rim diameters vary from 10 to 16cm, with most falling between 13 and 15cm [Fig. 4.10]. Also related to this group are two shoulder sherds with three or four incised grooves on them and three handles with one or two longitudinal grooves.

D. Bases. These are rounded, slightly flattened or flat and come in two size groups. Three smaller rounded or slightly flattened ones possibly go with the hemispherical grooved bowls or the smaller of the plain bowls without grooves. The larger two flattened bases could be either bowl or jar bases.

E. Body sherds and incomplete items. One body sherd in this fabric has a shallow slashed ridge (cf. Köroğlu 1998: 72, Fig.16: 3,11) while another has a knob lug below an incised line.

Around three quarters of the grooved bowls in Fabric 1 have surface smoothing or a slight burnish. The plain bowls are less frequently burnished. Wet smoothing is more common on jar rims than bowls.

Forms in Fabric 2 (15 sherds in total, two burnished)

Most of the sherds in this group come from jars of a similar shape to those in Fabric 1 (five jar rims, five jar neck/shoulders). Diameters fall between 8 and 12cm, except for one at 24cm. One rim has a brown wash on the surface [Fig. 5.13], another has a handle with dent at the top and two grooves [Fig. 5.15]. Three jar necks have a couple of incised lines [Fig 5.14] (cf. Bartl 2001: Fig. 5 nos. 3-5).

Forms in Fabric 3 (13 sherds)

Jars also predominate in this fabric and the shapes are again similar to those in Fabrics 1 and 2 (three rims, three neck/shoulders). One of the jar rims seems to have a brown wash (or some surface staining) perhaps similar to a rim in Fabric 2. The jar shoulders have shallow grooves rather than narrow incised lines. The handle on a rim [Fig 5.16] has one groove and a dent at the top, while another handle has two dents down the handle. The four flattened bases have diameters between 11 and 17cm.

Forms in Fabric 4 (seven sherds, all heavily burnished)

Most of the vessels in this fabric are grooved. They include an elaborately incised, inturned rim bowl [Fig. 5.17] (cf. Bartl 2001: Fig 2:1), two carinated bowl rims [Fig. 5.18], and hole-mouthed cooking pots. The latter vary in colour from the usual pink brown to black. Of the plain bowls one is flared, the other shallow and rounded.

Forms in Fabric 5 (15 sherds, all burnished)

All the rim sherds in this fabric are from hole-mouth cooking pots with two to four grooves and the occasional lug and spout. Five sherds are from one vessel that has three lugs and remains of a spout [Fig 5.19]. This is one of the classic EIA grooved pottery forms, referred to by some researchers as Groovy Pottery, as identified by Karin Bartl and found at Tell Halaf, Norşuntepe, Lidar, and Tille (Bartl 2001: Fig 4; Muller 1999; Blaylock 1999: Fig.3) [Fig. 5.20]. Recently a few sherds of this type have been found on sites in the Habur triangle as part of the Tell Brak survey.

Forms in Fabric 6 (eight sherds, only one burnished)

The wheelmade painted sherds in this fabric are from jars and bowls [Fig. 5.21] (cf. Bartl 1994: Fig. 15; 2001: Fig 3, nos. 12-15; Blaylock 1999: Fig. 1). The unpainted fragments in this group include two jar rims and a small cup or beaker, the latter being the only possibly handmade vessel in this fabric. This wheelmade painted pottery is clearly associated with the handmade grooved pottery at several sites. However at Tille it occurs at the site two building levels before the grooved pottery is found, which might suggest that it has a different origin (Blaylock 1999: 265).

The grooved and related handmade pottery from Pit E-032 date to the period between the loss of control of this area by the Middle Assyrian empire and some time after the reassertion of Assyrian power by Assur-nasir-pal II. The tablets from nearby Giricano indicate that Assyrian control was still apparent around 1063-1056 BC when the tablets were written, but may have been lost soon after (indicated by the failure to recover current legal documents) (Roaf and Schachner in press). The arrival of this distinctive grooved pottery may not have been immediate and it is possible that its use may have continued for some years after the reassertion of Assyrian control in this area. Whether once Late Assyrian ceramic forms were in use in the areas of Assyrian political control, grooved pottery may have continued in some in the areas outside that control, is also an open question.

Although there is a growing body of literature on the various areas in which some form of grooved pottery is found, it now seems that a regional approach is the most useful (Bartl 1994, 2001; Roaf and Schachner in press). Recent work by Köroğlu on the grooved pottery of the Van area (which unlike that of the Elazığ and Ziyaret Tepe areas is wheelmade) suggests that in the Van area grooved pottery is contemporary with the Urartians (Köroğlu 2003). In other words, in the Van area grooved pottery is Middle, rather than Early, Iron Age. Therefore it seems most useful to relate the Ziyaret grooved pottery to sites in the immediate area or to those in the Elazığ/Karakaya area to which it seems to have most in common with regard to manufacture and date. That is not to say that the excavators of sites on which it is found in these areas are always in complete agreement. The excavators of Tille have preferred a slightly later date for the arrival of grooved pottery there, due in part to the presence of the Early Iron Age painted pottery two levels before the grooved pottery (Blaylock 1999). However Muller has recently attempted to bring the chronologies of Tille and Lidar together and if he is correct grooved pottery at both sites would date between 1050 and 900 BC (Muller 2003: Fig. 2).

Results of the Excavations in Operation G
John MacGinnis

In 2003 and 2004 we continued excavations in Operation G, the area in the lower town southwest of the high mound to which we had originally been drawn by both the local topography and the results of the geomagnetic survey [see Fig. 2]. Dr. John MacGinnis directed work in this area. The first two seasons, in 2001 and 2002, yielded the remains of substantial architecture with a classic Assyrian pavement of black and white cobbles arranged in checkerboard fashion (Courtyard 2) and rooms whose fill contained cuneiform tablets (Rooms 9 and 10). Although at first we thought these were part of a single complex, it now seems that they are in fact parts of two separate buildings. Furthermore, although we are not in a position to make a final interpretation, it may be that some of the architecture recovered in the 2004 season belongs to a third building; that is to say it is not yet entirely certain whether the ranges of rooms surrounding Courtyards 11 and 20 belong to a single complex. In these operations a total area of 400m^2 was opened up in 2003 and 500m^2 in 2004. The following participated as site supervisors: Céline Beauchamp, Mary Shepperson, Jeffrey Szuchman, David Dorren, and Carl Hayward.

Building 1 (Eastern Building)

This building, where we first found the checkerboard mosaic pavement (Courtyard 2), has now been almost entirely excavated, the exception being a part of the southeastern corner [Fig. 6]. In this area the structure is too eroded and too close to the surface to yield good results in excavation. In the 2003 season we worked in the area north of the courtyard, where we traced the walls of a long room (Room 4) running parallel to the courtyard with a small room approximately 3m square at the end (Room 19). Both were then excavated down to floor level. On the floor of both rooms a number of bronze fragments were found and a clay seal impression was recovered from near the door of the square room. The floors of these rooms were made of thick red plaster that was re-laid at least three times. After photography, the floor was divided into a 50cm grid and a one litre soil sample taken from every square for micro-debris analysis (see below). The remaining soil was taken for flotation. To the east of this area we excavated a portion of the north side of the building left over from previous years and in so doing uncovered two more *pithoi* built into the structure of the building. The remains of the building south of the courtyard were also uncovered, but due to erosion in this area this amounted to little more than tracing the lines of the walls (Room 18), with no good surfaces found.

Building 2 (Western Building)

This is the building where the tablets were first found in 2002 and is centred around Courtyard 11. In 2003 we excavated the remaining southern half of Room 10 and, among other things, recovered a further six cuneiform tablets and tablet fragments [see Fig. 7]. Opening up a trench to the west of that room we were at first puzzled by our inability to detect any lines of mudbrick walls until it became clear that we were coming down onto a different type of surface: a second checkerboard pavement filling almost the

entire trench (Courtyard 11). The pavement measures 11m across and is predominantly composed of squares divided by St. Andrew's crosses into alternating triangles of black and white stones. But there are many irregularities. For a start, the "squares" vary widely in size and most are, in fact, rectangles: some examples of measurements are 88 x 60cm, 63 x 63cm and 88 x 82cm. There are also areas where the squares are just black or white, and also some that are divided into two triangles, rather than four. Secondly, there is a curious feature where four baked bricks have been let into the pavement forming the corners of a rectangle measuring 1.9 x 1.1m. We do not know what this is, but possibilities would be supports for a table, bed, or even throne base. Thirdly, there are three areas where the pavement has been cut into and the area then relaid with much larger and rougher blocks. These areas all measure approximately 150 x 80cm. Our best guess is that they were graves. A fourth feature was a pit cut into the pavement, 30cm wide and 40cm deep, and lined with bitumen - possibly a fixture for a water jug. Finally, there was a shallow gutter running across the pavement ending in a drain capped by a baked brick with a 10cm hole in the centre. A large part of a clay tub was found overlying this drain. Future excavations will hopefully confirm whether this was a bathtub coffin, an actual bathtub, or yet a different feature.

Building 3

This designation refers to the suite of rooms grouped around Courtyard 20 [see Fig. 6]. The remains of this building are, on the whole, well preserved. In the rooms investigated to-date, there has been a coherent assemblage of ceramics and the overall impression is that this house was more hastily and peremptorily abandoned than Building 1. Building 3 has provided a number of interesting architectural details. The inside walls were originally covered with a thin layer of white plaster but this was then covered with a layer of grey mud plaster 2 to 3cm thick, onto which a second layer of thin white plaster was then laid. The evidence for two distinct phases is also observable in the floors. In the most northerly room (Room 15), work in 2003 revealed that the original floor was made of baked bricks, presumably for a water installation of some kind, but this was then overlaid with the same sequence of grey mud plaster followed by white lime. In the case of the floor, the lime plaster was then selectively overcoated with black paint to create a pattern of concentric rectangles. In the underlying baked brick pavement one of the bricks had a hole approximately 12cm wide, stopped with a stone ball. Our provisional interpretation of this unusual feature was that it was a drain blocked up before the room was converted to its new use. This was confirmed when work on Room 15 was resumed in 2004. After careful excavation of the plaster, we lifted part of the pavement itself to reveal an excellently preserved drainage system ending in a sump approximately 2m deep and filled with stones to the greater part of its depth. Another noteworthy feature is that in the layer overlying the floor in the southwest room of this building - a layer which we believe to be the remains of roofing collapse - we found a number of patches of bitumen with stone inclusions, which may have formed waterproofing for the roof.

Excavation in the trench to the southwest exposed a complex of rooms all of which showed signs of multiple phasing with doorways blocked, floors relaid, and walls repaired and rebuilt in a manner clearly inconsistent with the original layout of the

building. In a long (12.6 x 3.7m) room on the east side (Room 16), removal of the upper floor exposed a cobbled area measuring 2.9 x 1.4m. The function of the feature is unknown, but a curiosity is the occurrence of an uninscribed, baked clay hand of Ishtar in amongst the other stones.

As regards Courtyard 20 itself, it is another checkerboard pavement - the third found at Ziyaret Tepe - and in fact the best made so far [Fig. 8]. The squares are neatly and evenly laid and all measure fairly consistently in the region of 55 to 58cm^2. An unusual feature is the remains of a staircase built out of mudbrick with baked brick treads preserved to a height of three steps on the northern side of the courtyard.

Immediately to the north of this area are the remains of a kiln, initially identified last year but not excavated until this year [Fig. 9]. It is a substantial structure, measuring approximately 5m long and 2m across, and preserved to a depth of 1.6m. Cleaning of the upper part revealed a network of at least fourteen plastered flues, averaging 10 to 15cm in diameter. The cutting of a section through the kiln revealed that it was built into a large pit lined with clay and that a number of firings took place, with a new platform being constructed for each firing, and the remains subsequently shovelled into the pit; that, at any rate, is the scenario which seems to best account for the layers of burnt clay packed to a depth of more than a metre below the floor as currently preserved.

Soundings

Soundings were carried out in two locations in Operation G in 2004. The first of these, Sounding G-S4, was on the eastern side of Building 1, first dug in 2003 and re-excavated this year in order to clarify some details. In this location we found that the floor of the building was laid on a substantial packing of clay some 25cm thick. This, in turn, was above a cobbled surface (possibly a street), which was itself above a layer of mudbrick collapse and a band of redeposited natural clay, all together approximately 1m thick. Finally, at the bottom of the sounding we found a white plastered surface. Although time did not permit further excavation here, it has been convincingly demonstrated that an earlier level of occupation existed in this area. Unfortunately, there was very little in the way of datable material on this surface. Our second sounding, Sounding G-S5, was put down through the floor of the southern tablet room (Room 10) of Building 2. This came straight down onto a lower floor constructed on a layer of mudbrick collapse/infill with a giant *pithos* (1.40m tall) set into it. Below this was evidence of two previous architectural phases with associated Neo-Assyrian pottery.

Overview of the Tablet Archive

Simo Parpola

When excavations started at Ziyaret Tepe in 2000, it was hoped that the site might yield textual evidence shedding fresh light on the little-known last years of Assyria. This goal was realized in August 2002 with the discovery of 21 unbaked cuneiform tablets in a large building uncovered in Operation G [Fig. 7]. The tablets found were, for the most part, short, ephemeral administrative documents, which, under normal circumstance,

would have been routinely destroyed at the end of an accounting period. They probably escaped this fate only because the part of the building concerned was burnt and abandoned before the accounts could be settled. Two of the tablets (ZTT 1 and 4) were dated by year-eponyms, the former by the well-known Nabû-tapputu-alik, who probably held office in 613 (± one year), the latter by a previously unknown Aššur-šarrani. Several other tablets were dated by month and day only, mostly in the third and fourth months of the year (ZTT 1, 2, 3, 11, 12, 13, 14, 17). It is very likely that these texts date from 611 BC, the year following the fall of Nineveh, and this is almost certainly the year in which the new eponym has to be placed (cf. Grayson 1995: 95, lines 53-55).

The tablets were dispersed in two rooms (Rooms 9 and 10) that were connected by a doorway. These premises, situated alongside a mosaic-paved courtyard, must have functioned as a granary, since the larger room (Room 10) contained three pithoi, each capable of holding up to 10,000 litres of grain, and most of the tablets deal with barley. Two documents (ZTT 1 and 2) found in the smaller room record the receipt of 76,000 litres of barley on Nisan 20 and 26 — a quantity sufficient for feeding 2,400 persons for a month and 200 persons for an entire year. The documents from Room 10 are mainly concerned with the storage and distribution of grain. In ZTT 12 and 13, substantial quantities of barley – 10,800 and 2,000 litres respectively – are issued to the *akītu* festival and to a harem (*bēt isāti)*. In ZTT 11, a manageress of the harem *(šakintu)* receives 4,000 litres of barley; and in ZTT 14, bakers receive 200 litres of barley "for the governor's reception" (*ana pānāt pāhiti).* Various villages *(kapru)* and individuals figure as sources of the grain. A "granary of the house of scholars/experts" (*karmu ša bēt ummâni)* containing 42,100 litres of barley is mentioned in ZTT 13.

All the documents dealing with the receipt, storage, and issue of grain were found next to storage jars, thus, they were perhaps originally kept for reference on the storekeeper's desk or in baskets placed on the floor. However, the more valuable documents seem to have been kept elsewhere. A sealed document recording a loan of grain (ZTT 4) was found next to the northern wall of Room 9, and may have been stored on a wooden shelf or in a cupboard attached to the wall.

Other tablets found during the 2002 season include an unusual conveyance recording the handing over of a 'man-woman' *(assinnu)* to a whitewasher (ZTT 6); an unusual loan of garments involving a sworn pledge (ZTT 8); a list of young women and a male (ZTT 9); and a fragmentary letter possibly referring to a prophet and resettlement of people (ZTT 19). In ZTT 6, the owner of the 'man-woman' is identified as Sasî, scribe of Ishtar of Nineveh. This man also occurs in two other texts: ZTT 1, where he receives a large quantity of barley, and ZTT 4, where he witnesses a loan of grain administered by a certain Ahua-eriba. Even though he is not identified by title in these texts, which come from different rooms (ZTT 6 from Room 10, the others from Room 9), it is evident that the same person is being referred to, since the said Ahua-eriba also appears as a witness in the *assinnu* text. In addition to Ahua-eriba, still another witness in ZTT 6, Ubru-Issar, appears as witness in ZTT 1 together with a man named *Ša-ili-dubbu*, and both also occur in ZTT 2 and 3. One may conclude that all these men were permanent members of the establishment owning the granary, which, based on the title of Sasî, can only have been the temple of Ishtar of Nineveh (cf. Cole and Machinist 1999: nos. 8-15, esp. no. 13).

This conclusion agrees well with the contents of the tablets. The *assinnu* was a devotee of Ishtar, and one may note that the names Ubru-Issar ("Client of Ishtar") and Ša-ili-dubbu ("Speak the word of god!") make very good sense in the context of the cult of Ishtar, as do the references to the *akītu* festival, the harem, and the prophets (see Parpola 1997: xlvii). The young women listed in ZTT 9 were almost certainly to be incorporated in the harem. The whitewasher figuring in ZTT 6 would have bleached the robes of the clergy of Ishtar (cf. Attridge and Oden 1976: § 42) and the garments mentioned in ZTT 8 could have been produced in the workshops of the temple. Thus, there is every reason to believe that the large building uncovered in Operation G was, if not the temple of Ishtar itself, at least an important part of it, perhaps its treasury (see below). The villages providing the grain for the granary would have been donated to the temple by a royal grant.

During the 2003 season, seven more tablets were found at the southern wall of Room 10. The most important of them is a long and well-preserved letter (ZTT 22) from a certain Mannu-ki-Libbali to 'his lord.' The title of the addressee, who possibly was the official in charge of the whole building where the tablets were found, is unfortunately almost completely broken away but is almost certainly to be restored as "treasurer" *(masennu)*. This official (cf. Mattila 2000: 24-25) would have been the superior of the temple scribe Sasî as well. The writer explains that he had been unable to put together a chariotry unit for lack of horses, officials, and professionals, and he ends the letter on a gloomy note: "Death will come out of it!" *(muātu ina libbi illaka)*. This unique text is probably the last extant Assyrian letter and may have been written shortly before the fall of the city.

A small, rather damaged tablet from the same spot records the issue of ten minas of copper(?) to a prophet, an augur, and a temple (ZTT 25). The remaining texts from the 2003 season are very fragmentary and little can be said about their contents. Two of them (ZTT 23 and 24) deal with the receipt and/or delivery of barley, while one large vertical tablet broken into many tiny disjoined pieces (ZTT 26) may be a purchase of fields.

The tablets discovered so far do not positively prove the identification of Ziyaret Tepe with ancient Tušhan, but they do provide a great deal of valuable information about the site. We now know that the city was, like Tušhan, the seat of a provincial governor and a royal harem (cf. Fales and Postgate 1992: no. 23:12), and that cuneiform script continued to be used there down to the end of the Neo-Assyrian period. What is more, to judge from the onomastics of the tablets, its population at this late period was still predominantly Akkadian. This implies that many more tablets, including a major archive or library, are likely to be discovered in future excavations of the lower town, particularly in the area of Operation G.

Excavations in Operation K

Kemalettin Köroğlu

Magnetic gradiometry surveys carried out previously at the southern edge of the lower town indicated the existence of a thick wall running in an east/west direction and a gate or tower in an area designated Operation K [see Fig. 2]. Results from electrical

resistivity surveys carried out this season echoed this interpretation (see below). The original goal of excavations in Operation K was to reveal the fortification wall and gate and to date them. In 2003, a 2.5 by 15m area was excavated, verifying the existence of the fortification wall. In addition, we recovered the remains of domestic architecture adjacent to the interior of the city wall. A second goal of the excavations in Operation K has been the elaboration of these domestic structures. In 2004, the work area was extended to include a 10 by 20m area [Fig. 10]. Dr. Kemalettin Köroğlu directed these excavations, assisted by Mr. Adam Allentuck and Ms. Gülay Dinçkan. The lower town fortification wall, the settlement within the wall, and post-Assyrian building levels were investigated within Operation K.

Previous excavations in 2000 in Operation D revealed an analogous mudbrick tower or gatehouse associated with the city wall at the eastern limit of the lower town (Matney et al. 2002: 60-61).

Lower Town Fortification Wall

A deep sounding (K-031) excavated in 2003 and 2004 on the interior (north) and exterior (south) of the lower town fortification wall provide information about the building phases and date of the wall. It seems that, prior to the construction of the wall, the Assyrian builders raised the area artificially by creating a terrace, which is up to 4m high. Within this fill layer, ash clusters and the lack of pottery sherds found within the fill confirm this interpretation. A few pottery sherds found at about 1.2m below the foundation level of the wall were identified as Dark Rimmed Orange Ware, which is dated to the end of the 3rd millennium B.C. This suggests that the soil used to build up the terrace may have been taken from an earlier settlement in the vicinity.

The exterior fortification wall is about 2.6 to 2.8m thick and was built into a foundation trench dug into this terrace fill [Fig. 10]. As inferred from the deep sounding opened in 2003, a wide area outside the wall was cleared and leveled prior to the wall's construction. Subsequently, a 30cm wide and 10cm deep drainage channel was dug adjacent to the wall's foundations. The top of this channel was then covered by a horizontal mudbrick course. A second course of mudbricks was placed over the first at a slope in order to protect the junction of the foundation trench and the wall by keeping water from entering the foundation trench. Later, this drainage system and the foundations of the mudbrick wall were covered by a clayey fill that was as much as a metre thick. Alternating layers of sand and mud covered the clayey fill to a depth of about 60cm. This layer served as a drainage path for pulling water away from the base of the wall. Finally, the sandy layers are covered by a 13-14cm thick mud layer and a capping surface comprising a mixture of sand and pebbles. This pebble floor must be a surface that was in use at the same time with the wall. The total thickness of these fills is between 1.8 and 2m. Similar fills were identified in another sounding (K-082) that we opened on the exterior side on the western section of the wall in 2004. However, more pebbles and mud are mixed in with the sandy layer to the west. Here, the pebble layer on the surface is about 30-40cm thick.

It is difficult to explain such an effort to protect the foundations of the lower town wall from just rainwater. The intentional terracing fill and the methods employed to

protect the exterior surface from water suggest that there could have been a streambed just to the south, and therefore a risk of occasional flooding.

In 2004, a 10m long section of the wall extending in a northwest/southeast direction was excavated. The wall was built of sun-dried mudbricks. Several different coloured mudbricks were used for this purpose. The dimensions of the mudbricks are 38-40 x 38-40 x 12-13cm and 18-19 x 38-40cm (for half mudbricks). Below the ground level six, or six and a half, mudbricks were laid side by side to form the 2.6m thickness, with 4 to 9cm thick mud mortar between the mudbricks. On the higher levels a thickness of 2.8m was formed by seven mudbrick lines. Red mudbricks with white lime inclusions were used in the upper courses. These red mudbricks were of poor quality and did not preserve well. Mudbricks made of light coloured clay were used on the foundation. These light coloured bricks had less sand and more chaff inclusions that the red mudbricks.

It is not clear whether the use of different coloured mudbricks above the foundation level points to a different building phase or, possibly, to a later repair phase. On the ancient surface level, there are some clues indicating that the wall may have shifted to the south at some point. This suggestion is supported by the presence of mudbricks added to the exterior façade. There was no preserved evidence for the height of the wall in this area except for a few courses of mudbricks above the foundations where the accumulation can be interpreted as the collapse of the upper portion of the wall (no thicker than 30cm). It can be assumed that the upper portion was removed by modern agricultural activity as well as by erosion.

There are a few clues to the date of the wall. A grooved pottery sherd was found in the clayey soil over the foundation level in sounding K-082 in the western section. The grooved pottery, being completely handmade, is very different from Middle and Neo-Assyrian pottery. This type of grooved pottery was found in the levels immediately above the Middle Assyrian settlements at Üçtepe, Giricano and Ziyaret Tepe in the Upper Tigris region, as well as in surveys of the region (Roaf and Schachner in press). This sherd suggests that this fill associated with the wall dates sometime during or after the Early Iron Age. The suggestion that the lower town wall was built in the Late-Assyrian period is supported by the artefacts from a domestic area found adjacent to the city wall.

Domestic area

About 2.5m to the north of the lower town wall a structure was uncovered. Built parallel to the wall the probably domestic structure included at least four rooms and a stone paved courtyard [Fig 10]. It seems that the city wall and interior structures were planned and built contemporaneously. There is little information as to how the space between the building (Rooms A-E) and the fortification wall was used. The ashy gray soil accumulation in this area is different from the earlier fill. Also, the floor of an oven found within this grey soil is stratigraphically above the foundation trench and the earlier fill. This indicates that the space was used at some point by the inhabitants of the building complex to the north.

The walls of the building to the north of the fortification wall are also made of mudbricks. The dimensions of the mudbricks are the same as those that were used to

build the fortification wall. The thickness of the domestic walls varies between 80 to 90cm, depending on the thickness of the mud used as mortar.

Among the rooms found side by side and parallel to the lower town wall, the one at the centre (Room A), together with some *in situ* finds in it, was completely excavated. Most of the information on the dating and the function of the building came from this room. The dimensions of the room are about 4 x 3m, and there are two *tannurs* in it. One is in the southeast corner of the room, and the other is on the northwest section of the room, flush with northern wall. The *tannurs* lie on the floor level, and are separated from each other by a small dividing wall or platform made of a single course of mudbrick. The *tannur* in the southeast corner was mostly complete. The *tannur* is composed of pottery sherds, mud and mudbrick pieces to keep the heat in. The flue is to the north. The second *tannur* is much more damaged; only the floor and lower body has survived. It is possible that the one to the south was built after the one to the north was damaged.

An *in situ* broken pot was found on the floor of Room A, next to the west wall. Against the south wall are the traces of a platform, which was possibly a bench. A layer of 20-25cm thick ash and mudbrick collapse on the room floor was found, and above that were some traces indicating that the roof may have been covered with reeds. The entrance of the room is not clear. However, a stone door socket in front of the north wall may indicate that there was a passage from the stone paved courtyard (Room E) into this room.

Among the findings from Room A are small conical stone and clay tokens and beads, pottery sherds dated to the Late-Assyrian period, one nipple based goblet sherd, and Palace Ware quality goblet sherds. These finds also show that the area was not only used as a bread-making area, but it also housed some part of daily life, and this room functioned as a kind of kitchen.

Room B, to the west of Room A, is 2m wide. Its south wall is 70cm offset to the north from Room A's south wall. Three of the Room C walls in the eastern portion of the trench were identified; the fourth (eastern) wall was beyond the excavation area. The excavation below the floor level revealed a burial and a cobble feature. The burial pit, which was dug parallel to the west wall of the room, also cuts the stone feature below. A prone, extended burial was placed in the pit with the head directed to the north.

A 4.4 x 5.8m courtyard (Room E) associated with these rooms is located to the north of the Room A. This courtyard has an irregular pebble-paved surface with baked bricks inserted in between the pebbles on its southern portion. At the centre of the pavement is a well, surrounded by river pebbles. This well and the pavement bricks are similar to those that were used in the Late-Assyrian building levels in other parts of the mound. In front of the wall, separating the courtyard from the room to its west are two *tannurs*. As with the ones in Room A, these *tannurs* were placed on the floor and were thickened by pottery sherds of the same type. There is no stone pavement around the *tannurs*. This room has at least two occupational phases. When the *tannur* to the east was worn, the floor was raised and a new *tannur* was built. The brick pavement may also belong to this later phase. Although not very clear, mudbrick remains indicate that this area was used as a semi-open space with supports on each side. The last room excavated to the west of the courtyard (Room D) measures 2.8 x 2m.

No signs of a fire or intentional destruction of this complex building were found. The area appears to have been largely uninhabited since its abandonment in the Late Assyrian period. The latest occupational level within the excavation area comprises the remains of two unassociated features made of river cobbles and some pottery sherds. This level was immediately below the plow zone. Two complete pots found in the topsoil may belong to this building level. One of the cobble features is located just above the cobble-paved courtyard. The fact that the features do not form a plan and that there are no associated floors suggest that these might belong to temporary occupants. There are indications that the Operation K area may have been used as a graveyard in later periods as a few poorly preserved burials were found in the later levels.

Excavations in Operation L
Jeffrey Szuchman and Sara Kayser

Excavation of Operation L began in 2004 on the western portion of the high mound in grid square N1080 E1030 [see Fig. 2]. The trench supervisors were Mr. Jeffrey Szuchman and Ms. Sara Kayser; they were assisted for two weeks by Mr. Mesut Alp. The aim of this new operation was to determine the nature of Assyrian occupation at the very top of the mound. In general, subsurface geophysical survey techniques, employed widely across the site, have not been informative in mapping remains on the high mound (Matney et al. 2002: 199). Subsequently, we have returned to more traditional excavation techniques in order to document the nature of occupation on the high mound. The placement of the first trench in Operation L was therefore determined primarily by the results from Operation I, a series of eight small soundings between Operation E and Operation B that were excavated in 2001 (Matney et al. 2002: 71-72). These soundings suggested that substantial Late Assyrian architecture, including a possible terrace platform, lay more than one metre below the surface.

Late Assyrian/Post-Assyrian Room (Phase A)

At least three phases of occupation were identified in Operation L. The earliest phase, Phase A, is represented only in a 5 x 5m sounding within the original grid square. In the final weeks of the season, we concentrated on this smaller square to increase our chances of finding Assyrian levels in the 2004 season. We located our sounding in the southeast corner of the original gridsquare based on the presence of six large cobbles that lay at the bottom of a pit that had been dug from the Medieval Phase B level, and that appeared to be part of a larger feature [Fig. 11]. These stones comprised the southern portion of a feature that resembled the drain found in the bath in Operation G (Building 3, Room 15). Eight flat-lying, baked bricks were arranged in a 0.75 x 0.55m rectangle, two bricks wide and four bricks long. A large groundstone stood upright between the first and second rows of bricks from the north, resembling the standing baked bricks of the Operation G drain. In the centre of the bricks was a rectangular hole that measured 0.25 x 0.13m, formed by the distancing of two small bricks, and an intentional break in a third, larger brick. Directly south of the bricks lay several large stones, perhaps to aid in

drainage, and the southernmost baked bricks were placed on top of two of these large stones. The whole feature sloped slightly to the south and may have extended further, but a pit cut away whatever lay south of these stones.

Our initial interpretation of the feature as a drain was challenged by the fact that only a thin layer of soil separated the bricks from the packed earth floor beneath them. Between the floor and the stones south of the bricks was a layer of fine soft soil mixed with pebbles and potsherds. The fact that the feature lay on top of a thin level of fill just above the floor suggests that it would have functioned very poorly as a drain.

The finds from elsewhere in the room did not help shed light on the function of this feature. To the east of the bricks at least two smashed pots lay on the floor. In the northwest corner of the sounding, the floor was especially difficult to follow as it approached an area of small, colourful cobbles, which may be a disturbed portion of a larger pavement that continues to the north. In the western portion of the floor a small patch of burnt material may be associated with some sherds, bones, and pebbles that lay adjacent to it on the floor. Only the thin southern wall of this room was excavated, but it was cut by later pits. What remains of the wall is one row of six mudbricks. The meager finds in this small sounding suggest an immediately post-Assyrian date for this phase, but only further excavation will clarify the picture of this occupation level.

Post-Assyrian Pits (Phase B)

A pot burial of a child was cut into the floor of Phase A and, along with several other pits in the sounding, probably represents a post-Assyrian level. A more thorough analysis of the pottery is required to confirm this suggestion. The child was covered with half a pot but, unlike the pot burial in Operation A (Matney et al. 2002: 56-57), there were no grave goods associated with the poorly preserved remains of this child.

Medieval Islamic Phase (Phase C)

This phase of Operation L was characterized primarily by mudbrick architecture, *tannurs*, and pits [Fig. 12]. In the southwest corner of the trench, two mudbrick walls, each two bricks wide and preserved to a height of about 0.25m, bonded to form a room (L-115) that must have extended beyond the south and east baulks. Though no clear surface was found, a flat-lying smashed pot, a bit of plaster along the eastern wall, and some large stones (all lying at approximately the same elevation) may be the only indications that there was once a surface at this level.

A third mudbrick wall with a stone foundation ran just east of and parallel to the eastern wall of Room L-115. No surface or abutting walls associated with this small wall were found. Northeast of this wall another poorly preserved mudbrick wall ran diagonally from the northeast to southwest and may have been associated with a disturbed chalky, white surface.

The architecture of Phase C in Operation L is much more substantial than that found in similar levels from Operations A, B, and C on the high mound (Matney et al. 2002; Matney et al. 2003). Other features of this phase, however, specifically the large number of *tanners*, extensive pitting, and distinctive green- and blue-glazed sherds and

Sgraffiato ware, do correspond with those of the Medieval Islamic levels of other operations.

In general, although the pits provide some specific stratigraphic information about Phase C, the nature of the occupation of this phase as a whole, especially the relationship between the *tannurs* and the walls, is unclear. However, the poorly constructed walls, and the high density of *tannurs* and pits suggests seasonal or short-term occupation over a long span of time.

Late Architecture (Phase D)

The latest phase, Phase D, consisted of several stone walls, projecting at different angles from the baulks of the trench. Because these walls were so close to the surface, they were only poorly preserved and no clear surfaces were found. However, in most cases, the stone walls of this phase sat directly above the mudbrick walls of the preceding phase. Two walls formed a corner in the northeast portion of the trench, within which sat a *tannur*.

Micro-Archaeology

Lynn Rainville

Alongside traditional troweling and sieving techniques, a concentrated effort has been made since 2001 to collect samples for micro-archaeology at Ziyaret Tepe. This work is directed by Dr. Lynn Rainville. To date, a total of 633 samples have been collected from a wide range of contexts from almost all of the Operations (Operation A – 16 samples; Operation E – 58 samples; Operation G – 524 samples; Operation J – 1 sample; Operation K – 22 samples; Operation L – 10 samples). Each of these samples represents two to 100 litres of sediment that was collected from a specific horizontal and qualitative context (i.e., the corner of a floor within a room). The sediment was floated and the resultant heavy fractions were sorted to separate small pebbles and ecofacts from micro-artefacts. The heavy fractions contained a variety of artefacts, mostly under 1cm in size, including sherds, animal bones, chipped stone debitage, bitumen, plaster, beads, metal fragments, and the occasional botanical remain. Each artefact type was counted and weighed and, based on the volume of the sediment sample, the density of artefact types was calculated per sample. The ability to calculate artefact densities enables us to compare activity areas in various areas of the site and at various levels (i.e., among neighbourhoods, between houses, and within rooms; for more detailed discussion of the technique see Rainville in press). Moreover, with the support and hard work of several trench supervisors, over half a dozen rooms were selected for 100% collection. In each of these rooms, once the floor level was reached, a 50 x 50cm grid was laid out across the room so that each square of sediment could be collected, floated, and analysed separately. For example, the results from 87 such samples, taken from the floor in Operation G Room 3, were discussed in an earlier report (Matney et al. 2003: 194-97, Fig. 15, p. 218).

During the 2004 season several techniques were added to the micro-archaeological collection strategy to (1) enhance our understanding of daily activities

conducted within rooms and, (2) compare consumption and production habits among households and between neighbourhoods at the site. Following the lead of other researchers (e.g., Courty et al. 1989, Goldberg and Sherwood 1994, and Matthews 2003), we collected seven micro-morphological samples from Operations K and G. Thin sections will be prepared from these block sediment samples and analysed for inclusions, such as reed impressions, microscopic fragments of botanical and artefactual matter, and other heterogeneous aggregates. An additional 24 samples were collected for soil chemistry analysis. These samples were taken from Operations E, G, K, and L and tests were run for soil pH, and the quantity of phosphorous, potassium, magnesium, and calcium. The recording of pH levels is useful in interpreting the differential preservation of materials, especially metal and faunal remains. Work at other sites suggests a correlation between soil chemistry and activity areas, such as latrines, animal stabling, and human burials (Barba and Ortiz 1992, Middleton and Price 1996, and Parnell et al. 2002). The results from the 2004 Ziyaret Tepe samples will be added to the 33 samples collected in 2003 and, hopefully, will aid in identifying activity areas that otherwise lack an artefactual trace. In addition to sediment samples, phytolith and pollen samples were collected from about 30 on-site contexts in 2004 and will be analysed over the next year to identify plant remains and to establish a several thousand-year pollen sequence at Ziyaret Tepe (using the stratigraphic steps in Operation E as source for diachronic samples).

Due to space limitations, we will restrict our discussion of micro-archaeological results to the samples taken in 2003 and 2004 from Operations G and K [Fig. 13b and c].

Micro-Archaeology samples collected from Operation G

As reported above, Operation G contains two or three buildings with well-constructed mudbrick walls, elaborate pebble-laid surfaces, cuneiform tablets, and an outdoor kiln, adjacent to one of the buildings. The distribution of micro-archaeological densities within these structures compliments the interpretations that are based on architecture and features. First, we recovered a variety of small fragments that would have been difficult, if not impossible, to recover with traditional troweling and sieving with a 1/4" screen. These fragments included metal pins, jewellery, very small beads, tokens, and unidentified metal objects that may include door hinges and other architectural decorations. Several of the beads were un-cut molds: thin cylinders with notches to indicate where to break off individual *lapis lazuli* beads (2mm each in diameter) [Fig. 13a]. For the three main micro-artefact types we graphed the average density per locus [Table 1]. The column headings in the table represent the density of micro-artefacts, calculated as the ratio of fragments to the volume of sediment in the flotation.

The micro-sherds were found in the highest concentrations in the *tannur* samples, outdoor surfaces, the fragments associated with an *in situ* broken ceramic vessel, hearths, and trash pits. In a somewhat similar profile, the micro-bones from animals were concentrated in outdoor surfaces, above the baked bricks in Operation G Room 15, hearths, and in trash pits. Finally, very low densities of chipped stone debitage were recovered (primarily because of the Iron Age date of the structure suggesting a greater percentage of metal tools), but high density clusters included within *tannur* fills and hearths. The raw material used in these lithic tools varied within the structures, with a

concentration of tan debitage in Room 4, red coloured fragments in Rooms 4 and 16, and a concentration of the rarely found (at Ziyaret Tepe) obsidian in Rooms 3 and 4. Possible explanations for the differential distribution of chipped stone colours included separate knappers who preferred different raw material types (and, in turn, worked in different locations within the structures), or a preference for certain types of raw materials for different tasks (i.e., sickle blades versus cutting knives). Moreover, it is interesting that the obsidian debris was highest in two rooms associated with the eastern-most structure, suggesting a correlation between the occupants of this structure and the non-local, volcanic material. In other words, the variable preference for chipped stone types may correlate with economic resources (if, for example, some of the types are not local) or household preferences. Similarly, a majority of the 16 beads recovered from the Operation G trenches were located in Rooms 1, 3, 7, and 13 (all situated within the Eastern Building). The beads ranged from painted glass circles to plain, gypsum cylinders and were most often recovered from floor samples where they, presumably, were lost and never recovered.

Micro-archaeology samples from Operation K

Twenty-two micro-debris samples were collected from Operation K. In addition to a diversity of ceramic, faunal, and lithic debitage, over two dozen clay tokens, several metal fragments, and sealing clay fragments were recovered from the heavy fractions [Fig.13d]. Five primary locus types were sampled for micro-debris: ovens, *tannurs*, pits, burials, and supra-floors. As with the Operation G chipped stone debitage, the type of raw material varied by locus type. In Operation K, burials contained high densities of tan lithics (versus no red or obsidian, and low levels of grey), ovens contained a wide range of lithics (tan, grey, and red), while obsidian only occurred in supra-floors and pits. The preliminary results from the micro-archaeological samples support the conclusion discussed above that the structures north of the city wall contain domestic refuse.

Future Work

For each of the samples discussed here, work is on-going to identify the ceramic wares, fabrics, and vessel forms; the animal species represented by the bone fragments; and the source of the raw material types for the lithic tools. For example, of the 10,700 faunal fragments collected in 2002, about 567 (or 5%) were identifiable to species, representing about two dozen species. Although a small percentage, this sample provided information on small animal species that are rarely recovered with traditional techniques, including rodents, birds, fish, and snakes. In the end, the micro-archaeological samples will increase our understanding of daily activities within an Assyrian provincial centre. This, in turn, will help us build a sophisticated model of Assyrian urbanism based on variability, rather than uniformity, among households and public structures.

Magnetic Gradiometry and Electrical Resistance Surveys
Timothy Matney

An important continuing aspect of the Ziyaret Tepe archaeological project is our ambitious attempt to map the entire structure of the Assyrian city using subsurface geophysical survey techniques. Initial survey seasons were conducted in 1998, 1999, and 2002 using a hand-held magnetic field gradiometer to record subsurface features both on the high mound and in the lower town (Matney and Somers 1999; Matney and Bauer 2000; Matney et al. 2003). Magnetic gradiometry measures very small fluctuations in the strength and direction of the earth's magnetic field caused by subsurface features such as those common to archaeological sites, e.g., walls, pits, hearths, and kilns (Burger 1992; Herz and Garrison 1998). These measurements are spatially recorded within the established site grid and can be used to generate a map of potential subsurface features. While our gradiometry results on the high mound have been generally disappointing, those from the lower town serve as the basis for locating excavation trenches and have proven invaluable in interpreting major structures within the ancient city.

In 2003, a continuation of our geophysical survey efforts was undertaken by Ms. Ann Donkin (University of Akron) who conducted a magnetic gradiometry survey of 4.12 hectares on the eastern edge of the lower town [see Fig. 2 for the location of the survey area]. This area was chosen in part because it was not under cotton cultivation and was, therefore, accessible to archaeological investigation. Data was collected using a GeoScan FM-36 gradiometer with a sampling density of eight samples per metre and a transect interval of 1m. Each 20 x 20m survey grid, then, comprised 3,200 data points and a total of 329,600 data points were collected during the season. There were no visible surface features within the survey area.

From the gradiometry maps, several clear subsurface features emerge [Fig. 14a]. First, the line of the city wall is clearly seen along the northern edge of the survey area, where the city wall is running from the southwest to the northeast. The city wall, seen as a very faint feature with negative readings (i.e., as white on the plan), makes a abrupt corner just north of our survey area and is seen returning from the northwest to the southeast for a distance of 80m before jogging to the east for a distance of 60m [marked as feature A on Fig. 14]. The wall then makes another sharp corner and continues on its previous northwest/southeast alignment to the edge of the survey area. It is at this point at the southern edge of the survey area that we approach the location of a city gate discovered by John MacGinnis in Operation D in the 2000 field season (Matney et al. 2002). The reason for the jogs in the city's fortification wall at these junctures is unclear.

The other easily discernable feature seen in the geophysical survey map from 2003 are a number of large circular anomalies, some of which display the dipolar characteristics common to kilns at Ziyaret Tepe. These features are seen in the centre of the 2003 gradiometry survey area [marked B on Fig. 14]. Additionally, there are five circular features, some 3 to 4m in width, which are weaker magnetically and have mostly positive magnetic values. These features may also be kilns that have been disturbed or are buried deeper, but they may also represent an entirely different phenomenon, perhaps large grain storage pits or other disturbances.

In 2004, we shifted geophysical survey techniques to test the applicability at Ziyaret Tepe of a different methodology. Electrical resistance surveys pass an electrical field through the earth and measure the resistance of the soil (and buried features) to the passage of the electrical current. By measuring the resistance of the soil at regular intervals, we are able to map subsurface features that either inhibit or enable the flow of electrical current (e.g., loose or compacted soils, walls, and pits). This technique has limited utility in extremely dry soils where it is difficult to get good contact between the electrical probes that are pushed into the ground during the survey. The summer months available for our research in the Diyarbakır province are exceptionally hot and dry. In order to overcome the lack of moisture in the soil, it was necessary to drill holes into the soil and fill the holes with water prior to inserting the probes. The process of drilling holes spaced precisely 1m apart and filling them with water proved to be very time consuming, but the quality of imagery produced more than justifies the time and energy spent collecting the data. During the 2004 season, we collected data over 7,000m^2 at with a sample transect and interval of 0.5m, measuring 400 data points per 10 x 10m survey square. A total of 28,000 data points were collected during the 2004 season.

Our principal electrical resistance survey area was at the southern edge of the lower town, near Operation K [see Fig. 2 for location of the survey area]. Previous gradiometry survey had located a gate structure along the city wall in this area, confirmed in 2003 by a narrow trench. Our goal with electrical resistivity in this area was to map additional details within the gate and the resulting electrical resistivity map shows considerable detail [see Fig. 14b]. The city wall runs from east to west across the southern edge of the survey area [marked A on Fig. 14b]. The gate itself is in the centre of the survey area [marked B on Fig. 14b]. The sides of the gate project both inside and outside of the line of the wall. An area of high resistance leading into the gateway (shown as a dark area on the plan) is probably a paved or highly compacted soil marking a heavily trafficked area. Small projecting buttresses on the outside of the city wall can be seen approximately 10 to 12m on either side of gate [marked C on Fig. 14]. On the western side of the survey area, a series of large rectangular enclosures can be seen running perpendicular to the city wall. These structures, clearly seen in the electrical resistivity maps, were not visible in the magnetic gradiometry surveys of previous seasons. Finally, the northeastern corner of the survey area is dominated by a large circular feature, approximately 20m in diameter, with a smaller low resistance anomaly in the centre [marked D on Fig. 14]. If our suggestion that areas of high resistance represent paved or compacted surfaces, then this may represent an important open area with radiating paths moving away from it seen by weaker high resistance lines. The central circular feature seen in the resistivity map might represent a later disturbance, perhaps a large storage or trash pit, which has a lower resistance owing to the looser fill within the pit.

Finally, towards the end of the 2004 season, we cut a 10m long by 2.5m wide trench (Operation M) through one of a series of long parallel magnetic anomalies detected during the 1999 survey season at Ziyaret Tepe (Matney and Bauer 2000: 123-124; Fig. 4). At the time, we suggested that these features may represent concentric fortification or terrace walls, or buried field boundaries analogous to modern boundaries which are marked by lines of stones brought up by the plow. The results of the excavations, also

supervised by Ms. Ann Donkin, showed these features to be roads constructed of a thick deposit (50-90cm) of stones with the remains of mudbrick walls on either side. This finding is significant in that it allows us to draw a significant portion of an ancient roadway system across the whole of the southern lower town. Likewise, it is clear evidence that the lower town was a planned construction with evenly laid streets running parallel to the southern edge of the high mound and the fortifications to the north.

Geomorphology

Kathleen Nicoll and Timothy M. Demko

During the 2004 field season, the geomorphological survey team was comprised of Dr. Kathleen Nicoll (University of Oxford, UK) and Dr. Timothy M. Demko (University of Minnesota Duluth). In addition, Dr. Nigel Wattrus at The University of Minnesota Duluth provided technical and logistical support.

In 2004, the main goals of the continuing field survey were to (1) delineate the floodplain sediments associated with occupation of the high mound at Ziyaret Tepe; (2) describe local landscape development through time; (3) test the utility of Ground-Penetrating Radar (GPR) methods for subsurface assessment of cultural contexts in the excavation area; and, (4) characterize the properties of radar transmission, reflectance and attenuation within specific natural and cultural features along this reach of the Dicle (Tigris) River. The 2004 season involved vehicular, pedestrian, and geophysical survey, and acquired more than 1.6km of GPR profiles from the high mound and its environs [Fig. 15].

GPR is a noninvasive methodology useful for imaging features preserved in sediments; specific details of the GPR technique are discussed in Conyers and Goodman (1997) and Bristow and Jol (2003). The GPR method operates by transmitting a series of short high frequency electromagnetic (EM) pulses into the ground using an antenna. The time it takes for signal transmission, reflection from subsurface stratigraphy and buried features, and reception of the responding signal is measured in the field. Readings are taken at intervals across the survey area, and at different depths depending on the frequency of the signal. The recorded signal is registered as amplitude and polarity versus two-way travel time (TWT). The signal is processed and displayed as a GPR profile, in which the vertical axis is expressed as two-way travel time in nanoseconds (ns, or 1/1000 of a second), and the horizontal axis is a distance axis along the measured survey line in the field. The vertical axis can be converted to depth or elevation if the radar wave velocity in the penetrated material is determined. The raw data profiles are further processed for additional interpretation and correlation with the topographic profile.

The GPR acquisition system we used in our survey is a Sensors and Software, Inc. pulse EKKO 100 IV radar system with a 400 V transmitter and both 50 and 100 MHz antennae. Data were acquired in reflection survey mode using step separation of 0.25m and antennae separation of 2 m or 1m (respectively for the 50 and 100 MHz), with the antennae oriented perpendicular to the direction of movement along the survey line. Each trace was vertically stacked 128 times (i.e., each point along the survey line is an average of 128 individual pulses), with a sampling rate of 800 ps (picoseconds) over a time

window of 300 ns (nanoseconds). Common Mid-Point (CMP) surveys were used to calculate the near-surface radar velocity for depth conversions and to determine signal penetration.

We commenced a pilot GPR survey in the lower town portion of the site in Operation K along trench N850 E850 in order to test the suitability of the method and to ground-truth the GPR data with corresponding features apparent in the nearby excavation, which included building walls, cobble pavements, mudbrick city walls, roads, and cobble-gravel fill. An north/south oriented line approximately 47.5m long was the test location for the initial reflection profiles and CMP surveys. Observed radar returns were calibrated with sediment features, and materials were sampled for further analysis in the laboratory, including grain size, age determination, magnetic susceptibility, and radar-specific properties including dielectric constant and attenuation. To this end, radar facies will be linked to specific sedimentary materials and cultural contexts. Additional lines acquired on the high mound and adjacent floodplain were critical to determine the parameters for optimal subsurface imaging, and to develop strategies to avoid potential noise sources during the acquisition.

Our initial evaluation of the surveyed area indicates that materials have properties of high attenuation and low transmissivity at the frequencies (50 and 100 MHz) and transmitter power (400 V) used. The observed signal penetration (3 to 4m below ground surface) is somewhat low compared to the theoretical signal penetration in optimal conditions (5-12m), although detection of large features may be possible. Velocities calculated from the CMP surveys range from 0.06m/ns (clay) to 0.09m/ns (silts and shales), which reflects the dominant sediment size of both natural landscape and cultural materials. From the raw data returns, certain archaeological features may be apparent as distinctive radar facies; mudbrick walls, baked clay tiles, mosaic floors and cobble pavements can be recognized in the transects that have "ground-truth" in nearby excavation trenches. However, the signal-to-noise ratio is very low and it is important to insure the data quality. During our acquisition, we noticed artefacts contributed from local environmental factors such as surface metal objects (e.g., wheelbarrows, horse carts, pipelines, and power lines), military aircraft, buildings, plants (e.g., cultivated cotton plants), people, and animals (e.g., site workers, shepherds, and flocks). Within the excavation area, a wide (~50cm diameter) irrigation pipeline contributed returns on the profile at later TWTs. In local fields, ditches, crop furrows, and desiccation cracks contribute disruptions to the air and ground waves.

Although GPR studies are optimally conducted in sediments with low conductivities such as sand and gravels, we conclude that this method of subsurface investigation is a valuable contribution to the continuing studies at Ziyaret Tepe. Use of GPR in conjunction with surface geophysical surveying techniques (e.g., magnetic gradiometry and resistivity) has strong potential for imaging archaeological features in three dimensions prior to excavation. Following further processing of the data collected during the 2004 field season, we will integrate the GPR profiles with chronometric age and sedimentological determinations. Future surveys in the region should investigate the suitability of (1) higher frequency antennae to image smaller objects; (2) shielded antennae to reduce airwave reflections and mute noise; and, (3) higher power radar

transmitters (1000 V) to overcome the high attenuation and the low transmissivity of the local materials.

Operation A Excavations

Operation A is located on the eastern edge of the high mound between grid squares N990 E1150 and N1010 E1190. In 2001 and 2002 we excavated 500m^2 of architecture, almost all of which dates to the Late Assyrian period based on ceramics and other small finds from stratified contexts within the structures. The excavated levels included a large, Late Assyrian mudbrick platform, three metal-working installations, and thick (1.5m wide) well-constructed mudbrick walls that suggest an important public building. For a more complete description of the features see our earlier report (Matney et al. 2002: 53-58; Matney et al. 2003: 186-87). Here we provide the results from the ceramic analysis and metal conservation of artefacts excavated from three rectangular kilns (A-242, A-252, and A-805). The kilns had plastered walls, evidence of heavy burning, and were filled with ash and slag. The artefacts recovered from these features included numerous copper-alloy vessels, furniture fittings, fragments of carved ivory, fine ware pottery vessels, and stone vessels.

Three radiocarbon age determinations taken from charcoal samples recovered from one of the kilns (A-252) processed by the NSF-Arizona AMS Laboratory (samples AA60278, AA60279 and AA60280) have yielded a tight cluster of dates. The radiocarbon ages are: 2438 ± 38, 2485 ± 39 and 2472 ± 38. These yield 2 sigma calibrated ranges of: 761-404 cal BC, 781-413 cal BC and 764-411 cal BC. These dates are consistent with a dating of the Operation A building late in Assyrian period.

Ceramics from the Operation A metal-working installations

Helen McDonald

The metal-working installations or kilns A-242, A-252, and A-805 have produced several largely complete Neo-Assyrian fine ware vessels, most of which were broken into many pieces [see Appendix B and Fig. 16]. Like many of the other deposits in Operation A, all three installations were cut by later pits, in this case dug through the pavement of the Late Assyrian courtyard that originally sealed the installations. Several of the vessels are almost identical to examples from Nimrud and may have been imported. The fine wares include Palace Ware with no inclusions, eggshell thin walls and pale green in colour (the bowl in Fig. 16,22, cf. Oates 1959, pots 27-28) and a dimpled beaker [Fig. 16.34]. The ZT beaker is taller than most of the published Nimrud vessels of this type but there are similar unpublished examples (cf. Jamieson 1999: Fig 6:9 and 13). Then there is a 'Near Palace Ware' essentially the same fabric with slightly thicker walls and a variation of colour including cream, pale grey, and pale green [Fig. 16.23 and Fig. 16.24] (cf. Oates 1959, pots 12, p. 59). The concentric grooves on the interior of a fine bowl base are unusual and we know of no parallel.

There is also a fine, pale brown fabric with a small quantity of fine mineral inclusions that can be burnished or painted [Fig. 16.25-27]. The plain version includes

items like the bottle rim [Fig. 16.27] (cf. Oates 1959, pot 86). The painted bottle and jar have close parallels at Nimrud (Oates 1959: pots 90 and 91). Painted decoration in the Assyrian heartland is rare in this period and seems to be confined to 'carrot-shaped' bottles (cf. Curtis 1989: Fig. 40, p. 276; 1997: Fig. 38, p. 158) or a few bands on the shoulder of the occasional jar (Curtis 1989: Fig. 40, p. 271-272; Jamieson 1999: Fig. 8, p.7).

In the heartland of Assyria at this period burnishing is usually confined to particular fabrics or surface treatments, such as red-slipped or grey fabrics and occasionally cooking vessels. However sites in southeastern Turkey have produced a variety of Late Assyrian bowl types with burnished surfaces on otherwise ordinary buff or brown fabrics (cf. Parker 2001: Figs. 3.17.E; 4.11.I; 5.13.G; 5.14.B). Given that burnishing on pottery of all periods is more frequent in Anatolia than in Mesopotamia, it is perhaps not surprising to see local modifications of Late Assyrian types in this way. At Ziyaret Tepe this seems to happen to a greater extent in the Late Assyrian period than in the Middle Assyrian period. Although the incidence of burnishing on pottery of the Late Assyrian period is greater at Ziyaret Tepe than at Nimrud, the actual proportion of burnished vessels in the kilns is still small, just 4% of all sherds.

The most common fabric types among the kiln sherds is one with predominantly mineral inclusions (fine) with either fine or sparse vegetal inclusions. This fabric type makes up 45% by number or 67% by weight of sherds from these installations and 3% are burnished [Fig. 16.28-30]. The three jar rims in this fabric [Fig. 16.29] probably had knob bases (there were three bases of this type in the kilns) and, when complete, would have had long ovoid bodies. Variations on this jar type are found widely in both Assyria and further afield (cf. Jamieson 1999: Fig. 2.4; Blaylock 1999: Fig. 9.5-6; Curtis and Green 1997: Fig. 40; Lumsden 1999: Fig. 6.28). A slight variation on this fabric is one where the vegetal inclusions are more predominant by size or frequency and this makes up 5.13% (10.28% by weight), 29% of the sherds with this fabric are burnished [Fig. 16.31, Fig. 16.32]. Vessels with no vegetal inclusions but only fine to medium mineral inclusions are less common 19% (7% by weight) and 2% are burnished [Fig. 16.33].

Some of the vessels in the kilns, such as the chalices [Fig. 16.32-33] and the 'fruitstand' [Fig. 16.31], are more closely related to material from other Iron Age sites in Turkey, such as Tille Höyük, than from sites in the Assyrian heartland (Blaylock 1999: Fig. 10.20-22). Goblets from sites in the Assyrian heartland and at closely related sites usually have shorter bases (Oates 1959: pots 55-57; Jamieson 1999: Fig. 4.12). The potstand is also less like examples from Assyria that tend to be wider than they are tall (Nimrud, Oates 1959: pots 111-114 and Assur, Hausleiter 1999b: Figs. 9.4 and 9.7) and more like those from elsewhere (Til Barsip, Jamieson 1999: Fig. 4.15; Tille Höyük, Blaylock 1999: Figs. 7.7 and 12.1).

There were a small number of residual sherds in the installations. A nipple base on a vessel with a globular body is probably Middle Assyrian. Other residual sherds include an early Iron Age painted bowl rim and four sherds of Dark Rimmed Orange Bowls, dating to the third millennium BC (for the type see Oates et al. 2001: Figs. 185d and 401).

The close similarity between the fine ware vessels in the kilns and that from seventh century BC contexts at Nimrud may be an indication that the kilns were

abandoned in the last decades of the Late Assyrian Empire, but it must be admitted that, despite recent work by Hausleiter (1999b), the life spans of many Late Assyrian types within the period are not well defined and some of the pottery discovered in storerooms at Nimrud may have been substantially earlier than the final destruction of the site (Curtis 1989: 18).

Metal Conservation of Materials from the Operation A Kilns

Philipp Schmidt and Mandy Reimann

The primary aim of conservation during the excavation season in 2003 at Ziyaret Tepe was the treatment of the bronzes found in Operation A. This deposit of artefacts, probably representing a ritual deposit connected to the rebuilding of this important Late Assyrian monumental building, are exceptionally important examples of types well known from Nimrud and other centers from the Assyrian heartland, but rarely attested elsewhere. Here we refer to the objects as "bronzes" following a common practice in most museums, institutions, and excavations to call objects made of copper-alloys "bronze" *in lieu* of knowing the precise alloy. All work on the objects was conducted in the conservation laboratory at the dig house between August 8 and September 10, 2003. The treatment of the artefacts included the three primary steps taken by conservators: clean, stabilise, and record. Most of the objects from the kilns in Operation A included rough, uneven encrustations and were covered in soil. A wide variety of colours of the encrustations indicated the broad spectrum of corrosion products formed during the burial in the ground.

Cleaning

To ensure a close examination of each object, we removed the outer corrosion and reached the original surface. This surface is often maintained within the cuprite (Cu_2O) or tenorite (CuO) layers of encrusted bronzes (e.g., Cronyn 1990: 200). The removal of soil was done by hand, primarily using brushes, which were occasionally dipped in ethanol to aid in the removal of the layers. To reveal shapes and patterns the corrosion encrustations were removed under the microscope using additional tools such as scalpels, high speed rotary drills, and fibreglass brushes (e.g., Wharton 2000: 100). Fig. 17 illustrates one of the vessels before the body surface has been treated (note the corrosion products) and after the handle has been cleaned and stabilised, revealing the original, engraved surface.

Because of the high quantity of bronzes found in Operation A, most objects were only partially cleaned to allow us to make an impression of the shape and the surface. Only artefacts with patterns, like the handle shown in Fig. 17, have been completely cleaned in order to investigate the entire surface and prepare the objects for display.

With some of the objects, organic residues were discovered during cleaning. These impressions, or pseudomorphs, were preserved within the corroded copper and thus the corrosion was not removed. Any visible light green or bluish crusts, indicating copper (II) - chlorides (referred to as "bronze disease" because they can cause serious deterioration after excavation), were removed completely.

Stabilisation

(a) Active: The most common treatment for stabilising copper alloys to prevent further deterioration is the application of benzotriazole (BTA). This approach has been used for several decades (Sease 1978: 76-85). Only objects that were cleaned completely were treated with BTA in a solution of 3% in ethanol (standard practice, following Scott 2002: 380). To simplify additional treatments of the partly cleaned objects in future seasons, no inhibition with BTA was done, because of the unhealthy properties of this inhibitor (it is still debated whether BTA is a carcinogen).

The objects were further coated for impregnation by the use of an acrylic resin system to form a barrier against corrosive elements (e.g., oxygen, water, and salts) (Koller and Baumer 2000: 201-225). The most common resin for this purpose is paraloid B 48N (known as acryloid B 48N in the U.S.). As paraloid/acryloid B 48N has a T_G:50°C, an ambient temperature easily achieved in southeastern Turkey, paraloid/acryloid B 44 (T_G:60°C) has been applied (Rohm and Haas 1992).

(b) Passive: All objects were stored in dry conditions, which was achieved by dense packing (polyethylene boxes with a tight fitting lid) and controlling the humidity with colour indicator silica gel.

Observation of corrosion products

Remarkably, often the objects from the kilns in Operation A contained black surfaces that indicate tenorite (CuO). The formation of tenorite is limited to a few specific conditions, such as high temperature oxidation and high pH. Scott (2002: 95) explains, "When tenorite is present as a patina constituent, it usually indicates that the object has been subjected to heating (by fire, conflagration, etc.) before or during burial." A second set of circumstances that form tenorite are wet conditions with high pH and high amounts of CO_2. Under these conditions, blue copper carbonate azurite [$2CuCO_3 \bullet Cu(OH)_2$] is transformed into black tenorite (Scott 2002: 96). But as the formation of azurite is limited to an atmosphere without CO_2 (Ullrich 1985: 98) and because at no point was azurite observed as a corrosion product on any object, the transformation of this mineral into tenorite is not plausible. The high quantity of tenorite could therefore considered as a clue that the artefacts were subjected to high temperatures during or after being deposited in the metal-working installations.

Ceramic petrography and XRD

Timothy Matney

With the permission of the director of the Diyarbakır Museum, Necdet İnal, a collection of several hundred ceramic sherds, as well as several modern clay samples, were exported for destructive analysis at the University of Akron. Two analytical techniques are being used to determine the mineralogical and chemical constituents of the clay used to make the pottery of Ziyaret Tepe (Rice 1987). Ceramic petrography requires that sherds be impregnated with resin, cut, and mounted on glass slides to generate thin sections that can be ground to a uniform thickness of 0.03mm. When examined under a

polarizing microscope, it is possible to characterize the minerals by their observable interference colours and other properties (Rice 1987). For X-ray diffraction analysis, unoriented mounts were prepared from fine powders (<2 microns) of sampled ceramic materials (Carroll 1970; Tucker 1991). The ultimate goal of this project is determine the various local clay sources used by potters at Ziyaret Tepe in antiquity and to identify classes of vessels that were imported into the region. This study will inform our understanding of trade and manufacturing patterns. To date, 53 sherds have been prepared for ceramic petrography and 51 sherd samples have been subjected to X-ray diffraction analysis. These samples cover the entire range of time periods represented at Ziyaret Tepe, from the Early Bronze Age to the Islamic period.

A preliminary assessment of a small subsample (n=12) of the sherds was completed with the assistance of Dr. Lisa Park of the University of Akron. Approximate ages of the samples were based on stylistic analyses and on contextual information. Initial findings suggest that the Middle and Late Assyrian ceramics show similarities in their composition, with a wide variety of minerals found in the clay matrix, including: smectite, montmorillonite, vermiculite, kaolinite, hematite, tourmaline, kainite, potassium feldspar, other feldspars, and quartz. A single sherd of grooved pottery from the Early Iron Age differed significantly from the Middle and Late Assyrian sherds, with additional accessory feldspars (albites), and chlorite. Sherds of Dark Rimmed Orange Ware and red-brown wash ware showed X-ray diffraction patterns similar to one another, but different from those of the analysed Assyrian sherds. Additional tests are underway, including petrographic and X-ray diffraction analyses, of modern clay samples taken from near Ziyaret Tepe. Once we have both the modern data, and a larger sample size from the exported ancient sherds, we will be able to address more fully the issue of trading and manufacturing patterns and the identification of imported versus locally-made ceramics.

Conclusions

On-going archaeological work at Ziyaret Tepe during the 2003 and 2004 season was successful in making progress towards the goals outlined above. The completion of the Operation E step trench secures the stratigraphic sequence for both the site and comparable sites in the upper Tigris River valley. Broad area excavations in Operation G document an important series of buildings from the urban settlement of the Late Assyrian period. These excavations are enhanced by the geophysical surveys which set the architecture of Operation G within the wider city structure. Likewise, limited soundings in Operations K and M in the lower town add specific data on the town fortifications, domestic architecture, and road systems. Finally, Operation L provides a set of stratified remains documenting the post-Assyrian use of the high mound and have penetrated through to the Late Assyrian levels in an otherwise largely unexplored area of the site. Specialist studies of pottery, microdebris, animal bones, chipped stone, and metalwork continue to generate rich databases on the material culture of Ziyaret Tepe.

APPENDIX A: Catalogue of EIA pottery [Fig. 4 and Fig. 5]

4.1. E-031, ZT 3069/6. Handmade bowl with internal bevel and one groove on exterior. D. = 32, 7% extant. Inclusions: abundant fine white mineral and fine vegetal, common fine mica. Munsell exterior surface 10YR 8/3 very pale brown. Interior surface 5YR 7/4 pink. Paste varies 5YR 6/4 light reddish brown to 2.5Y 6/2 light brownish grey to 2.5Y 5/0 grey.

4.2. E-029, ZT 3067/6 & /10. Hemispherical handmade bowl with two grooves. D. = 12, 35% extant. Inclusions: Common fine black and white mineral and fine vegetal, occasional medium white mineral and fine mica, sparse medium and coarse vegetal. Munsell exterior surface 7.5YR 8/4 pink varies to 5YR 7/6 reddish yellow. Interior surface and paste 10YR 7/3 very pale brown.

4.3. E-029, ZT 3067/14. Handmade carinated bowl with three grooves above the carination. D. = 28, 5% extant. Inclusions: Common fine white mineral and fine vegetal, occasional fine black mineral, fine mica and medium vegetal. Munsell surfaces 5YR 7/4 pink. Paste 7.5YR 7/4 pink.

4.4. E-029, ZT 3072/1. Handmade bowl with two grooves. D. = 36, 5% extant. Slight burnish on interior and exterior. Inclusions: common fine white mineral and fine vegetal, occasional fine black mineral and fine mica, occasional medium and sparse coarse vegetal. Munsell exterior surface 2.5Y 8/2 pale yellow. Interior surface and paste 5YR 7/4 pink.

4.5. E-008, ZT 3023/3 (joins ZT 3067/5). Handmade bowl with internal bevel rim and two grooves. Smoothed surface with slight burnish, particularly on exterior. Rim D. = 34. 12% extant. Inclusions: Common fine black and white mineral, common fine vegetal, sparse fine mica, sparse medium black and white mineral. Munsell surface 2.5Y 8/2 pale yellow varying to 2.5Y 6/0 grey; Paste 7.5YR 8/4 pink.

4.6. E-029, ZT 3072/5. Small deep bowl with external carination and one groove above carination, smoothed surface with slight burnish especially on interior. D. = 15, 5% extant. Inclusions: Common fine white mineral and common fine mica, occasional fine vegetal. Munsell surfaces 5YR 7/4 pink. Paste 5YR 7/6 reddish yellow and core 7.5YR 8/4 pink.

4.7. E-029, ZT 3071/5. Small bowl with three grooves near rim. Slight burnish on exterior and very slight on interior. D. = 11, 7% extant. Inclusions: abundant fine white mineral, common fine vegetal and occasional fine black mineral. Munsell exterior surface 2.5Y 8/2 pale yellow. Interior surface 5YR 7/3 pink. Paste 5YR 7/4 pink.

4.8. E-029, ZT 3072/4. Small bowl, heavily overfired. D. = 14, 7% extant. Inclusions: common fine black mineral, occasional fine vegetal, sparse coarse white mineral. Munsell exterior surface 5Y 7/4 pale yellow. Interior surface and paste 5Y 8/4 pale yellow.

4.9. E-029, ZT 3064/7. Handmade deep bowl with tapering rim and slight burnish/smoothing. D. = 29, 11% extant. Inclusions: common fine black and white mineral, common fine vegetal, occasional medium vegetal, sparse coarse vegetal and medium white mineral. Munsell surfaces 2.5Y 8/2 pale yellow. Paste 10YR 7/3.

4.10. E-018, ZT 3041/1. Jar rim with neck and out-turned rim, wet smoothed surfaces. D. = 15, 19% extant. Inclusions: Common fine white mineral and fine vegetal, occasional fine black mineral and fine mica. Munsell surfaces 5YR 7/3 pink. Paste varies 5YR 8/2 pinkish white to 10YR 6/1 grey.

4.11. E-031, ZT 6456/10. Handmade flat rim bowl, heavily burnished on both surfaces. D. = 20, 13% extant. Inclusions: Common fine white mineral and fine mica, occasional fine vegetal, sparse medium and coarse vegetal. Munsell exterior surface 5YR 8/2 pinkish white to 7.5YR 8/2 pinkish white to 7.5YR 6/1 grey. Interior surface 5YR 7/4 pink. Paste 10YR 7/3 pale brown. Core 7.5YR 4/1 grey.

4.12. E-018, ZT 3041/3. Handmade bowl with thickened rim, smoothed surfaces with slight burnish on exterior. D. = 29, 10% extant. Inclusions: abundant fine white mineral and fine vegetal, occasional fine mica, fine black and medium white mineral, sparse coarse white and black mineral. Munsell exterior surface 2.5Y 8/2 pale yellow. Interior surface 5YR 8/3 pink. Paste 7.5YR 8/4 pink.

5.13. E-029, ZT 6452/2. Jar rim with a brown wash over exterior and extending into the interior of the vessel. Wet smoothed surface. D. = 11.5, 20% extant. Inclusions: common fine black mineral, occasional fine white mineral and fine vegetal, sparse coarse white mineral. Munsell exterior surface (wash) 10YR 5/1 grey. Interior surface 10YR 8/2 very pale brown. Paste 10YR 8/3 very pale brown.

5.14. E-018, ZT 3036/16. Sherd from the neck of a jar, two incised lines close to the shoulder. Surfaces smoothed and a slight burnish on the exterior. L. of sherd = 6.4, sherd Ht. = 3.7, D. = 00. Inclusions: common fine black mineral, fine mica and fine vegetal. Munsell surfaces and paste 10YR 6/3 pale brown.

5.15. E-031, ZT 6456/11. Jar rim with handle that attaches to the top of the rim. Two longitudinal grooves down the rim and a circular dent at the top end of the handle where it joins the rim. Surface is wet smoothed. The rim is distorted where the handle attaches so a diameter measurement is not possible. Sherd W. = 6.2, ext Ht. = 3.1, L of handle 5.5. Inclusions: common fine white mineral and fine mica, occasional fine black mineral and fine vegetal. Munsell exterior surface 5YR 7/4 pink. Interior surface 10YR 7/3 very pale brown. Paste 10YR 7/4 very pale brown.

5.16. E-031, ZT 6456/13. Jar rim with handle. Circular dent at the top of the rim where it joins the handle and one groove down the handle. Bottom of handle attaches to a lateral ridge round the body. Rim slightly distorted where handle attaches. D. = 9, 25% extant. Inclusions: common fine white and fine white mineral, fine mica and fine vegetal, sparse medium and coarse white mineral. Munsell exterior surface 5YR 7/4 pink. Interior surface and paste 7.5YR 7/4 pink. Core 7.5YR 5/1 grey.

5.17. E-018, ZT 3036/1. Slightly hole mouth hemispherical bowl rim with four grooves and two lines of short incised diagonal lines and one line of zigzags between the grooves. Surfaces heavily burnished. D. = 15, 5% extant. Inclusions: common fine vegetal, occasional mica and occasional fine white mineral. Burnished interior and exterior. Munsell surfaces and paste 5YR 6/4 light reddish brown. Core 5YR 5/1 grey.

5.18. E-029, ZT 6452/1. Carinated bowl with three grooves above the carination. Burnished surfaces. D. = 26, 5% extant. Inclusions: common fine white mineral and mica, occasional fine black mineral, fine and medium vegetal, sparse medium white mineral. Munsell exterior surface 10YR 7/4 very pale brown. Interior surface 5YR 7/4 pink. Paste 2.5YR 6/6 light red. Core 7.5YR 7/4 pink.

5.19. E-018, ZT 3036/4. One of four sherds probably all from the same hole mouth cooking pot. Three lugs and part of a spout extant as well as three grooves. Exterior surface burnished. D. = 22, 41% extant. Inclusions: abundant medium white mineral, occasional fine mica. Munsell exterior surface varies 7.5YR 7/4 pink to 7.5YR 6/2 reddish grey to 10YR 4/1 dark grey. Interior surface 5YR 6/2 light reddish brown to 5/2 reddish brown. Paste 10YR 6/1 grey.

5.20. E-031, ZT 6456/17. Black, slightly hole mouth cooking pot with four grooves near rim and a strap handle. Burnished exterior and interior. Sherd 3064/2 is probably part of the same vessel but no join. D. = 16, 35% extant (percentage includes 3064/2). Inclusions: common fine and medium white mineral and fine mica, sparse fine vegetal. Munsell exterior surface 5YR 3/1 very dark grey varies to 7.5YR 4/2 brown. Interior surface 5YR 4/1 dark grey. Paste 5YR 3/1 very dark grey.

5.21. E-018, ZT 3036/7. Sherd from jar shoulder with painted band and top of a possible zigzag below. Sherd Ht. = 6.8, sherd W. = 8.1. Inclusions: occasional fine white and fine black mineral, fine mica and sparse medium vegetal and medium white mineral. Munsell exterior surface between 7.5YR 7/4 pink and 10YR 7/4 very pale brown. Interior surface 7.5YR 7/4 pink. Paste 10YR 6/3 pale brown. Core 10YR 6/2 light brownish grey. Paint 5YR 5/4 reddish brown.

APPENDIX B: Catalogue of Operation A pottery [Fig. 16]

16.22. A-252 (kiln), ZT 7277/2. Palace Ware bowl with rounded base. Rim diameter 16cm (13%). Ht 3.5cm. No visible inclusions. Munsell Colour, surfaces and paste: 5Y 7/2 light grey to 7/3 pale yellow.

16.23. A-242 (kiln), ZT 7202/2. Very fine bowl with ring base. Rim diameter 15-16cm. Ht. 4cm. No visible inclusions. Munsell, surfaces and paste: 5Y 8/2 white.

16.24. A-242 (kiln), ZT 7202/1 (joins to ZT 2484 A-238). Very fine bowl with rounded base. Rim diameter 17-18cm (20-22%). Ht. 7-8cm. No visible inclusions. Munsell, surfaces and paste: 5Y 8/3 pale yellow.

16.25. A-242 (kiln), ZT 7290/1. Fine bottle with pointed base and dark brown painted stripes. Rim diameter 3cm. Ht. 18cm. Complete but broken. Surfaces heavily encrusted, pale brown with only fine mineral inclusions. Munsell Colour, surfaces and paste 10YR 7/4 very pale brown.

16.26. A-242 (kiln), ZT 7234. Fine ring-based jar with one handle extant and brown painted stripes, rim missing. Ext. ht 23cm. Base diameter 3.6cm (50%). Broken into many small pieces. Exterior surface polished. Inclusions: none visible. Munsell Colour, external surface: 2.5Y 8/2 varies to 8/4 pale yellow. Internal surface and paste: 2.5Y 8/4.

16.27. A-252 (kiln), ZT 7277/1. Bottle rim. Rim diameter 4.6cm (100%). Wet smoothed surface. Inclusions: occasional fine black and white mineral and occasional fine mica. Munsell, external and internal surfaces: 5YR 7/4 pink. Paste: 5YR 7/4 pink to 6/6 reddish yellow.

16.28. A-242 (kiln), ZT 7257/2. Bowl with ring base. Rim diameter 31cm (90%) base diameter 10cm (35%) ht. 20.7cm. Wet smoothed surface. Occasional fine black and white mineral, occasional medium white mineral, common fine mica, occasional fine vegetal and sparse medium vegetal. Munsell, external and internal surfaces: 5YR 7/4 pink. Paste: 5YR 6/4 light reddish brown.

16.29. A-242 (kiln), ZT 7257/1. Jar rim and shoulder. Rim diameter 9.4cm (100%). Wet smoothed surface with much surface encrustation. Occasional fine white mineral and occasional fine vegetal. Munsell, external and internal surfaces and paste: 10YR 7/4 very pale brown. Core: 10YR 5/1 grey.

16.30. A-252 (kiln), ZT 7233/1 (joins to ZT 6854/2 and 6868/3). Complete section of potstand. Rim diameter 18cm (30%), base diameter 21.cm5 (30%), and ht. 22.3. Inclusions: common fine black and white mineral, abundant fine mica and occasional medium vegetal. Munsell, external and internal surfaces: 7.5YR 6/4 light brown. Paste: 5YR 6/6 reddish yellow.

16.31. A-252 (kiln), ZT 6858. Bowl with very high ring base or stand. Rim diameter 13cm (15%), base diameter 10.9 to 11.4cm (100%), ht. 16.6cm. Inclusions: occasional fine black and white mineral, common fine mica and occasional fine vegetal. Munsell Colour, surfaces: 5YR 6/4 pink. Paste: 7.5YR 7/3 pink. Core: 2.5Y 4/1 dark grey.

16.32. A-805 (kiln), ZT 9161. Chalice, cup with very high ring base. Wet smoothed surface. Rim diameter 10.4 to 10.6cm (99%). Base diameter 10.1 to 10.2cm (100%) ht. 16.5cm. Inclusions: common fine white mineral, occasional fine black mineral, fine mica and fine vegetal. Munsell, external surface: 2.5YR 6/6 light red. Internal surface encrusted. Paste: 5YR 6/6 reddish yellow.

16.33. A-252 (kiln), ZT 6857. Chalice, cup with very high ring base. Rim diameter 10.7cm (80%), base diameter 9.5cm (100%), ht. 17.5cm. Wet smoothed surface. Inclusions: common fine black and white mineral and common fine mica. Munsell Colour, surfaces and paste: 7.5YR 7/4 pink.

16.34. A-242 (kiln), ZT 7202/3. Dimpled palace ware beaker. Three rows of dimples on body above a very small disc base. Body and neck trimmed in a leather-hard state. Rim diameter 8.3-8.9 (100%) ht 21.7. No visible inclusions. Munsell, external surface varies from 5Y 8/3 to 7/3 pale yellow. Internal surfaces and paste: 5Y 8/3.

References

Attridge, H.W. and R.A. Oden (eds.), 1976 – *The Syrian Goddess* (De Dea Syria). Society for Biblical Literature Texts and Translations, No. 9. Greco-Roman Series 1. Missoula, MT: Scholars Press.

Barba. L. and A. Ortiz, 1992 – Analisis Quimico de Pisos de Ocupacion: un caso ethnographico en Tlaxcala, Mexico. *Latin American Antiquity* 3: 1: 63-82.

Bartl, K., 1994 – Die frühe Eisenzeit in Ostanatolien und ihre Verbindungen zu den benachbarten Regionen. *Baghdader Mitteilungen* 25: 473-518.

Bartl, K., 2001 – Eastern Anatolia in the Early Iron Age. In: R. Eichmann and H. Parzinger (eds.), Migration und Kulturtransfer: Der Wandel vorder- und zentralasiatischer Kulturen im Umbruch vom 2. zum. 1. vorchristlichen Jahrtausend, pp. 383-410. (Römisch-Germanische Kommission, Eurasien-Abteilung des Deutschen Archäologischen Instituts, Kolloquium zur Vor- und Frühgeschichte Band 6, Bonn).

Blaylock, S.R., 1999 – Iron Age Pottery from Tille Höyük, South Eastern Turkey. In: Hausleiter and Reiche 1999: 263-286.

Bristow, C.S. and H.M. Jol (eds.), 2003 – Ground Penetrating Radar in Sediments. Geological Society Special Publication, No. 211. London.

Burger, H. R., 1992 – Exploration Geophysics of the Shallow Subsurface. Upper Saddle River, NJ: Prentice Hall.

Carroll, D., 1970 – Clay Minerals: A Guide to Their X-ray Diffraction. GSA Special Paper 126. Boulder, CO: The Geological Society of America.

Cole, S. and P. Machinist, 1999 – Letters from Priests to the Kings Esarhaddon and Assurbanipal. *State Archives of Assyria* 13. Helsinki: Helsinki University Press.

Courty, M.A., P. Goldberg,and R. Macphail, 1989 – Soils and Micromorphology in Archaeology. Cambridge: Cambridge University Press.

Cronyn, J.M., 1990 – The Elements of Archaeological Conservation. London: Routledge.

Curtis, J.E., 1989 – Excavations at Qasrij Cliff and Khirbet Qasrij. London: BMP.

Curtis, J.E. and A.R. Green, 1997 – Excavations at Khirbet Khatuniyeh. London: BMP.

Fales, F.M. and J.N. Postgate, 1992 – Imperial Administrative Records, Part I: Palace and Temple Administration. *State Archives of Assyria* 7. Helsinki: Helsinki University Press.

Fischer, B., H. Genz, E. Jean and K. Köroğlu (eds.), 2003 – Identifying Changes: The Transition from Bronze to Iron Ages in Anatolia and its Neighbouring Regions. Proceedings of the International Workshop (Istanbul), November 8-9, 2002.

Goldberg, P. and S. C. Sherwood, 1994 – Micromorphology of dust cave sediments: some preliminary results. *Journal of Alabama Archaeology* 40: 57-65.

Goodman, D., 1994 – Ground Penetrating Radar simulation in engineering and archaeology. *Geophysics* 59: 224-232.

Grayson, A.K., 1975 – Assyrian and Babylonian Chronicles. *Texts from Cuneiform Sources*, Vol. 5. Locust Valley, NY: J.J. Augustin.

Hausleiter, A., 1999a – Neo-Assyrian pottery from Kalhu/Nimrud. In: Hausleiter and Reiche 1999: 17-60.

Hausleiter, A., 1999b – Graves, chronology and ceramics: some considerations on Neo-Assyrian Assur. In: Hausleiter and Reiche 1999: 127-147.

Hausleiter, A. and A. Reiche (eds.), 1999 – Iron Age Pottery in Northern Mesopotamia, Northern Syria and South-Eastern Anatolia. Papers presented at the meetings of the international *table ronde* at Heidelburg (1995) and Nieborow (1997). Altertumskunde des Vorderen Orients. Band 10. Munster: Ugarit Verlag.

Herz, N. and E.G. Garrison, 1998 – Geological Methods for Archaeology. Oxford: Oxford University Press.

Jamieson, A., 1999 – Neo-Assyrian Pottery from Tell Ahmar. In: Hausleiter and Reiche 1999: 287-308.

Karg, N., 2001 – First soundings at Grê Dimsê 1999. In: Tuna et al. 2001: 662-693.

Koller, J. and U. Baumer, 2001 – Organische Überzüge auf Metallen, Teil 1, Lacke. *Arbeitsblätter für Restauratoren* 33, No. 1. Mainz: Römisch-Germanisches Zentralmuseum.

Köroğlu, K., 1998 – Üçtepe I. Ankara: Türk Tarih Kurumu.

Köroğlu, K., 2003 – The Transition from Bronze Age to Iron Age in Eastern Anatolia. In: Fischer et al. (eds.), 2003: 231-244.

Lebeau, M., in collaboration with A. Pruß, M. Roaf, and E. Rova, 2000 – Stratified archaeological evidence and compared periodizations in the Syrian Jezirah during the third millennium BC. In: C. Marro and H. Hauptmann (eds.), Chronologies des pays du Caucase et de l'Euphrate aux IV^{e}-III^{e} millénaires. From the Euphrates to the Caucasus: Chronologies for the 4th-3rd millennium B.C. Vom Euphrat in den Kaukasus: Vergleichende Chronologie des 4. und 3. Jahrtausends v. Chr., Actes du Colloque d'Istanbul, 16-19 décembre 1998, pp. 167-192 (*Varia Anatolica* XI). Istanbul-Paris.

Lucien (attributed to), 1976 – Concerning the Syrian Goddess. In: H.W. Attridge and R.A. Oden (eds.), De Dea Syria.

Lumsden, S., 1999 – Neo-Assyrian pottery from Nineveh. In: Hausleiter and Reiche 1999: 3-15.

Matney, T. and A. Bauer, 2000 – The third season of archaeological survey at Ziyaret Tepe, Diyarbakır Province, Turkey, 1999. *Anatolica* 26: 119-128.

Matney, T., J. MacGinnis, H. McDonald, K. Nicoll, L. Rainville, M. Roaf, M.L. Smith, and D. Stein, 2003 – Archaeological Investigations at Ziyaret Tepe, 2002. *Anatolica* 29: 175-221.

Matney, T., M. Roaf, J. MacGinnis, and H. McDonald, 2002 – Archaeological Excavations at Ziyaret Tepe, 2000 and 2001. *Anatolica* 28: 47-89.

Matney, T. and L. Somers, 1999 – The second season of work at Ziyaret Tepe in the Diyarbakir Province: preliminary report. *Anatolica* 25: 203-219.

Matthews, R. (ed.), 2003 – Excavations at Tell Brak Vol. 4: Exploring an Upper Mesopotamian Regional Centre, 1994-1996. Cambridge and London. McDonald Institute and the British School of Archaeology in Iraq.

Matthews, W., 2003 – Microstratigaphic sequences: indications of uses and concepts of space. In: Excavations at Tell Brak Vol. 4: Exploring an Upper Mesopotamian regional centre, 1994-1996, R. Matthews (ed.), pp. 377-388. Cambridge and London: McDonald Institute and the British School of Archaeology in Iraq.

Mattila, R., 2000 – The King's Magnates: A Study of the Highest Officials of the Neo-Assyrian Empire. *State Archive of Assyria Studies* 11. Helsinki: Helsinki University Press.

Middleton, W. and T. D. Price, 1996 – Chemical analysis of modern and archaeological house floors by means of Inductively Coupled Plasma-Atomic Emission Spectroscopy. *Journal of Archaeological Science* 23: 5: 673-87.

Muller, U., 2003 – A change to continuity: Bronze Age traditions in the Early Iron Age. In: Fischer et al. (eds.) 2003: 137-149.

Oates, J., 1959 – Late Assyrian pottery from Fort Shalmaneser. *Iraq* 21: 130-146.

Oates D., J. Oates, and H. McDonald, 1997 – Excavations at Tell Brak Vol. 1: The Mitanni and Old Babylonian Periods. Cambridge and London: McDonald Institute and the British School of Archaeology in Iraq.

Oates D., J. Oates, and H. McDonald, 2001 – Excavations at Tell Brak Vol. 2: Nagar in the Third Millennium BC. Cambridge and London: McDonald Institute and the British School of Archaeology in Iraq.

Parker B.J., 2001 – The Mechanics of Empire. The Northern Frontier of Assyria as a Case Study in Imperial Dynamics. Helsinki: The Neo-Assyrian Text Corpus Project.

Parnell, J.J., R. Terry, and P. Sheets, 2002 – Soil chemical analysis of ancient activities in Cerén, el Salvador. *Latin American Antiquity* 13: 3: 331-342.

Parpola, S., 1997 – Assyrian Prophecies. *State Archives of Assyria* 9. Helsinki: Helsinki University Press.

Pfälzner, P., 1995 – Mitannische und mittelassyrische Keramik, eine chronologische, funktionale und produktionsökonomische Analyse. (Berichte der Ausgrabung Tall Šēh Hamad, Dūr-Katlimmu Band 3). Berlin: Dietrich Reimer.

Radner, K. (with contributions by A. Schachner and M. Roaf), 2004 – Das mittelassyrische Tontafelarchiv von Giricano/Dunnu-ša-Uzibi Ausgrabungen in Giricano I, Subartu 14. Belgium: Turnhout.

Rainville, L., in press – Investigating Upper Mesopotamian Households Using Micro-Archaeological Techniques. BAR International Series. Oxford: Archaeopress.

Rice, R.M., 1987 – Pottery Analysis: A Sourcebook. Chicago: University of Chicago Press.

Roaf, M. and A. Schachner, in press – The Bronze Age to Iron Age transition in the Upper Tigris region: new information from Ziyaret Tepe and Giricano. In: A. Çilingiroğlu and G. Darbyshire (eds.). *Anatolian Iron Ages* V. London.

Rohm and Haas, 1992 – Technisches Merkblatt für Paraloid B 48N. cf. http://www.chunghan.chem.co.kr /eng_paraloid.htm

Schachner, A., with P.V. Bartl and J. Heigermoser, 2002 – Ausgrabungen in Giricano (2000-2001). Neue Forschungen an der Nordgrenze des Mesopotamischen Kulturraums. *Istanbuler Mitteilungen* 52: 9-57.

Schachner, A., 2003 – Identifying Changes in the Upper Tigris Region - The Case of Giricano. In: Fischer et al. (eds.), pp. 151-163.

Scott, D.A., 2002 – Copper and Bronze in Art. Los Angeles: Getty Conservation Institute.

Sease, C., 1978 – Benzotriazole: a review for conservators. *Studies in Conservation* 23, No. 2: 76-85. London: IIC- International Institute for Conservation.

Tucker, M. E. (ed.), 1991 – Techniques in Sedimentology. Oxford: Blackwell Scientific.

Tuna, N., J. Öztürk, and J. Velibeyoğlu (eds.), 2001 – Salvage Project of the Archaeological Heritage of the Ilısu and Carchemish Dam Reservoirs. Activities in 1999. Ankara.

Ullrich, D., 1985 – Zur Chemie und Mineralogie von Korrosionserscheinungen an Bronzen. In: Born, H. (ed.), Archäologische Bronzen- Antike Kunst, Moderne Technik, pp. 96- 104. Berlin: Staatliche Museen zu Berlin Preussischer Kulturbesitz, Museum für Vor- und Frühgeschichte.

Wharton, G., 2000 – Field course in Bronze Conservation. In: Kaman-Kalehöyük (*Anatolian Archaeological Studies* 9), pp. 109- 113. Tokyo: Middle Eastern Culture Center in Japan.

	n	Ceramic	Bone	Lithic
Building collapse	19	.57	4.77	.15
Drain	4	.35	8.80	0.25
Floor	72	.96	7.13	0.15
Fill	4	.21	3.94	0.11
Floor (gridded)	315	1.27	8.13	0.35
Hearth	2	1.8	12.50	0.80
Oven	4	.52	1.79	0.23
Pit	1	1.8	17.00	0.20
Supra-floor	66	.6	4.22	0.16
Outdoor surface	2	3.0	28.75	1.08
Tannur	1	4.0	4.00	8.00
Vessel	3	3.03	9.83	0.27
Other	31	2.43	16.71	0.53

Table. 1. Count density (mean) of micro-artefacts per locus type in the micro-debris samples.

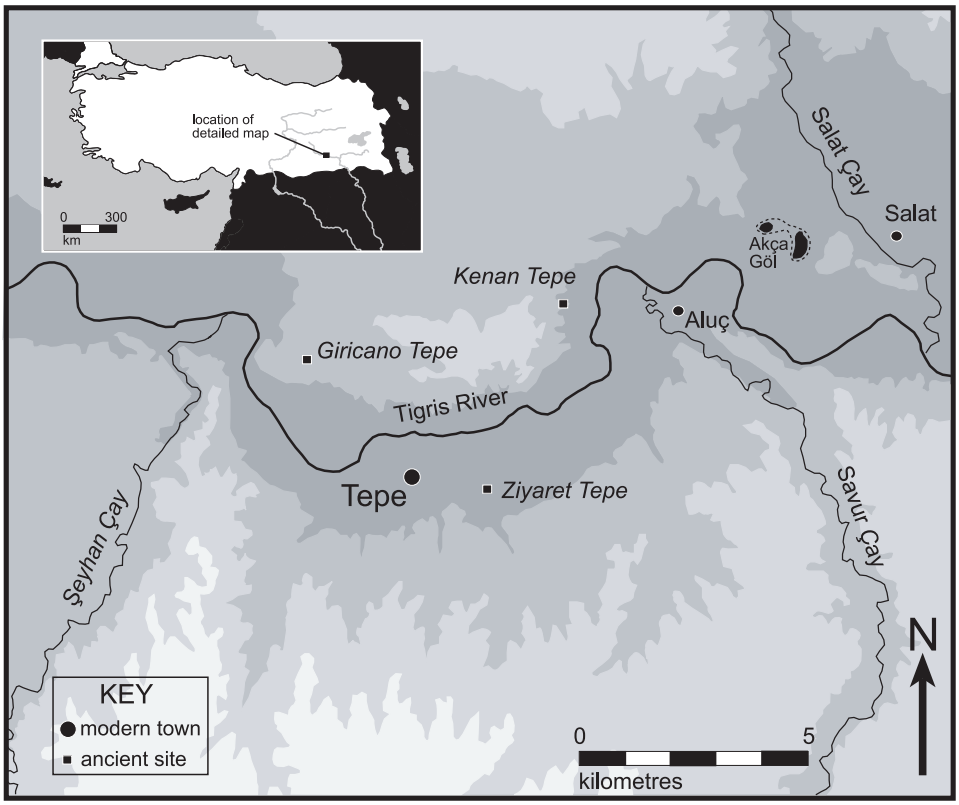

Fig. 1. Regional map showing the location of Ziyaret Tepe within the upper Tigris River valley. Inset shows location of the detailed map on a map of modern Turkey.

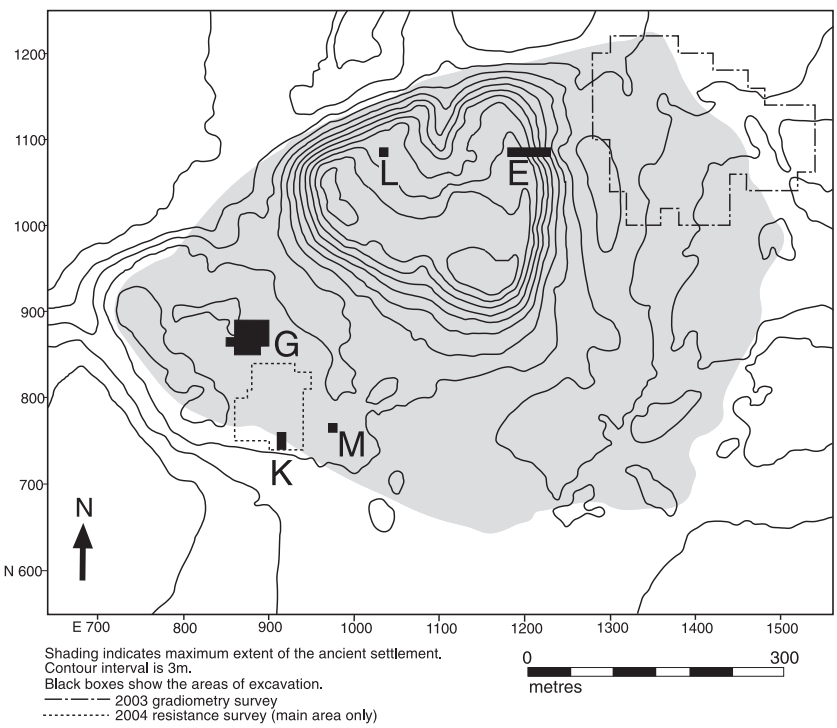

Fig. 2. Contour plan of Ziyaret Tepe showing the 2003 and 2004 excavation areas and limits of geophysical survey.

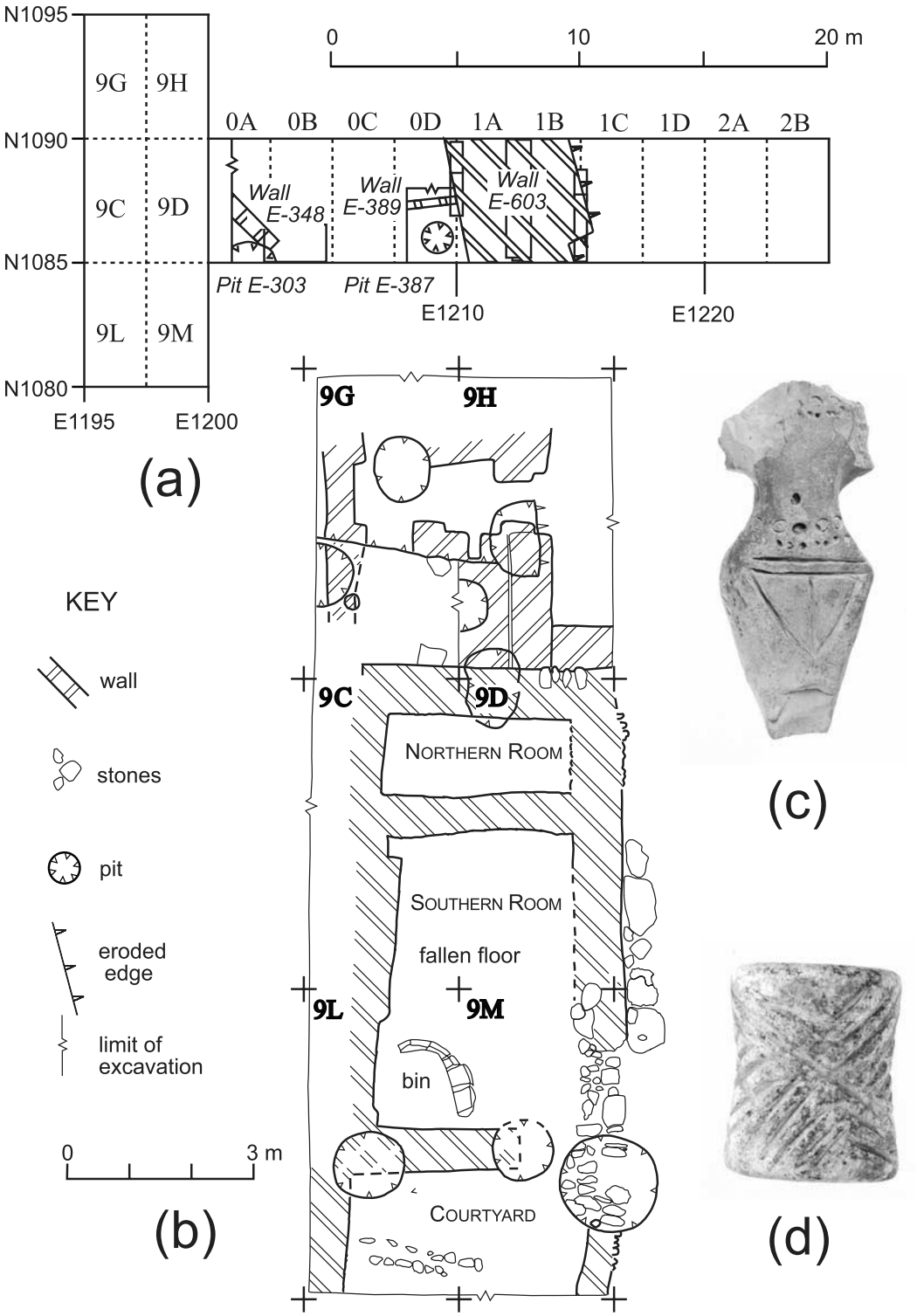

Fig. 3. a. The trenches in Operation E showing the salient features discussed in this report;
b. Plan of the Brightly Burned Building as excavated;
c. Figurine of a naked woman from the Brightly Burned Building (E-128 ZT 5229), extant height 58mm;
d. Cylinder seal from the Early Bronze Age levels (E-387 ZT 4790), height 23mm.

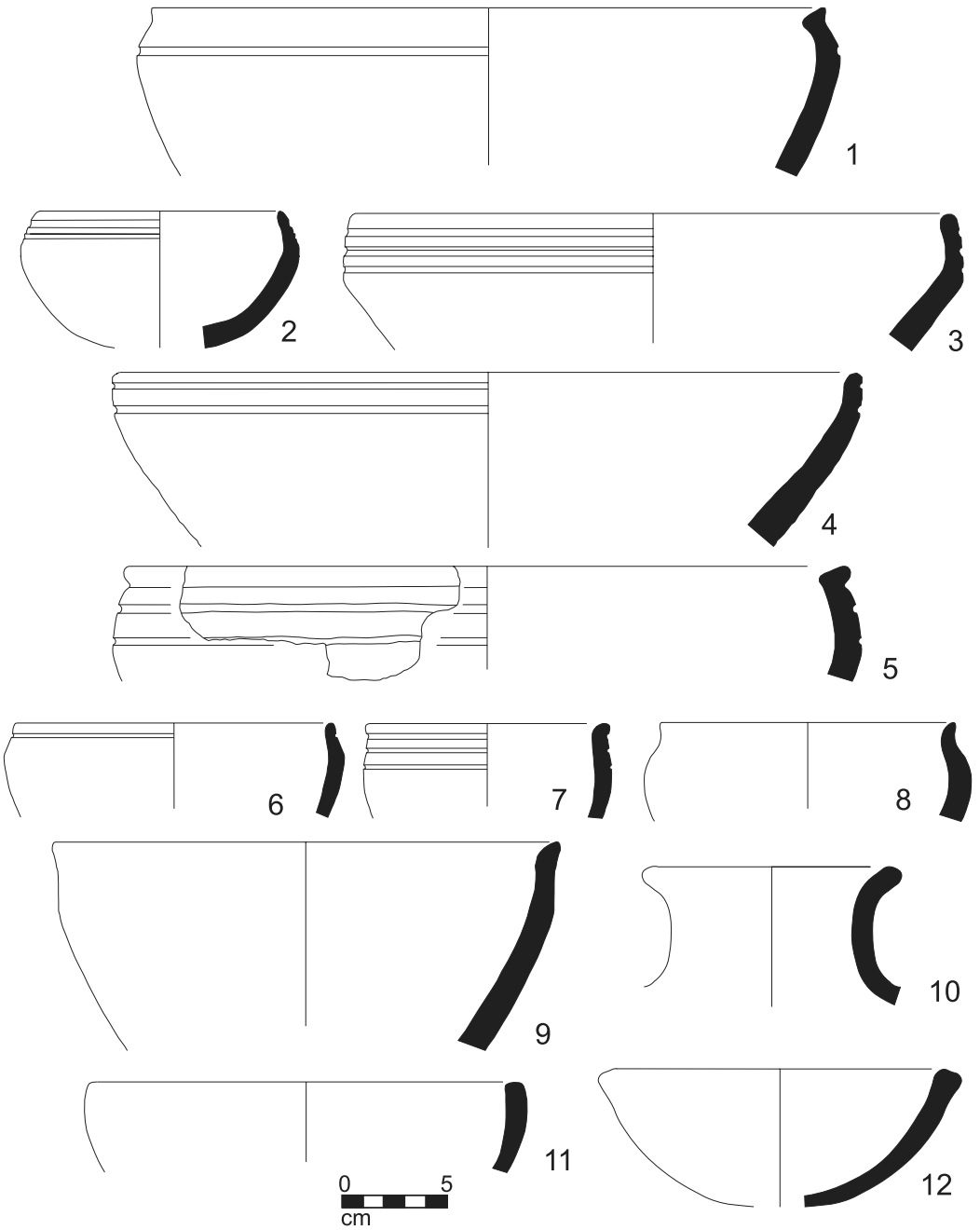

Fig. 4. Pottery of Fabric 1 from the Early Iron Age Pit in Operation E.

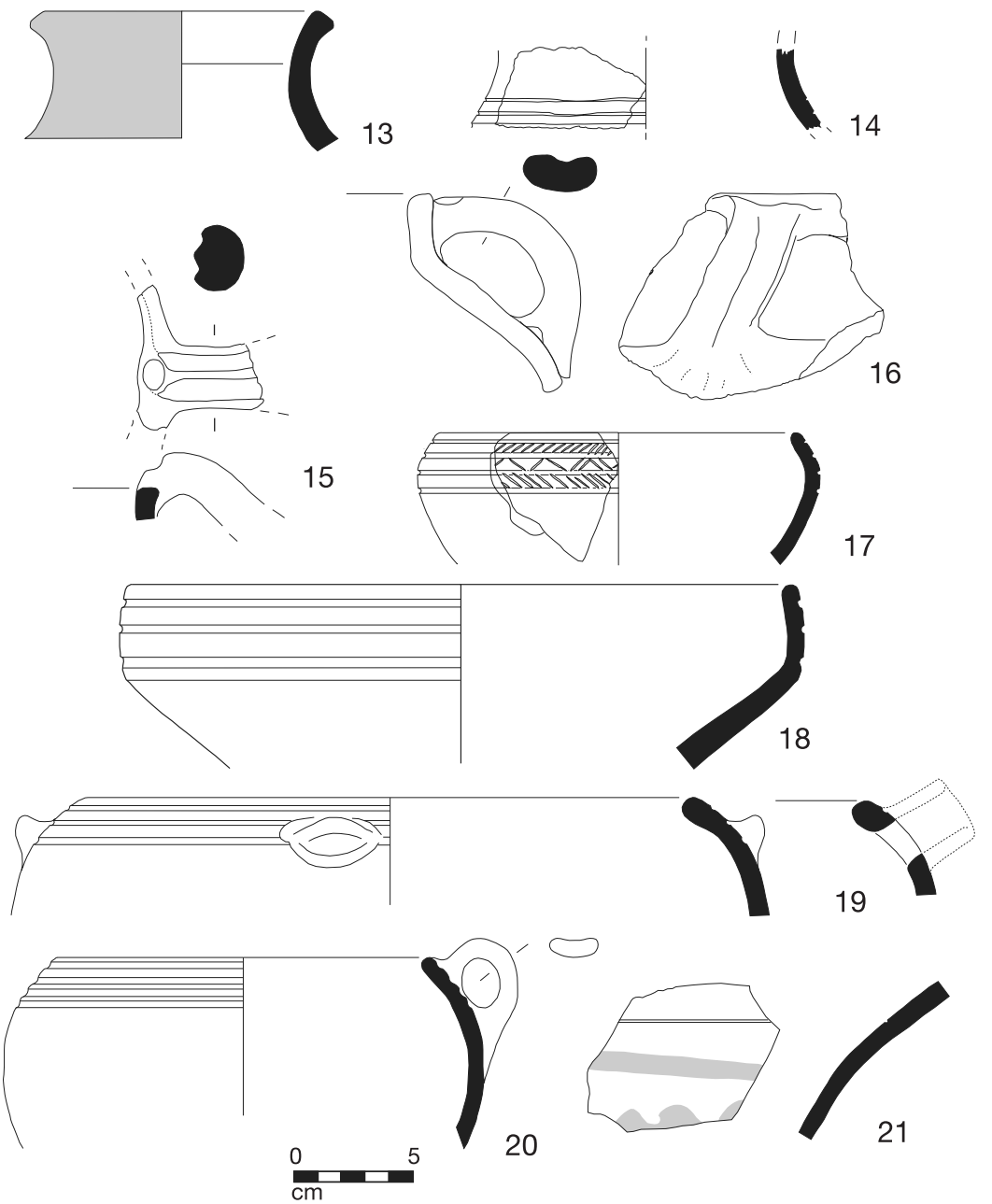

Fig. 5. Pottery of Fabrics 2-6 from the Early Iron Age Pit in Operation E.

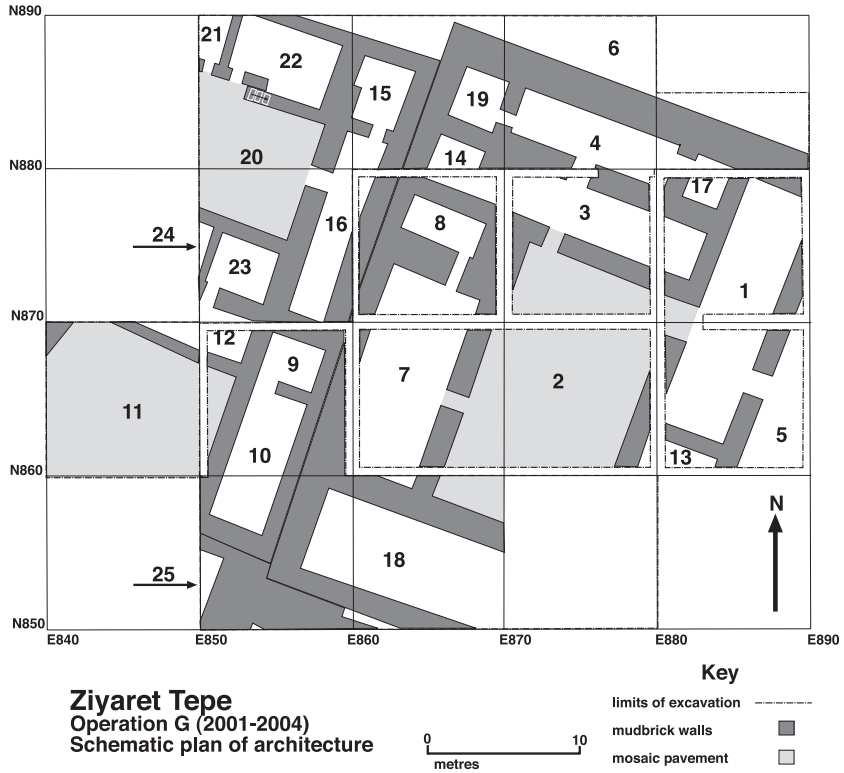

Fig. 6. Plan of the Late Assyrian architecture found in Operation G in the lower town at Ziyaret Tepe.

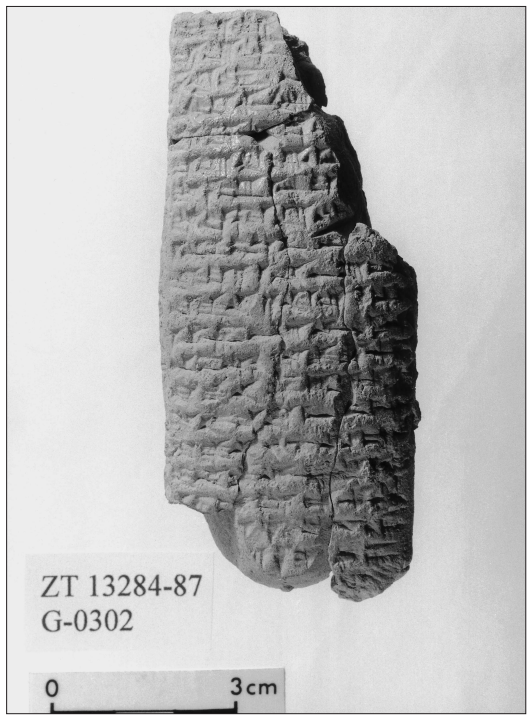

Fig. 7. Cuneiform tablet (G-302 ZTT 22) excavated in Operation G in 2003.

Fig. 8. Mosaic pavement in Operation G, Room 20, (G-521).

Fig. 9. Kiln in Operation G north of Rooms 15 and 19 (G-242).

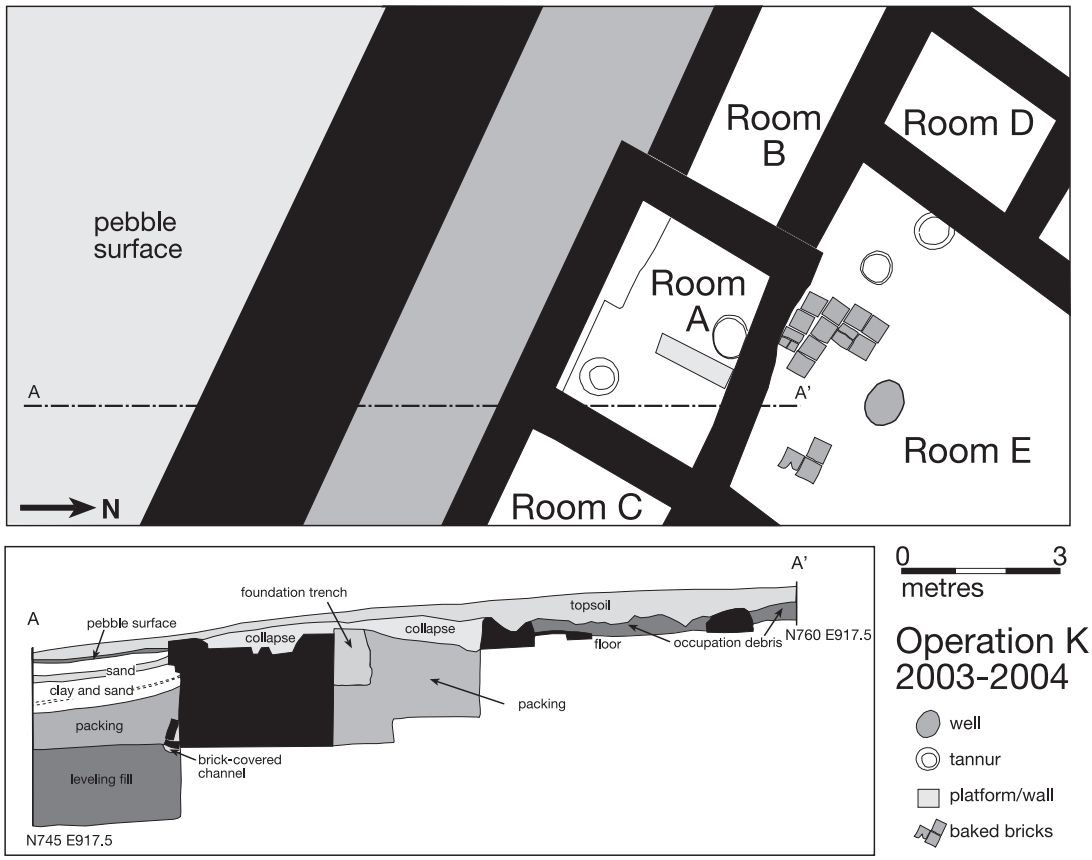

Fig. 10. Plan of city wall and associated domestic structures (above) and section through the city wall (below) in Operation K.

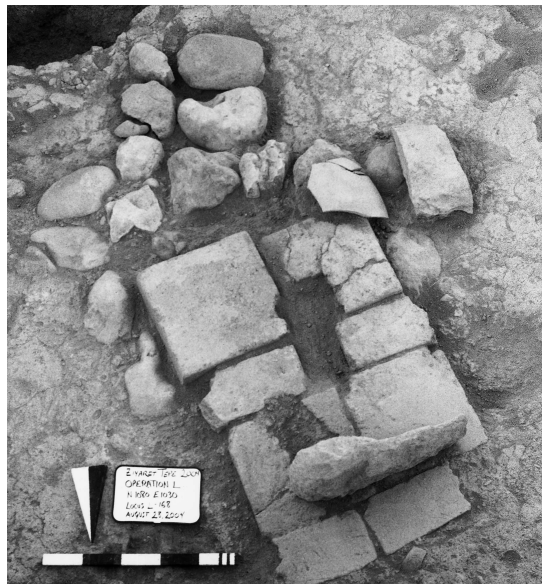

Fig. 11. Late Assyrian (Phase A) brick feature, possibly a drain found in Operation L on the high mound.

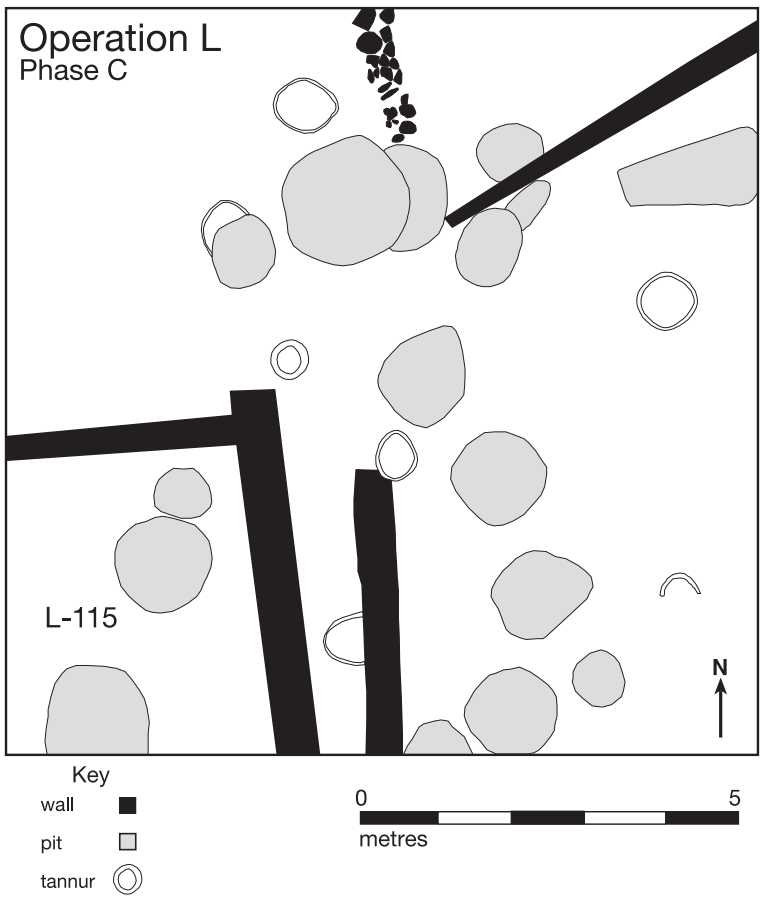

Fig. 12. Plan of the Medieval Islamic (Phase C) architecture in Operation L.

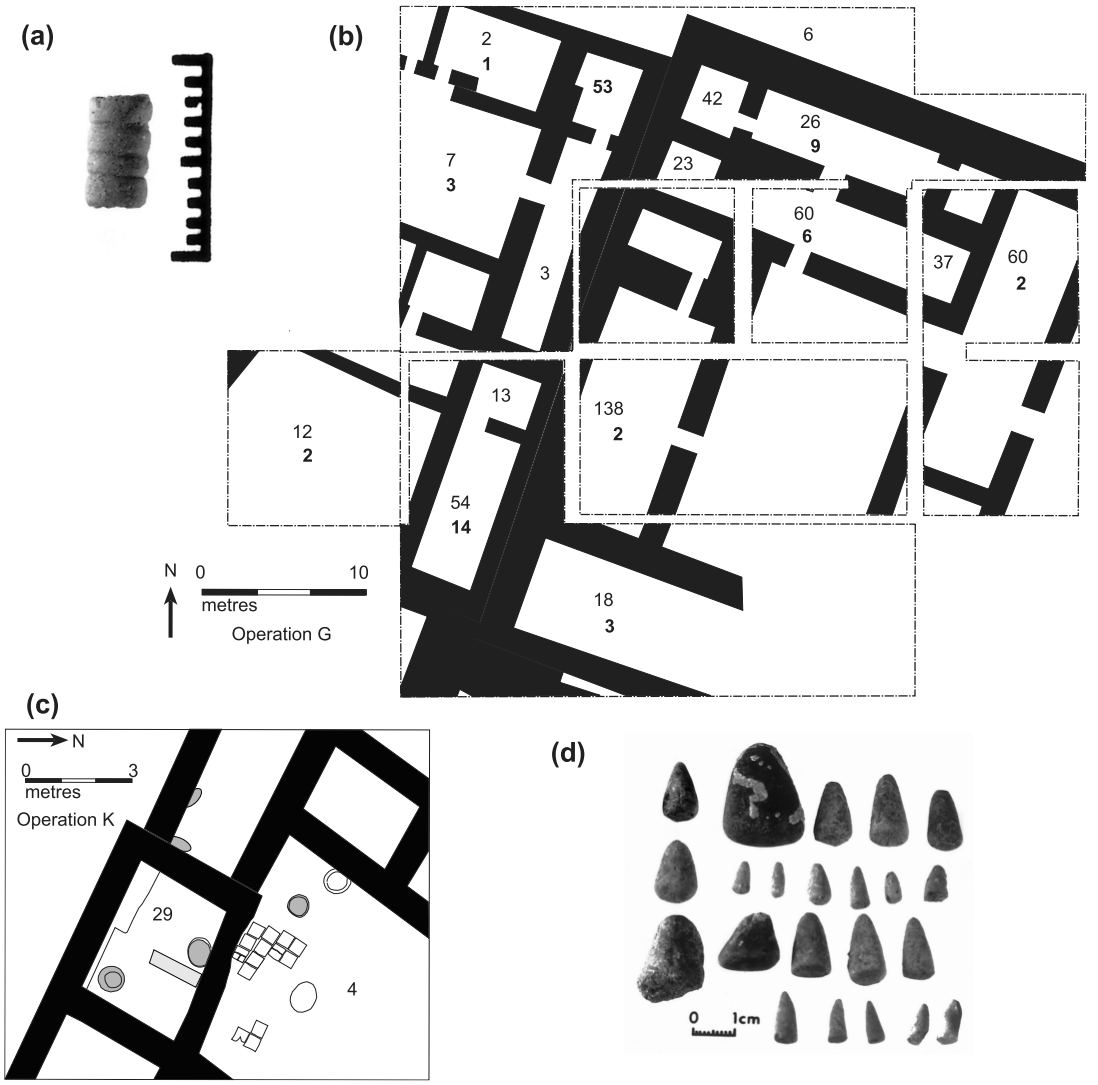

Fig. 13. Plan of micro-debris sample locations taken from Operation G (b) and Operation K (c). The number of microdebris samples is indicated for each room (the quantity of floor/supra-floor samples is in plain type; the quantity of collapse/fill samples is in bold type; and samples taken from features are highlighted in gray on 17c). Please see Fig. 6 and 10 for the key to the room numbers and features in these Operations. (a) illustrates an un-cut blank for small, 2 mm *lapis lazuli* beads recovered from Operation G. (d) illustrates a hoard of 22 tokens recovered from Operation K.

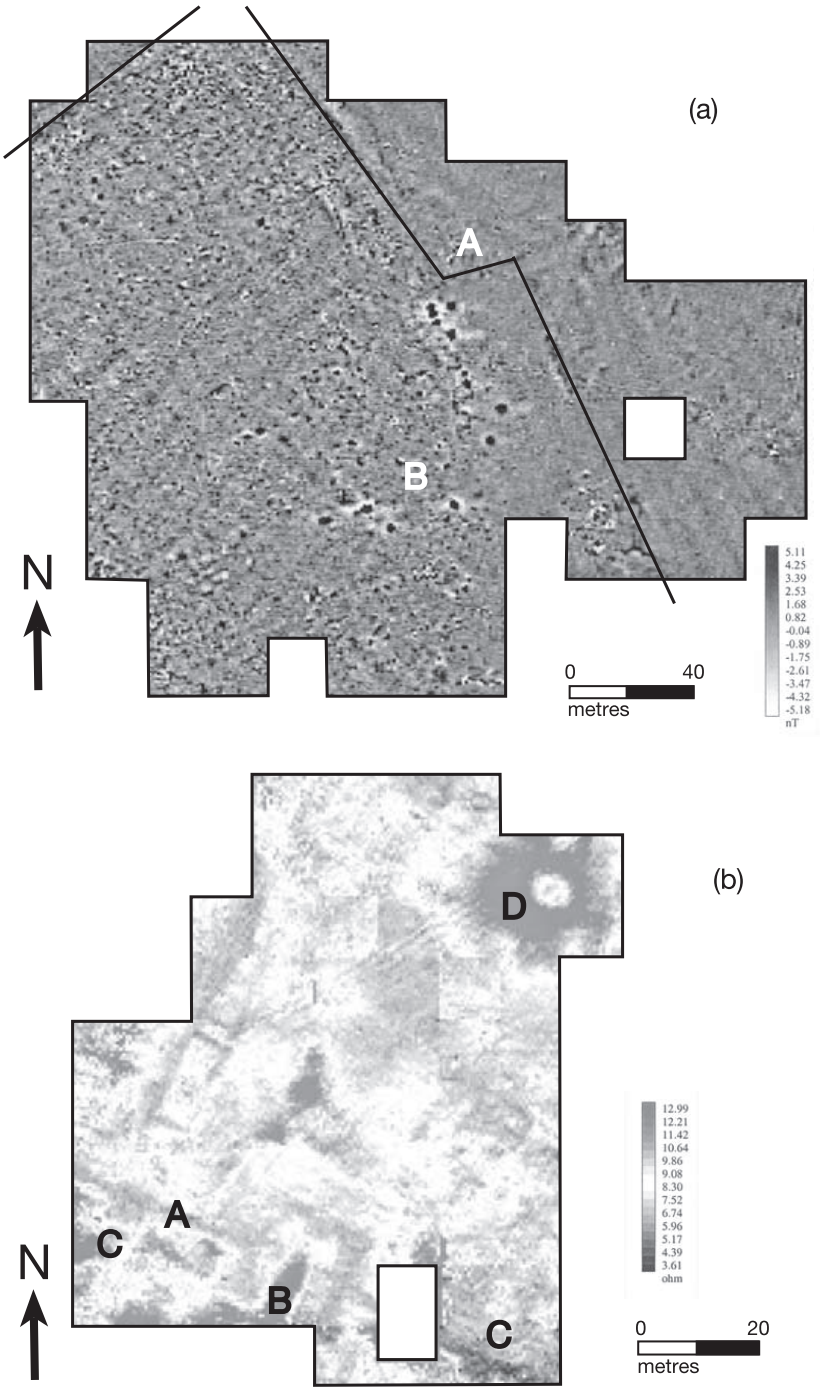

Fig. 14. a. Map of subsurface magnetic field gradiometry survey in eastern part of the lower town generated from data collected in 2003; b. map of electrical resistance survey data collected near Operation K in the southern lower town in 2004.

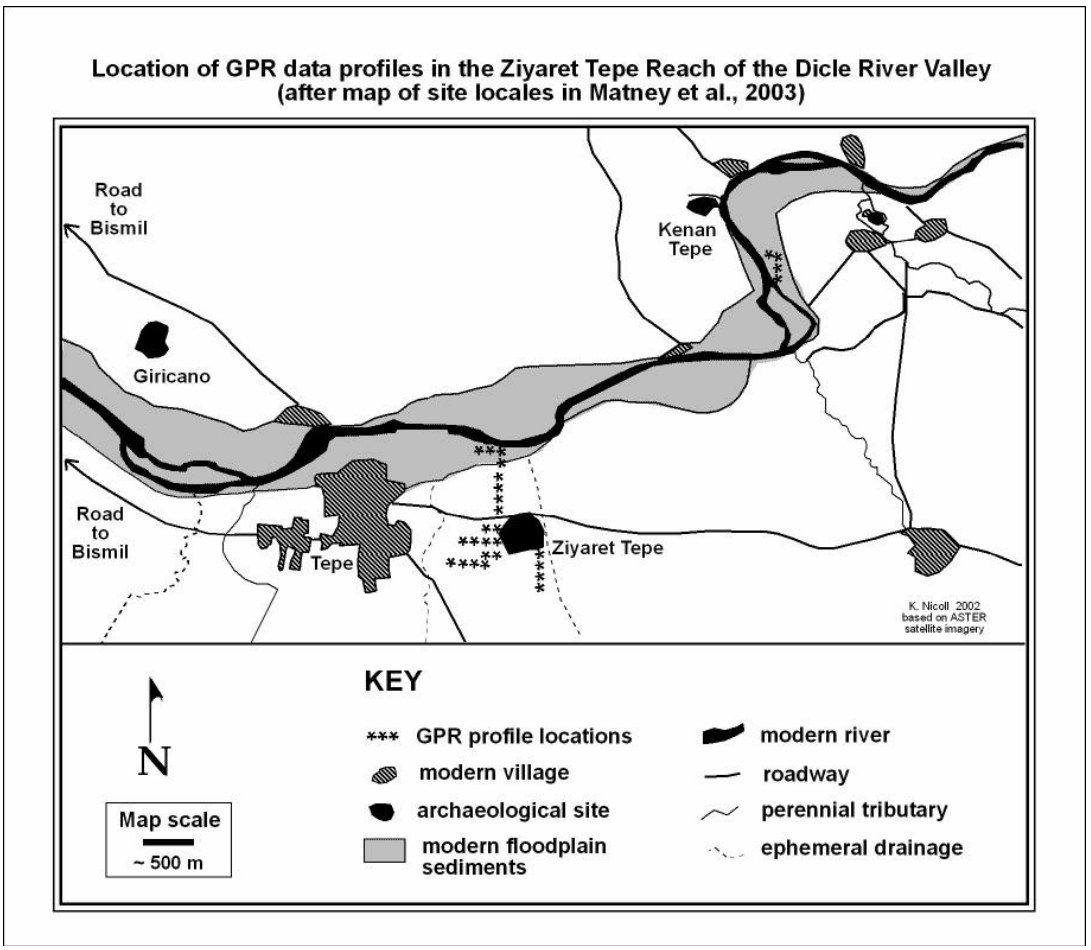

Fig. 15. Map of general location of the GPR profiles acquired during the 2004 geomorphology field season.

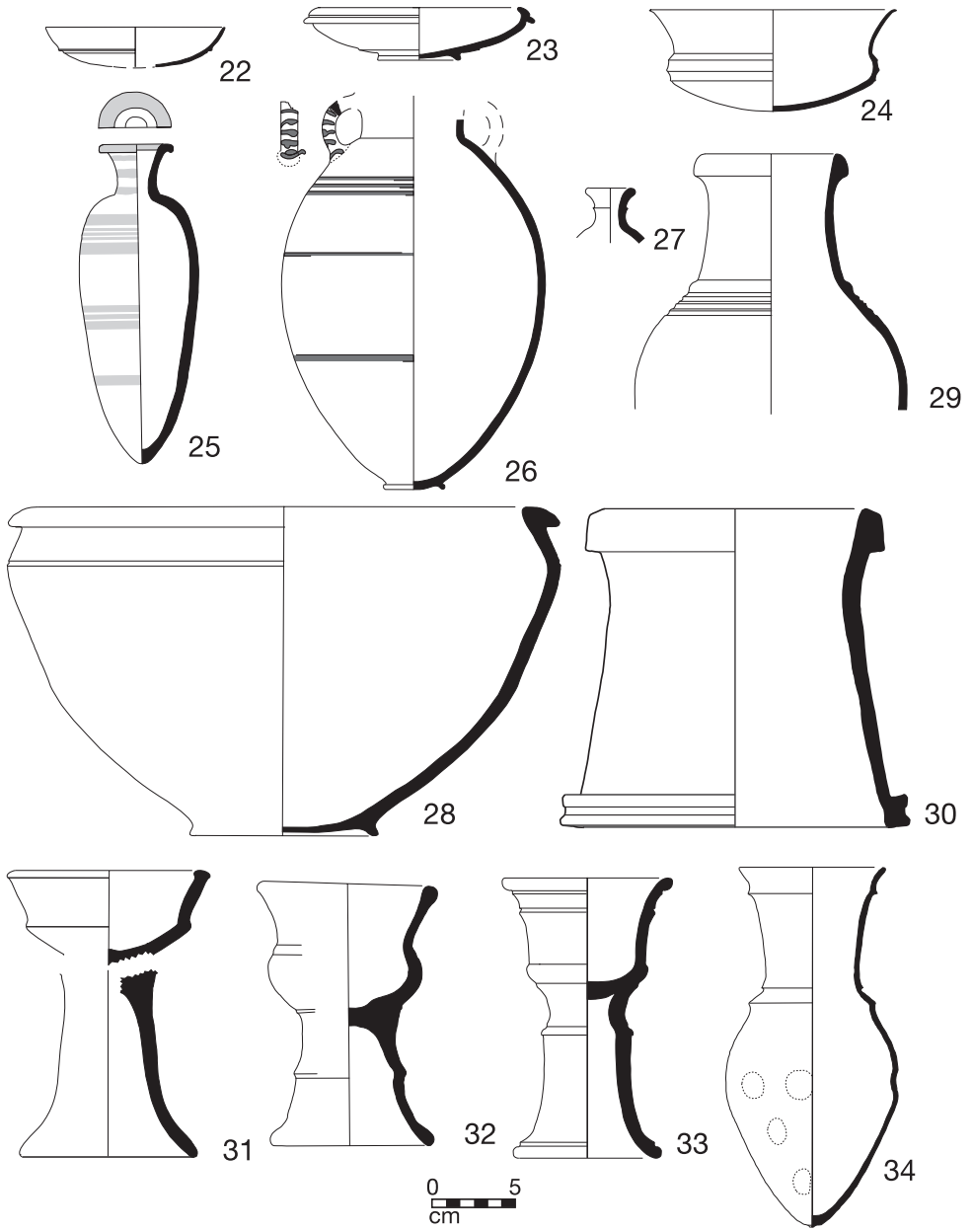

Fig. 16. Pottery from the Late Assyrian metal-working installations, A-242, A-252, A-805 in Operation A on the high mound.

Fig. 17. Detail of engraving on the handle of a Late Assyrian copper alloy vessel (A-252 ZT 7579) from Operation A after conservation;