Research of the Arbil Citadel, Iraqi Kurdistan, First Season

Výzkum citadely v Arbílu (irácký Kurdistán), první sezóna

Karel Nováček

with contribution by

Tomáš Chabr, David Filipský, Libor Janíček,
Karel Pavelka, Petr Šída, Martin Trefný and Pavel Vařeka[1]

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North Mesopotamian town Arbil (ancient Urbilum, Arba-ilu, Arbela) with at least five-milenia-long history belongs among the towns with the longest settlement continuity of the world. The city, along with Ninive and Assur, reached the apex of its importance during the Neo-Assyrian period (10th–7th centuries BC) as a religious metropolis and royal residence, but maintained its central position in the region between Great Zab and Lesser Zab in later periods as well. The project of the archeological evaluation of the Arbil's tell and the 10 ha-large-citadel situated on its crown started in 2006 as a joint project of the Czech and Iraqi institutions and represents also the first Czech archaeological expedition to Mesopotamia at all. The primary emphasis of the first season of the project was laid on gathering documentation of the citadel and gaining the first data regarding to chronology and stratigraphy of the tell, mainly with the help of non-destructive methods. Particular attention was also paid to the settlement context of the tell, although its nearly all area has been destroyed by expanding building activity of the present-day metropolis.

Northern Mesopotamia, Arbil, non-destructive methods, Middle Palaeolithic, Late Chalcolithic, Neo-Assyrian Period, Islamic Archaeology

Severoirácké město Arbíl (ve starověku Urbilum, Arba ilu, Arbela) je jedním z nejdéle kontinuálně osídlených míst na světě, spolu s Aššurem a Ninive patřilo k hlavním královským městům Asyrské říše a jeho centrální postavení v regionu přetrvalo i do mladších období. Projekt archeologické evaluace ohroženého arbílského tellu a citadely na jeho vrcholu, zahájený v roce 2006 českými a irácký mi institucemi, poskytl vůbec první archeologické poznatky o této významné památce a je současně i první českou archeologickou expedicí, působící v Mezopotámii. První sezóna projektu byla zaměřena jednak na vytvoření kvalitní dokumentace hustě osídleného areálu citadely o rozloze 10 ha, jednak na získání základních informací o stratigrafii a chronologii tellu, převážně s využitím nedestruktivních metod výzkumu. Pozornost byla věnována také předpokládanému sídlištnímu zázemí, jehož plocha ovšem už téměř úplně zmizela pod expandující zástavbou současné metropole.

severní Mezopotámie, Arbíl, nedestruktivní metody, střední paleolit, pozdní chalkolit, novoasyrské období, islámská archeologie

1. Introduction (KN)

During preparations for the restoration of the unique historical complex at the Arbil citadel, representatives of the Kurdish Regional Government, Arbil's municipality and heritage management bodies expressed a need of an archaeological evaluation of the site. During preparations for this project in the spring of 2006, a basic structure was established on the Czech side for collaboration between professional bodies, while financing was secured mainly from the grant of the Ministry of Foreign Affairs of the Czech Republic. The organisational and logistical aspects of the project were handled by Gema Art Group a.s. Prague, which has since 2004 been active in Iraq and in Arbil especially in the field of monument restoration and the protection of the historical heritage. The Iraqi partner institutions involved included in particular General Directorate of Antiquities and the Department of Archaeology of the Salahaddin University at Arbil. The research aspects of the project were consulted in advance and during the work with the State Board of Antiquities in Baghdad.

The original, pure research programme was, at the request of the Kurdish side, expanded to include a teaching component for archaeology students from Salahaddin University and staff of the General Directorate of Antiquities in Arbil. This training was designed as

[1] The authors are stated in the head of each chapter by abbreviations: Tomáš Chabr (TC), David Filipský (DF), Libor Janíček (LJ), Karel Nováček (KN), Karel Pavelka (KP), Petr Šída (PŠ), Martin Trefný (MT), Pavel Vařeka (PV).

a series of seminars on the methodology of field archaeology, the conservation of archaeological artefacts, the basics of heritage management and museology, combined with participation in the excavations in the area of the Arbil citadel. A total of 20 students and staff from the institutions named completed the course, which was for the majority of them their first contact with archaeological fieldwork conducted in the standard manner.

The research aims of the field expedition were shaped in part by the very limited length of time available on site (September 14th to October 5th 2006) and were subject to requests to obtain by the most efficient means possible the maximum amount of information regarding the development and chronology of the citadel, and of the tell on the crown of which it is located. The primary emphasis was therefore on gathering basic documentation on the citadel and gaining general archaeological data with the help of non-destructive methods. Archaeological trenching was in this phase rather of a complementary and didactic character. To a limited extent, attention was also focussed on the documentation of the historic architecture of the citadel, which is threatened by rapidly advancing destruction. Thanks to the helpful attitude of the General Directorate of Antiquities, it was possible to study the available plans and project documentation for the buildings in the citadel, and to photographically document the archaeological exposition in the Museum of Civilisation in Arbil, which offered valuable comparative material for the finds made.

The expedition team consisted of Martin Dvořák (National Institute for Monument Care in Prague: leading of the project, conservation issues), David Filipský and Tomáš Chabr (INSET Prague: geophysical survey), Libor Janíček, Karel Nováček and Pavel Vařeka (Dept. of Archaeology, Faculty of Philosophy and Arts, University of West Bohemia at Plzeň: archaeology), Karel Pavelka (Mapping and Cartography Dept., Faculty of Building, Czech Technical University (CTU) Prague: mapping and photogrammetry), Tomáš Petráň (Academy of Performing Arts in Prague: film documentation of the expedition) and Dan Voříšek (Gema Art Prague: organisational support).

The realization of the archaeological project in Arbil gave us the unique opportunity to make contacts with many generous colleagues in their hardly suffered land. Our work would be unthinkable without continuing support and interest of Mr. Kana'an al-Mufti, the representative of the Kurdish Regional Government for affairs of Arbil citadel, and without friendly help and many fascinating discussions with colleagues from the Department of Archaeology of the Salahaddin University at Arbil, first and foremost with Prof. Dr. Ahmad Mirza and Mrs. Dr. Narmin Ali Muhamad Amen. Thanks must be given to Jamel J. Asaad and Songar M. Abdulla from General Directorate of Antiquities at Arbil, for their helpful attitude relative to deposition of the finds from citadel. We also remember with gratefulness to our interpreter Mustafa Argushi. Without them, and without the help of many students of archaeology from Arbil, the work would not have been possible. On Czech side, deep gratitude must be expressed to the staff of the firm Gemma Art Prague, namely to Petr Justa, Jan Urban, Dan Voříšek and Miroslav Houska, for their enthusiastic engagement in the project preparation and their support during its whole realization. European orientalists Petr Charvát and Blahoslav Hruška (Prague), Mirko Novák (Tübingen) and Stefano Valentini (Firenze) helped us by valuable consultations and comments on the earlier version of the paper. Finally, we would like to thank Alastair Millar for partial translation and improving of the text.

2. The settlement tell and citadel of Arbil (KN)

The tell and citadel (*qal'a*) of Arbil, capital of the Kurdish Autonomous Region in northern Iraq, is among the most important archaeological monuments of northern Mesopotamia with more than 7000 years long, continual settlement history. The settlement on the tell perhaps reaches back as far as the Neolithic, but clearly to the Chalcolithic cultures (ca. 5000–3200 BC). The first historical records in which Arbil (Urbilum) figures relate to the person of the Šulgi, king of the Third Dynasty of Ur (ca. 2095–2048 BC), which ravaged the town in the 43rd year of his reign (ancient history of the town more detailed in *Villard 2001*, 68–69; *Unger 1928*, 141–142). In the second year of the king Amarsin (2046–2038) Arbil was annexed to the Ur III Empire. Over the second millenium BC. the city became a part of Assyria and reached the apex of its importance during the Neo-Assyrian period (10th–7th centuries BC), when as Arba-ilu ("City of the Four Gods") it was, along with Ninive and Assur, a religious metropolis, centre of the cult of Ištar of Arbela (*Nevling Porter 2004*) and a royal residence known to have been used by King Assurbanipal (669–627 BC, resided at Arbil probably between 653 and 648 BC). This king renovated the Ištar temple and city walls (*Barton 1893*, 159), the important oracle and astronomic observatory connected with the temple is proved many times already during the reign of his predecessors, kings Sennacherib (705–681) and Esarhaddon (681–668) (*Banks 1898*; *Godbey 1917*). During the reign of Sennacherib, chronical problems with water supply were resolved by building of 22 km long, subterranean canal from Bastura river (*Ismail 1998*, 30). After the destruction of Assyria, probably in 615 BC, the city came under the control of the Medes, then the Persians and latterly the Greeks – after the famous Battle of Gaugamela (incorrectly Battle of Arbela) in 331 BC.

During the Parthian period (126 BC–226 AD) Arbil (Arbira) became the administrative centre of the Kingdom of Hidyab, and one of the earliest and most important centres of Christianity around the Tigris. Within the framework of the Sassanid Empire, the administration of the province of Nódh-Ardashirakan was concentrated in Arbil, along with that of the neighbouring southern province of Garmekan. At the same time, the existence is claimed here of a great Zoroastrian fire temple and prison. In 340 and 358 AD, persecutions of the Christians happened in the town (*Sachau 1915*, 9, 12, 15; *Sourdel 1990*, 76; *Simpson 1996*, 88; *Wheatley 2001*, 103–109).

In 642 northern Mesopotamia was conquered by the Muslims, and the function of regional centre shifted to

Mosul. The area, shaken by power struggles, gradually became more and more independent of the central Abbasid government in Baghdad. After a temporary union under the Seljuk Turks (post-1070), the region again fractured into a colourful grouping of small emirates, ruled by the families of local atabegs. It was thus that, in the first half of the 12th century, Arbil became the seat of the Kurdish Begteginid (Baktakin, Buktikid) family, later subordinated to the Egyptian Ayyubids, to whom it was related. The most important ruler of this dynasty is regarded as having been Saladin's brother-in-law, Muzaffar al-Din Kokburi (1190–1232), whose domains were then subject only to the caliph al-Mustansir (*Fiey 1965*, 74–76). The Mongols made an unsuccessful attempt to capture Arbil as early as in 1237 (*Woods 1977*), definitively taking the city only after the fall of Baghdad in 1258 and a six month siege (*Fiey 1965*, 76; *Sourdel 1990*).

Written records attest that in the Middle Ages the *qal'a* was a carefully fortified feature, protected along its perimeter by a contiguous wall with towers and gates, and with a moat surrounding the base of the steep, paved slopes of the tell. In the second half of the 13th and in the 14th centuries at least one Christian church and monastic cella existed within; the hypothe-

Fig. 1. *Localisation of Arbil on the map of Iraq.* — ***Obr. 1.*** *Poloha Arbílu na současné mapě Iráku.*

Fig. 2. *View at Arbil from southwest with al-Mudhaffar minaret on the left, author W. Walton 1820 (after Rich 1836).* — ***Obr. 2.*** *Pohled na Arbíl od jihozápadu, vlevo minaret al-Muzaffara, autor rytiny W. Walton 1820 (podle Rich 1836).*

Fig. 3. *Arbil citadel, south gate, photo by unknown author, 1918.* — ***Obr. 3.*** *Jižní brána citadely v Arbílu, foto neznámého autora z roku 1918.*

Fig. 4. *View on the citadel from west, photo by P. Vařeka, 2006. —* ***Obr. 4.*** *Pohled na citadelu od západu, foto P. Vařeka, 2006.*

tical residential and administrative centre that may also be presumed to have existed within the citadel (in detail *Nováček 2007*) also included, for example, a mint (*Heidemann 1996*, Fig. 3). The fortress, therefore, was not a citadel in the sense of being only a military/administrative feature, but it fulfilled the more complex position of urban core, incorporated into a single settlement unit with the separately fortified city in the plain, in which a large market operated and which contained a variety of public buildings. From the broader temporal and territorial context, the fortress clearly belongs in the large group of Ayyubid/Mamluke urban fortifications; close analogies may be found in the citadels at Aleppo, ar-Raqqa, Damascus or Cairo.

After 1534 Arbil became gradually a marginal, depopulated locality at the eastern periphery of the Ottoman Empire (*fig. 2*). Only at the end of the 19th century did the city begin to grow again, and after the Second World War this urban and demographic development exploded. In recent decades, as a consequent of directive interventions, the social structure of the citadel's occupants has fundamentally changed, and its basic maintenance was neglected.

The citadel lies on a clayey artificial mound that is an irregular oval in plan, the crown measuring 430 x 340 m (total area roughly 102,000 m²), which rises some 25–32 m above the flat steppe stretching between Greater and Lesser Záb rivers (*figs. 4, 29*). Today the area contains a dense agglomeration of heavily damaged houses (506 are listed for 1980: *Abid 2004*, 12), the conjoined facades of which form the outer front of the area. A preliminary assessment of the architecture implies that it is unlikely that any of the surviving house cores can be dated to earlier than the Late Ottoman period.[2] An exception may be found in late 18th century baths (*hammām*) which, however, was subjected in 1979 to major renovations, which removed a considerable part of its authentic construction.[3] The demolition of the south gate (*fig. 3*), which took place around 1960, meant the needless loss of an undeniably archaic, landmark structure, the location of which determined the urbanistic structure of the whole citadel, and its fan-like network of inner streets (*fig. 28*).[4] The opposite northern (*Bāb al-Ahmad*) and eastern (*Gichik kapi*) gates were in comparison of only secondary importance, and are clearly later in date. The citadel is traditionally divided into three historical sections: Takiya, Topchana and Saray quarters (*Nováček forthcoming*); the name of the first is apparently drawn from a now lost building belonging to a religious brotherhood. In addition to the Muslim religious buildings, the citadel area also contained a synagogue until 1957 (Mr. Kana'an al-Mufti, pers. com., October 2006).

Arbil's municipal and regional governments are searching for a rapid, efficient means of conserving the facades of the circumference, as well as the inner buildings, and seek to return the citadel to the role of natural city centre. The locality has in recent years been included several times in the list published by the World Monument Fund in New York of the 100 most endangered monuments in the world, and an application is currently being prepared to have it included on UNESCO's list of world cultural heritage sites.

The densely settled citadel area has hitherto not been the subject of archaeological investigations. Only

[2] Within the framework of what was possible, basic assessment, survey and documentation of the architecture of the citadel was undertaken in November 2007. Despite of the house reduction in recent decades by ca. 60 % we were able to identify a group of 72 valuable houses which should be surveyed in detail as soon as possible; preliminary results in *Nováček forthcoming*.

[3] The information was taken from the correspondence and photographic material deposited in the archive of the General Directorate of Antiquities Arbil.

[4] During the building of the new gate in 1979 the geological subsoil was found out 36 m deep (kind information of Mr. Kana´an al-Mufti, October 2006).

isolated finds have been made, during the building of the new south gate in 1979, which can be dated to the Neo-Assyrian period (ca. 1000–612 BC). Several of these finds are now in the exposition of the Museum of Civilisation in Arbil. The literature also contains references to several sculptural and epigraphic sources of Arbil's origin – a cuneiform tablet bearing the name of King Assurbanipal and a bronze statuette with an inscription naming of the owner of the piece, a priest Šamši-Bél (*Unger 1929*). Well-known is also the Assurbanipal panel with the view of Ištar temple and citadel of Arbailu (*Reade 2002*, Fig. 15) and other similar monuments (*Unger 1929*).

3. Geodetic measurements and photogrammetry of the citadel (KP)

In June and September 2006 photogrammetric and geodetic works were undertaken on the citadel at Arbil. Prior to this, no complete documentation or plan of the citadel had been available, the only accessible source being a cadastral map of 1920s.

During the short period of the expedition it was not possible to collect measured data for the detailed recording of this area. Instead, terrestrial and aerial photogrammetry was utilised. Sets of terrestrial digital images were taken (with more than 250 outside the citadel and 200 inside); the next 90 images were taken from a US Army helicopter at a height of approximately 100 m. The resolution of the images varies in the centimetre range; a typical resolution for the outer facades of the citadel is about 2–3 cm depending on distance from the building. During aerial photography it was of course not possible to take vertical photographs from which photographic plans could be make, and stereoscopic plotting was entirely impossible: not only did the helicopter fly too quickly, but it flew too low for this to be possible. From greater altitudes, however, the influence of the central projection rendered many details sketchy or entirely invisible.

There are no aerial photogrammetric images available in Iraq; instead, a satellite image from the QuickBird satellite with a resolution of 65 cm was used for the ground plan of the citadel (date of image acquisition: 2005, Aug. 23rd). The satellite image was processed using Geomatica 10.0 ("pan-sharpening" method) and Adobe Photoshop 7.0 (image sharpening, filtration and new sampling to 25 cm pixel size to improve image quality). The outputs of this procedure were encouraging and enabled the next step to progress at better quality.

A provisional geodetic network was built in the citadel area, and over 600 object points were geodetically measured (numbered from 100 to 1000). Next, 16 control points were signalised and measured for aerial imaging (labelled from 4001 to 4016), mainly on rooftops. Photomodeler software was used for all of the photogrammetric image processing. The 33 aerial images and 19 terrestrial images were adjusted to the base model. Mathematical least squares adjustment and absolute transformation using the control points was sufficiently accurate: the mean co-ordinate's error of control points was approximately 15 cm (mean position error 20 cm). In the 3D model about 1000 object points were measured and calculated.

A comparison of the geodetically measured and Photomodeler calculated object points was made; a small systemic and scale error was found (the model from Photomodeler was slightly larger and shifted southward; the typical differences were approximately 15–30 cm in comparison to geodetic measurement by total station). These displacements were solved by affine transformation into the geodetic measurements. Finally, geodetically measured object points, points from Photomodeler processing, measured control points and a transformed satellite photo plan (as an underlayer photo plan) were available. These data were then used for processing to the base vector plan (*fig. 28*).

The team is presently working on the creation of a final base vector plan of the citadel. We are also using computerised photogrammetric images to create virtual 3D models of the citadel fortifications and the valuable structures within (much of the inside was deliberately damaged, and the present habitations are provisional). The final part of this project will be the creation of a complex information system for the citadel, which will be used to store all valuable information (*fig. 30*).

4. Geophysical prospection (TC, DF)

On September 24th–25th 2006 geophysical surveying was performed on selected parts of the site with the following aims:

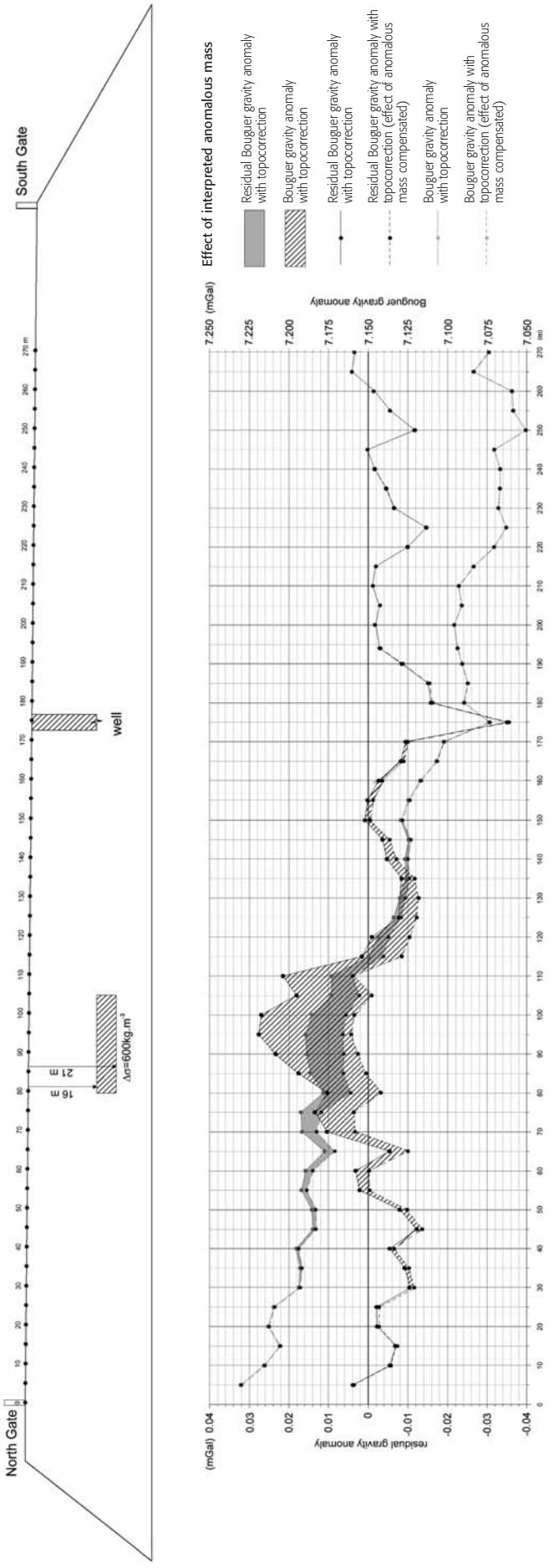
a) to identify possible traces of destroyed monumental architecture in the stratigraphy of the tell and to determine their approximate sizes, depths and structures
b) to verify the potential for the application of basic geophysical methods in a unique environment of non-geological origin.

The methods employed were those of micro-gravimetry, shallow refraction seismology and direct resistivity profiling in the multi-electrode variant (more detailed in *Nováček et al. 2007*, 9–13).

The results of the **gravimetric research** are presented in a form of profile curves of the field of Bouguer gravity anomalies, corrected by the topo-effect and the effect of weight relevant objects (*fig. 5*). To emphasize the effect of local non-homogenous features in quite a high gravity gradient, we also constructed a curve of the residual gravity field.

Apart from the positions with different degrees of soil and rubble consolidation on a base of clay, the expected sources of anomalous weight effects are mainly remnants of stone buildings and possible empty spaces. Interpretation is performed by means of the elimination of weight anomalies from local buildings with a differential density $\Delta\sigma$ = 600 kg.m^{-3} for stone rubble and $\Delta\sigma$ = -1,800 kg.m^{-3} for empty space, with a condition of a surrounding environment with homogenous density (σ = 1,800 kg.m^{-3}).

The dominant feature in the curve of Bouguer weight anomalies is a local increase of the vertical component of gravity acceleration at the 80–105 m length



interval. Collating the gravity acceleration to a surface approximating the regional trend corresponds to an object with a differential density of 600 kg.m^{-3} at a depth of 16–21 m and with dimensions of 25 m in the profile direction and at least 25 m in the transverse direction. Single profile measurement does not enable more exact determination of the geometry and differential density of interpretation. The interpreted building, in a shape of a flat disc with a height of approx. 5 m and width of 25 m in the profile direction, may even represent the buried elevation of more compact subsoil or the remnants of a destroyed stone structure. Given the local geological conditions the former seems less likely. In *fig. 5* the effect of the interpreted anomalous matter is marked with hatching below the weight curves.

To explain the weight deficit in close proximity to a well with a centre at 180 m, it is not enough to use the weight impact of the actual well. If the profile is not intersected at this point by a sewerage route, it is perhaps matter deficit due to the fact that fine-grain fractions of the soil around the well casing became liquid. Due to their shape and amplitude, the local weight depressions with centres at 250 and 225 m show a shallow matter deficit, which may indicate e.g. the routes of buried services or soil degradation in their surroundings.

The results of the **shallow refraction seismology** measurements are presented in the form of a velocity section, which shows the distribution of values of seismic (elastic) wave spread speed depending on spatial coordinates (*fig. 31*). The ground environment at the location of the profile is characteristic, with low seismic speed at the first few metres of depth. Up to a depth of approx. 5 m, the speed values do not exceed a level of 300 m/s, and this part of the section has a relatively homogenous speed. There are, however, clear local drops in speed to below 200 m/s in the zone close to the surface (with a depth reach of 1–2 m).

There are no signs of the hard surface in the velocity section – its thickness is too small, only in the first dozens of cm. In some parts of the profile, at a depth of around 8 m, there is a clear increase in speed to a level of around 400 m/s. From this depth, the environment starts to be clearly differentiated as regards the distribution of seismic speed values. There are clear areas with increased values of seismic speed, the most significant of which is a section between stations 18–63 m, where the increase of speed values is permanent (the trend continues towards the greater depth) and the gradient of speed change is also the most distinct. In the sections of the stations 95–125 m and 150–170 m there is also a local increase of speed, which again decreases with growing depth. Further changes in the speed field are apparent at the level of approx. 20–22 m below the surface. Over the whole width of the profile, the speed increase gradient is growing, its values exceeding 600 m/s. The aforementioned speed increase in

Fig. 5. *Micro-gravimetric profile through the citadel (N-S orientation), 2006. Drawing by T. Chabr and D. Filipský.* — ***Obr. 5.*** *Mikrogravimetrický profil citadelou (severojižní orientace), 2006. Kresba T. Chabr a D. Filipský.*

the area of 18–63 m continues sharply, the speed rising to greater than 1000 m/s at a depth of around 23 m. Only in the section of stations 75–102 m does the speed increase more slowly. The presence of a high speed gradient at a depth of around 22 m probably shows the base of the archaeological stratification and the level of the subsoil. The depth coverage with the seismic signal was most dense at depths of 5–15 m; at greater depths the information is sparser, and the signal coverage is highly dependent on the speed conditions in the vertical section.

The results of the **geo-electrical resistivity profiling** are presented in the form of a resistivity profile section (*fig. 31*). Field survey inside the citadel was highly complicated due to the presence of artificial conductors (lead water pipes at the surface or at minimal depth) and by the substantial intensity of terrestrial currents. Metal piping in close proximity to the measuring electrodes, in combination with a relatively high electric potential at this artificial conductor, results in greater errors in the measured values. Local hard surfaces at the sites of the measuring electrodes may also have negative impacts. In some parts of the profile inside the citadel, it was not possible to gain usable data. Outside the citadel, the situation is easier thanks to the absence of water pipelines, but the intensity of the terrestrial currents is very high here as well.

Profile 1 (inside the citadel) shows that the ground environment has relatively higher values of bulk resistivity in the layer close to surface (20–80 ohm.m). The variability of the values results from changes in volume humidity, which varies within a broad interval from virtually 100 % saturation to high dehumidification. It is a layer with a thickness of 2–3 m. Further down, the values of electrical resistivity decrease rapidly, to below a level of 5 ohm.m, which corresponds e.g. to a wet, loamy embankment. A significant anomaly is an area of very high resistivity in the section between 100–120 m, where the electrical resistivity exceeds 600 ohm.m, and which surely corresponds to a significant change in the character of the ground environment. These high values of resistivity correspond to an environment comprising a coarse-grained dry or slightly saturated embankment.

In the profiles measured at the edge of the slope of citadel, the resistivity sections do not have any symptoms of having a top layer of increased resistivity. In the profile running sideways to the slope along the path (profile 2), there are clear low values of resistivity, mostly in the interval 5–10 ohm.m., and a local increase can also be seen between 42–56 m, where at an approximate depth of 5 m there is a change to an area of locally higher resistivity (up to 20–30 ohm.m). The ground environment at the profile location comprises a clayey soil with very low electrical resistivity; the area of local resistivity increase is of the nature of rubble with clay.

Profile 3, running along the slope contour line as close as possible to the circumferential walls, shows a ground environment with more variable resistivity. On the one hand there are clear areas of very low resistivity (less than 5 ohm.m), but there are also areas with resistivity values significantly exceeding 150 ohm.m. An environment with higher resistivity is recorded in deeper parts of the profile section at a depth greater than approx. 10 m, but in several places this type rises to the surface or to its proximity (in the 22–26 m, 44–50 m and 56–58 m sections). At the profile location we predict the presence of a clayey embankment (at the site f low electrical resistivity), sections with higher values reflecting a material with the character of rubble, which creates formations analogous to rubble cones.

For both the seismic and the geoelectric profiles measured inside the citadel, we have prepared a simple interpretation scheme, which depicts the supposed soil types (*fig. 31*). The most frequently represented material is of the character of a clayey backfill with very low specific electrical resistivity, and a seismic speed corresponding to soft clay (significantly below 600 m/s). Local areas with higher speed (at a depth of 9–14 m between the 93–123 m and 147–167 m sections, and also an area at a depth of 12–19 m between the 28–56 m sections) are interpreted as environments with clayey backfill containing a significant proportion of coarse rubble; these may be the extensive remnants of buildings where the gaps between the individual blocks were filled with a clay material. In the 87–127 m section at a depth of 14–23 m we interpret the presence of material with a significantly high specific electrical resistivity, which also shows relatively high seismic speed. This is material with the character of coarse rubble with a minimal clayey component and very low water saturation. At a depth of 23 m below the surface is the boundary line of the expected tell base and the surface of the geological subsoil. Below the boundary line, in a section of higher seismic speed at the 20–60 m station, we interpret saturated gravel or sandy gravel (possibly a buried riverbed).

Through the combination of the methods described above we were able even in the extremely complicated environment of a densely settled tell with many disturbing influences to gain basic data about the structure of the stratigraphy and about possible relics of ancient monumental buildings. In the P1 profile, the area with the character of coarse rubble in the central part of the profile at a depth of 14–23 m, and the partial areas with the presence of mixed backfill, may be of greatest interest. In the marginal parts of the citadel we also detected the alternation of several types of backfills, mainly in profile 3 along the contour line near the circumferential facades. The gravimetric profile shows the presence of a significant increase of volume weight in the part of the ground environment under the main road. Such an increase of volume weight corresponds to an environment comprising mostly of coarse rubble (stone blocks), the gaps between the blocks being filled by clayey material. It is highly likely that this anomaly can be identified with a considerable, deep situated relic of monumental stone architecture (of Neo-Assyrian date?).

5. Archaeological research

5.1. Surface survey (LJ, KN)

On September 18th–26th 2006, in collaboration with archaeology students from Salahaddin University in Arbil, surface survey and artefact collection was conducted on the western slopes of the citadel. Of the several approaches possible, that selected for use was total artefact collecting, the principle of which is the maximal density of stint reference units, so that collection covers the entire surface. The main aim is to recover a careful collection of all the artefacts and ecofacts that appear on the surface of the study area at the given moment, irrespective of limitations of time in individual quadrats, of limitations to walkers keeping to stints in the measured lines or network. The reference unit in this case was the 20 x 15 m quadrat (sectors A1 to A3, *fig. 28*). All types of artefact and ecofact were collected from prehistory to the presence. The reference units (sectors) were laid out and measured using GPS I the WGS 1984 (UTM) system.

The results of the collection were markedly varied (*table 1*). The greatest number of artefacts was found on the middle part of the slope (sector A2) – where the number of finds was more than triple that in the poorest sector (A1, on the upper part of the slope). A very similar picture was painted by the distribution of stone industry (A1: 10 pcs, A2: 37 pcs, A3: 8 pcs). Contrastingly, the average weight of ceramic sherds was however the lowest in sector A2: just 9.75 g, as opposed to sector A1 where it reached 15.5 g. Sector A1 was investigated first, and it is therefore likely that these difference may result from the growing experience of the fieldwalkers, but of course other influences also cannot be ruled out. Despite the very steep slope angle and considerable erosion, which brings more and more artefacts to the surface from the clayey mass of the tell, it is clear that for the ceramics (even the large, heavy fragments) there is no visible trend in selective accumulation at the foot of the tell. The band of greatest erosion seems to be clearly the middle part of the side of the hill, where the path runs, but the artefacts revealed do not show any strong tendency to move down slope. The problem of the distribution of the ceramics on the slope of the tell and the post-depositional mechanisms that influence this distribution will need to be considered in more detail during further stages of surface artefact collection.

In addition to the total collection of artefacts in sectors A1–A3, casual collection of ceramics took place around the entire perimeter of the citadel on September 15th, 16th and 17th. On October 4th, a collection was made of chipped stone industry on the slope beneath the northern gate.

5.2. Excavation (PV, KN)

Excavations at Arbil citadel were part of both a research programme and fieldwork training organised for the Salahaddin University. Students and staff members of the department of archaeology were involved in all field activities, and excavations were therefore focused on archaeological information retrieval, as well as on education in field techniques and methods. The excavations combined two forms: firstly the cleaning and recording of profiles in the damaged parts at the foot of the tell (foundation ditches for lamp posts), and secondly standard excavation in the citadel area.

5.2.1. Sections

Two profiles were recorded during the first week of the expedition (sections 1/06 and 2/06, *fig. 28*). Cleaning of the eastern part of the foundation ditch for a lamp post at the foot of the tell, ca. 150 m to east from the northern gate (Bāb al-Ahmad), produced one profile extending 2.4 m and max. 2.6 m in height (*figs. 6, 7*). This section (1/06) was drawn and every stratum was provided with a written description. Archaeological artefacts were obtained from layers 1000, 1001, 1005–1008.

Profile 2/06 was the designation given to the cleaned northern section in the foundation ditch for another lamp post ca. 88 m from the first; this was 1.95 m long and max. 2.05 m in height (*fig. 8*). Sparse finds were obtained (*table 1*).

Sections 1/06 and 2/06 both displayed the thick erosion layers covering the surface of the citadel mound. The pottery finds analysis showed that all the deposits contain mixed items from different chronological settlement horizons, from antiquity to the medieval, post-medieval and recent periods. The slight remains of an adobe-built house oriented parallel to the circuit of the mound were traced in section 1 (stratum 1003). The foundation of the ca. 0.5 m thick adobe back wall and part of the floor set in the uppermost part of the erosional deposits prove that the surface of the tell mound has been changing rapidly. The front part of the house has already eroded away. This building might be connected to the mercantile houses which used to surround the foot of the citadel.

5.2.2. Intervention 3/06

After discussion with the local authorities, one of the 14 sites from across the entire citadel offered for trenching was selected. An intervention of 4 x 4 m was opened in the eastern part of the citadel, 95 m east of the centre of the citadel square, in a small square surrounded by partly destroyed adobe and brick houses (*fig. 28*). According to local sources this site is of recent origin and was previously built up with houses, reportedly in Jewish ownership (until 1949). This is confirmed by the cadastral plan of the *qal'a* from the 1920s, where three small, oblong, single-tract houses occupied the space of the current square, and are connected by a small, N–S oriented cul-de-sac. The square is situated in a moderate depression in a relatively lower part of the tell surface, which seemed promising in terms of the quick reaching of the historical stratification. The current surface consists of sub-recent and recent rubbish and building destruction layers. The relationship of the terrain level to the standing houses seems to

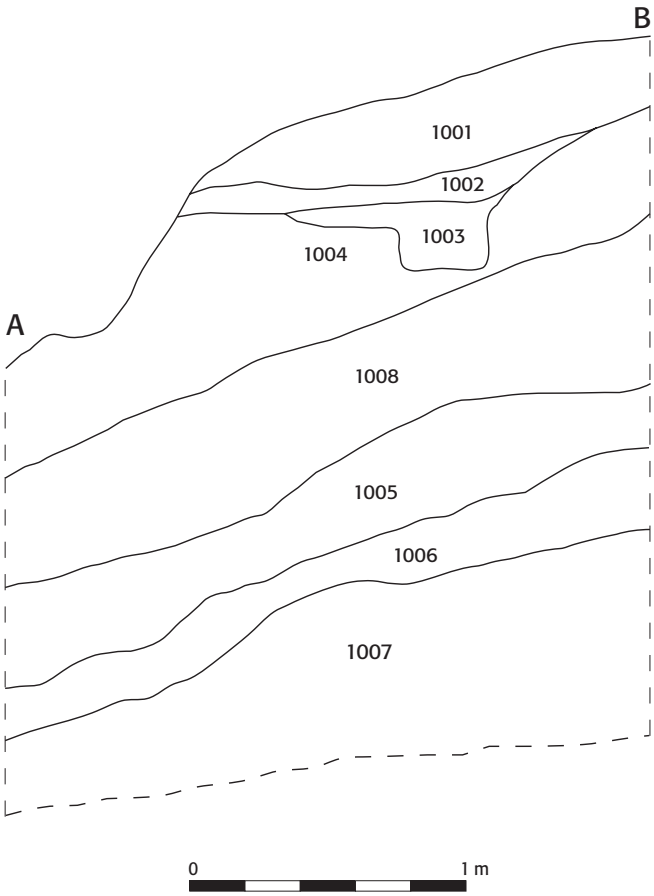


Fig. 6. *Section 1/06. Drawing by P. Vařeka.* — ***Obr. 6.*** *Řez 1/06, kresba P. Vařeka.*

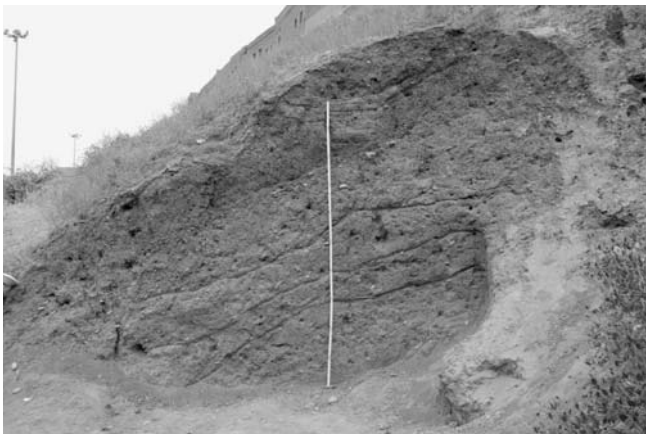


Fig. 7. *Section 1/06, eastern profile. Photo by P. Vařeka.* — ***Obr. 7.*** *Řez 1/06, foto P. Vařeka.*

indicate that the original level of the road surface must have been buried underneath varying depths of refuse.

The intervention was opened on September 20th and involved not only students of archaeology and staff members from the General Directorate of Antiquities, but also five local labourers for earth moving. Excavations proceeded for 10 working days to October 4th, when the trench, reaching a maximum depth of 140 cm, had to be backfilled. Parts of a demolished building

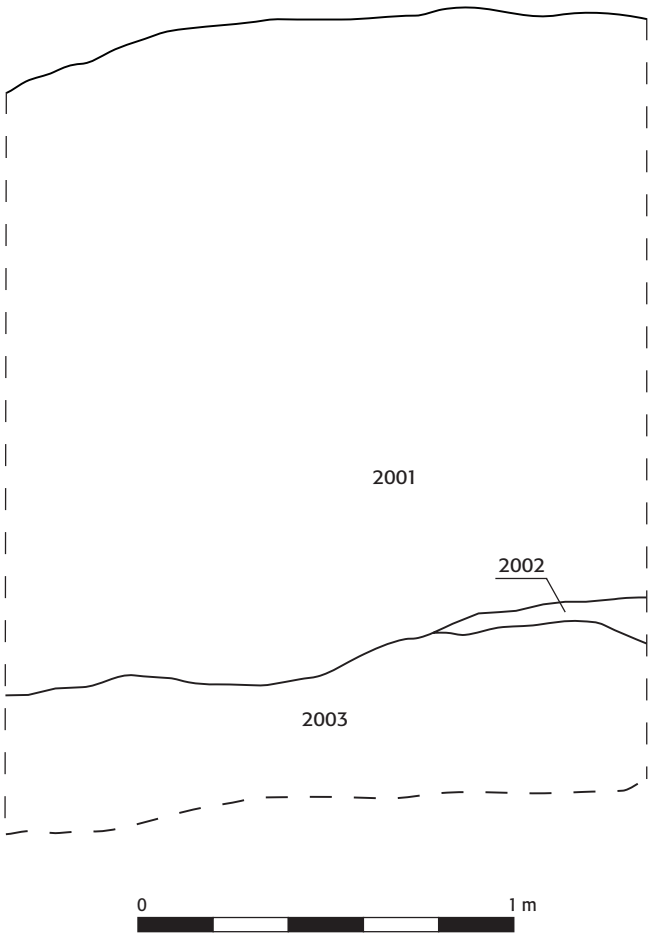


Fig. 8. *Section 2/06. Drawing by P. Vařeka.* — ***Obr. 8.*** *Řez 2/06, kresba P. Vařeka.*

of the latest phase of the citadel were unearthed, 23 stratigraphic units were recorded and four stratigraphic horizons were distinguished (*fig. 11*):

Horizon 1

The unearthed area was divided into two parts by wall 3004, oriented N–S in the earliest detected horizon (*figs. 9, 13*). This fired brick and adobe masonry structure most probably represents the western perimeter wall of the house plotted on the old cadastral map. The area west of the wall can be interpreted as the exterior (apparently the aforementioned cul-de-sac), which was provided with a brick pavement (context 3022), while the area east of the wall was the house interior. The northern edge of the house is uncertain, but fragmentarily preserved wall 3025, divided from 3004 by a joint, might be a dividing wall between two houses plotted on the aforementioned old plan. The floor of the northern part (behind wall 3025) was not found, which indicates the sunken character of the northern room (a cellar?). The southern part was divided into two rooms by a thin screen brick wall (context 3021). The earliest excavated levels on the eastern side are represented by fill layers 3023 and 3019, while on the west side, where the screen wall was provided with plaster, a concrete

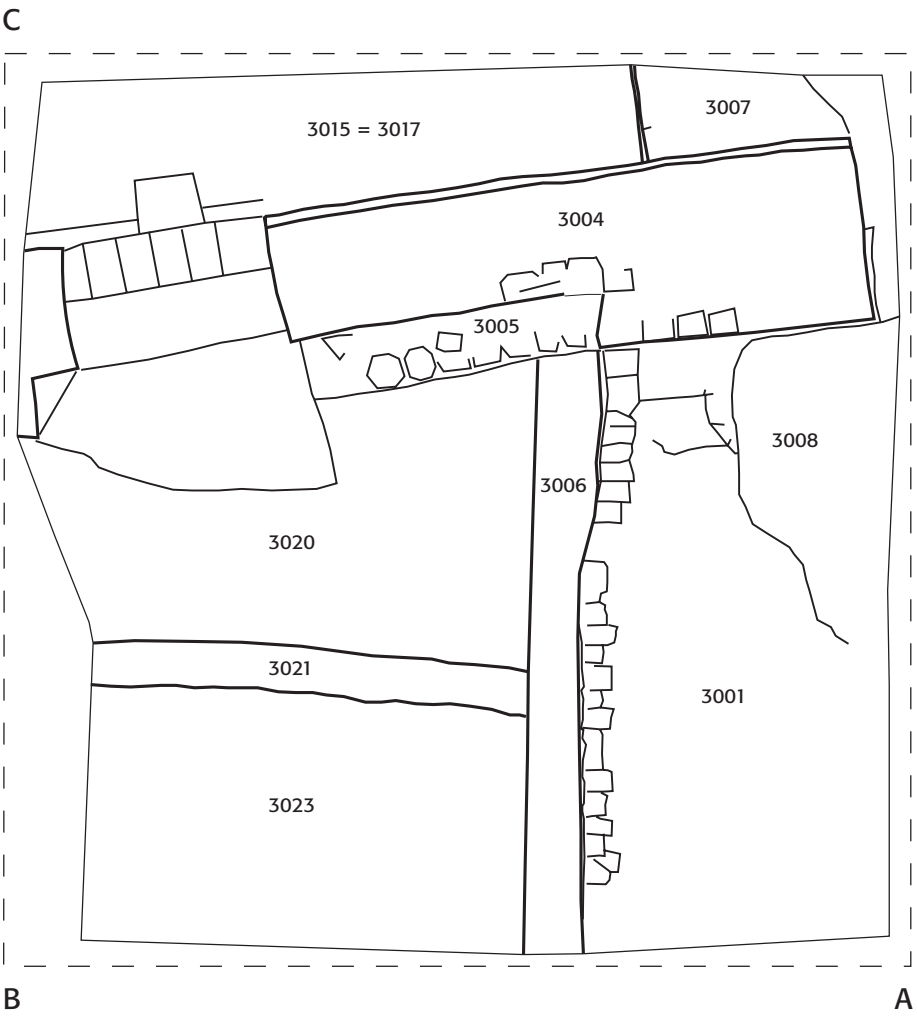


Fig. 9. *Intervention 3/06, plan of the finds of the horizon 1. Drawing by P. Vařeka and K. Nováček.* — ***Obr. 9.*** *Sonda 3/06, půdorys odkrytého horizontu 1. Kresba P. Vařeka a K. Nováček.*

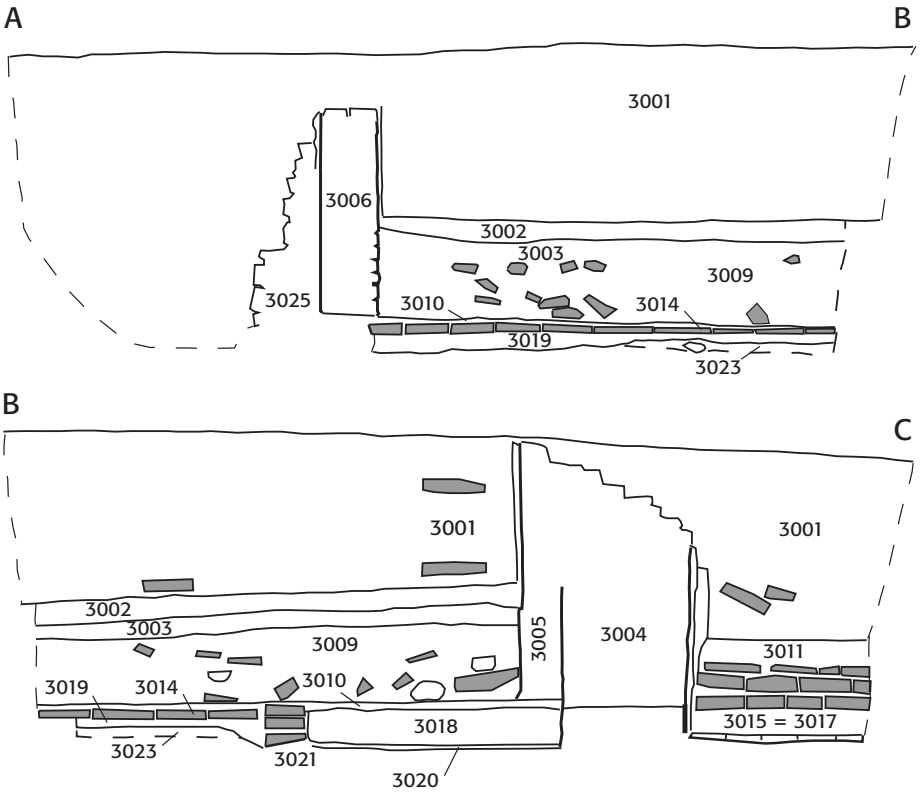


Fig. 10. *Intervention 3/06, eastern (AB) and southern (BC) sections. Drawing by K. Nováček and P. Vařeka.* — ***Obr. 10.*** *Sonda 3/06, východní (AB) a jižní (BC) profil. Kresba K. Nováček a P. Vařeka.*

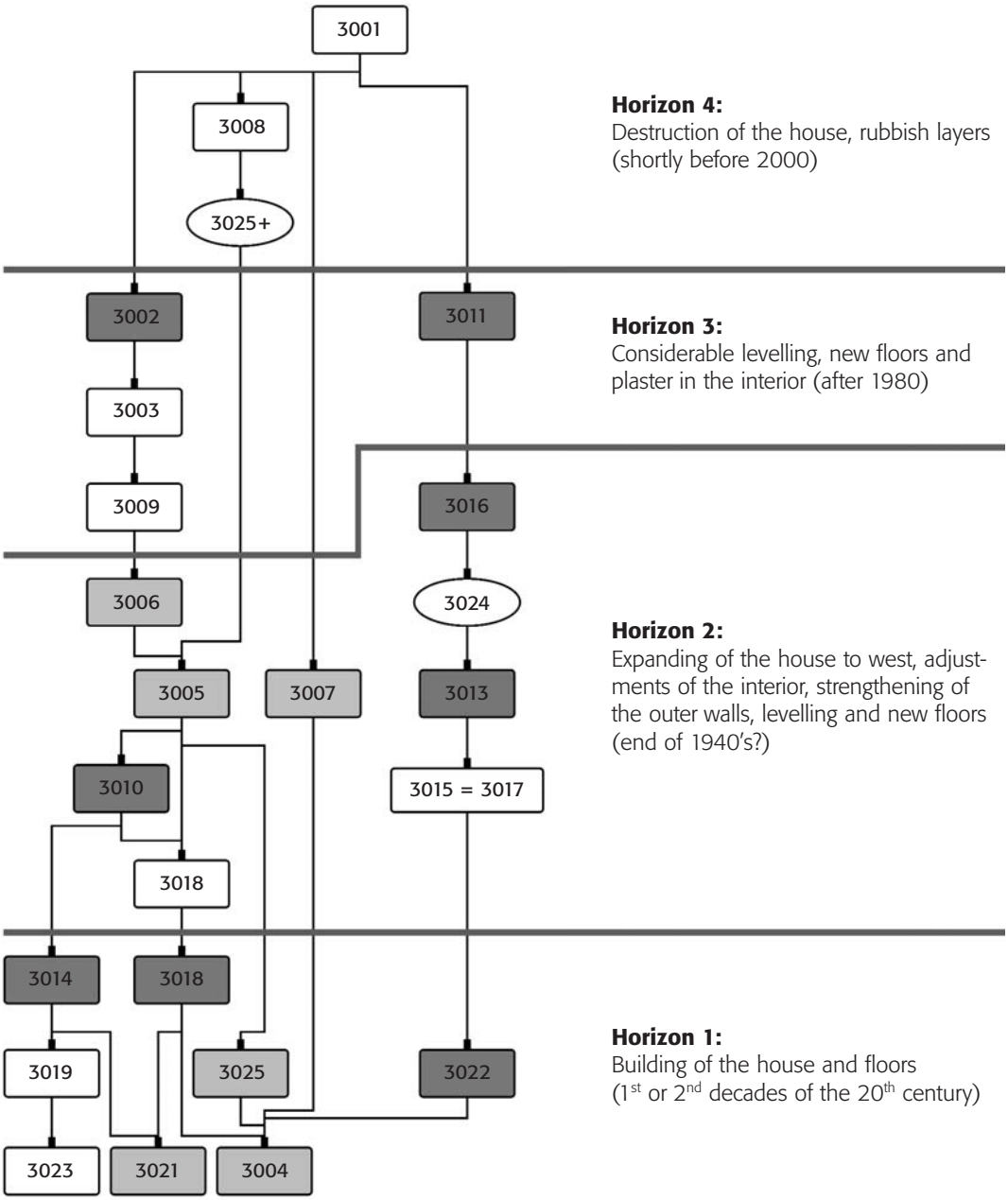


Fig. 11. *Stratigraphic diagram of the intervention 3/06 (walls indicated by light grey, floors by dark, interfaces by oval-shaped labels). Drawing by K. Nováček. —* ***Obr. 11.*** *Stratigrafický diagram sondy 3/06, zdi světle šedé, podlahy tmavě šedé, styčné plochy oválnými značkami. Kresba K. Nováček.*

floor was unearthed (context 3020), most probably the earliest floor of the house. Subsequently the eastern room was given a soft fired brick floor bounded by plaster (3014). The house building unearthed can be dated tentatively to the 1st or 2nd decades of the 20th century.

Horizon 2

The house expanded to west, into the space of the former line, which was subdivided by brick wall 3007, set at right angles to the façade wall 3004. Subsequently, the interior screen wall 3021 was demolished and wall 3025 (apparently of poor quality), and wall 3004, were strengthened by in-walled brick screens 3005 and 3006. The floor niveau was levelled by fill layer 3018 and the enlarged room was provided with a concrete floor (3010). Increase in the terrain level can be seen in the former exterior of the cul-de-sac, represented by layer 3015=3017 and by solid brick floor 3013, and then 3024 and 3016.

We are not able to provide precise dating for this rebuilding; hypothetically, it may be connected with the aforementioned change of ownership at the end of the 1940s.

Horizon 3

This horizon is characterised by a dramatic increase in the floor level both in the original interior and in the previously added room, as well as by modest structural alterations (*fig. 12*). Floor 3010 was covered by the overall 40 cm thickness of deposits 3009 and 3003, and a new concrete floor was laid (3002). Both the screen (3006) and western wall (3004 and 3005) are

Fig. 12. *Intervention 3/06. Horizon 3, remains of the demolished recent building with concrete floor in the interior (3002). Photo by P. Vařeka.* — ***Obr. 12.*** *Sonda 3/06. Horizont 3, relikty zaniklé stavby s betonovou podlahou (3002). Foto P. Vařeka.*

Fig. 13. *Intervention 3/06. Horizon 1 – brick floor (3013) in the exterior (front), concrete floor 3020 (front part of the house behind the entrance), remains of the earlier screen wall (3021), layer 3019 underneath brick floor 3014 (back), screen wall 3006 on the left, outer wall 3004 with entrance in the front. Photo by P. Vařeka.* — ***Obr. 13.*** *Sonda 3/06. Horizont 1 – v popředí před obvodovou zdí domu se vstupem (3004) cihlová venkovní dlažba (3013), betonová podlaha 3020 v přední vstupní části domu, zbytky starší plenty (3021); v pozadí vrstva 3019 pod cihlovou podlahou 3014, vlevo plenta 3006. Foto P. Vařeka.*

provided with concrete plaster from this level onwards. The earlier brick floors in the western part of the house were covered by a new concrete one (3011). The considerable levelling and inexpensive reconstruction of the house seem to be linked to the enforced changes to the citadel's population in 1980.

Horizon 4

The latest horizon is represented by the destruction of the house and rubbish layer 3001. This reportedly occurred shortly before 2000.

Despite of the time shortage and limitation of the trench size, which did not allow reaching earlier than recent archaeological situations, the information yielded by intervention 3/06 was useful from several points of view. We were able to reconstruct the development of the entrance part of the small house from its hypothetical origin at the beginning of 20th century to demolition around 2000, and to link this development with some important cultural and settlement changes on the *qal'a*. The very precise identification of the house on the plan from the 1920s proved the quality and informative value of this cartographic source. Relatively numerous ceramic finds obtained from the interior levels were used as a reference assemblage for recognizing the most recent pottery in the collections resulting from surface survey. Finally, it was possible to specify the level of the surface in the period prece-

ding the building decline on the citadel after ca. 1980, which is a valuable piece of information for the reconstruction project.

6. Finds

6.1. Pottery

6.1.1. Methodology (KN)

The ceramic assemblage obtained from the surface collections and excavations in and around the citadel contains 7978 sherds in total (ca. 96.7 kg) (*table 1*; *figs. 14–19*).

Most of the ceramics may be considered as a single whole without the possibility of relative chronological division on the basis of stratigraphy, except for the finds from sections 1/06 and 3/06; the ceramic assemblage from section 2/06 is too small for any meaningful analysis. Fragments were classified on the basis of macroscopic assessment complemented by detailed observations with a strong magnifying glass, and quantified by the sherd numbers and weights of fragments of individual wares in each context. All the morphologically diagnostic sherds were then recorded by drawing and camera, the resulting figures combining both (*figs. 20–25*). The classification system comprises six groups, each containing several wares (55 wares in total):

- 000 – undetermined
- 0xx – hand-made wares
- 1xx – wheel-made plain wares
- 2xx – unglazed fine wares, mostly wheel-made
- 3xx – coarse, glazed storage jars
- 4xx – glazed ceramic earthenwares and stonepaste
- 5xx – stoneware, pipes etc.

After the end of the field campaign all of the finds were deposited in the Museum of Civilisation in Arbil; a clone of the type series was permitted, by courtesy of the Ministry of Culture of the Kurdish Autonomous Government, to be deposited in the Department of Archaeology of the West Bohemian University in Plzeň.

6.1.2. Description of the wares (KN)

EC001 thick-walled, coarse ware with considerable content of inclusions (angular grains of beige and dark grey particles in size to 2 mm), medium to hard fired, dark ochre, brownish grey, beige, reddish brown colours.

Jars with light beaded, everted rims or flaring rims, lid fragment (?), decoration with comb incised waves and simple horizontal incised lines.

EC002 ditto 001, smoothed or burnished outer surface, usually of different tone to the inner.

EC003 ***tūb achdar* ware** – a variable, coarse ware with roughly modellated walls, medium fired, abundant ratio of finely chopped chaff in the clay (with characteristic dense imprints on the surfaces) and some mineral particles (a few, mostly light, grains to 1 mm). Most often beige or ochre in colour, occasionally with pinkish or greenish tones. The ware resembles the current, low fired brick used on the citadel.

Two different morphological categories fall within this ware: large containers and thin-walled jars. Containers have high, flaring necks and rounded or everted rims, the whole form being unknown. Jars are slight, cylindrical, with narrower necks, straight, rounded rims and flat bases with rounded edges. Fragments of flat lids with pointed rims. Distinctive decoration of narrow, deeply applied incisions and comb incisions.

EC004 **Corn containers** – thick-walled, very coarse ware, softly or medium fired, crumbly, in clay dense admixture of chaff and sand (dark brown, beige, black grains to 3 mm), variable colour, mostly buff to greyish brown with darker core.

Containers of unknown form, one fragment with comb-incised wave and applied strip with fingerprints.

EC005 thick-walled, coarse ware, compact, less porous material with chaff and sand (mostly beige grains to 1 mm), medium or hard fired to ochre or reddish brown colours with darker core. Some fragments covered with dirty white slip.

No morphologically diagnostic sherds, except of one fragment of the bowl base with a low footring.

EC101 **red, chaff tempered** – clay with considerable admixture of chaff and some white or beige, exceptionally dark grey mineral grains (to 1 mm size), softly to medium fired, sometimes darker core of fragments, yellow orange, light ochre to brown red colour, variable thickness of wall.

Conical containers, mainly with slightly incurved, thickened, rounded and outfolded rims (*fig. 20: 30–33*), bowls with straight and recurved rims (*fig. 20: 28, 29*).

EC102 **grey, chaff tempered** – ditto 101, light to dark grey colour.

Jars with rounded, thickened and outfolded rims (*fig. 20: 26, 27*).

EC103 **red, coarse** – fine clay with considerable amount of non-plastic inclusions (angular white, grey, yellowish and red grains to 2 mm), medium to

Context	Number	Total weight (gms)	%	Mean weight of sherds
random surface survey	13		0,16	
survey: A1	1171	18106	14,68	15,46
survey: A2	3613	35212	45,29	9,75
survey: A3	2054	20433	25,75	9,95
section 1/06	788	13173	9,88	16,72
section 2/06	98	1566	1,23	15,98
intervention 3/06	241	8172	3,02	33,91
Total qal'a	**7978**	**96662**	**100**	**12,12**
the al-Mudhaffar manara, Arbil	77			
Dawin	3			

Table 1. *Quantitative overview of the ceramic finds.* — ***Tab. 1.*** *Kvantitativní přehled keramických nálezů.*

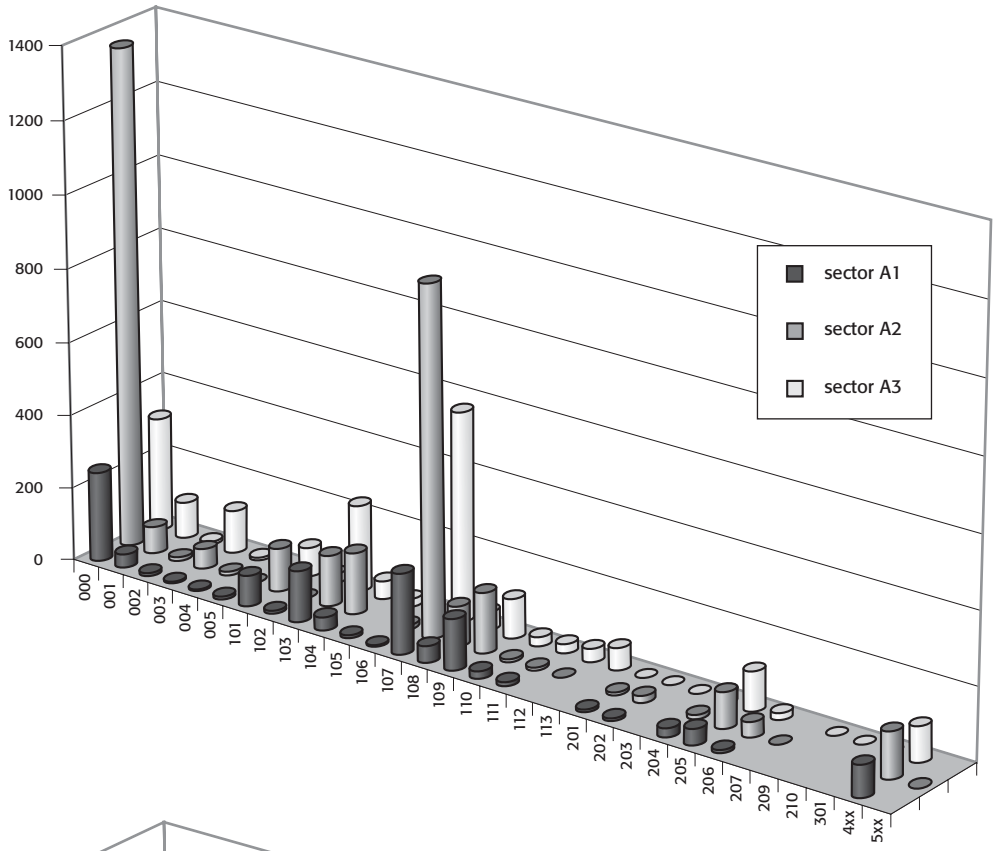


Fig. 14. *Ceramic ware distribution in the surface finds collections (by quantity of sherds).* — ***Obr. 14.*** *Zastoupení keramických tříd v nálezech z povrchových sběrů (podle počtu střepů).*

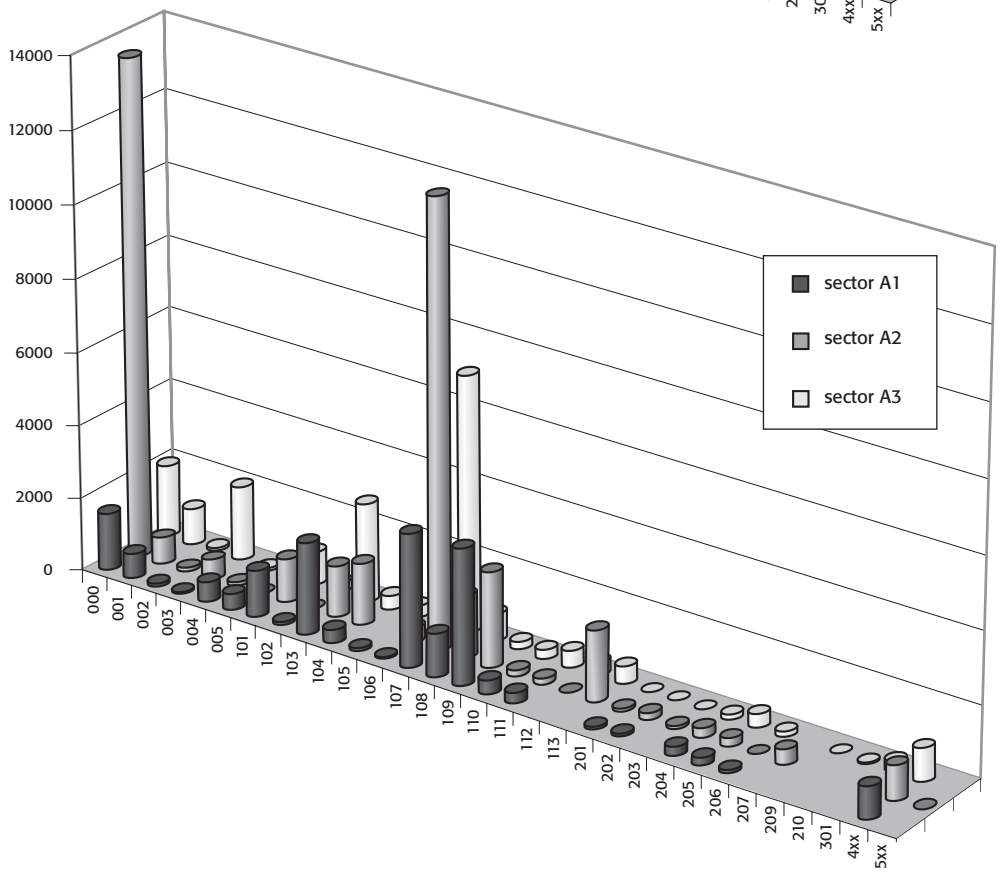


Fig. 15. *Ceramic ware distribution in the surface finds collections (by weight).* — ***Obr. 15.*** *Zastoupení keramických tříd v nálezech z povrchových sběrů (podle váhy).*

hard fired, pale buff to red brown, variable wall thickness. Some sherds with bitumen slip inside.

EC104 **red with slip** – fine, well levigated clay with variable ratio of visible inclusions (mostly white grains to 2 mm, occasional black grains to 0.5 mm), medium to hard fired, ochre, red orange to brick red colour, outer, occasionally also with the inner surface covered by beige to creamy slip.

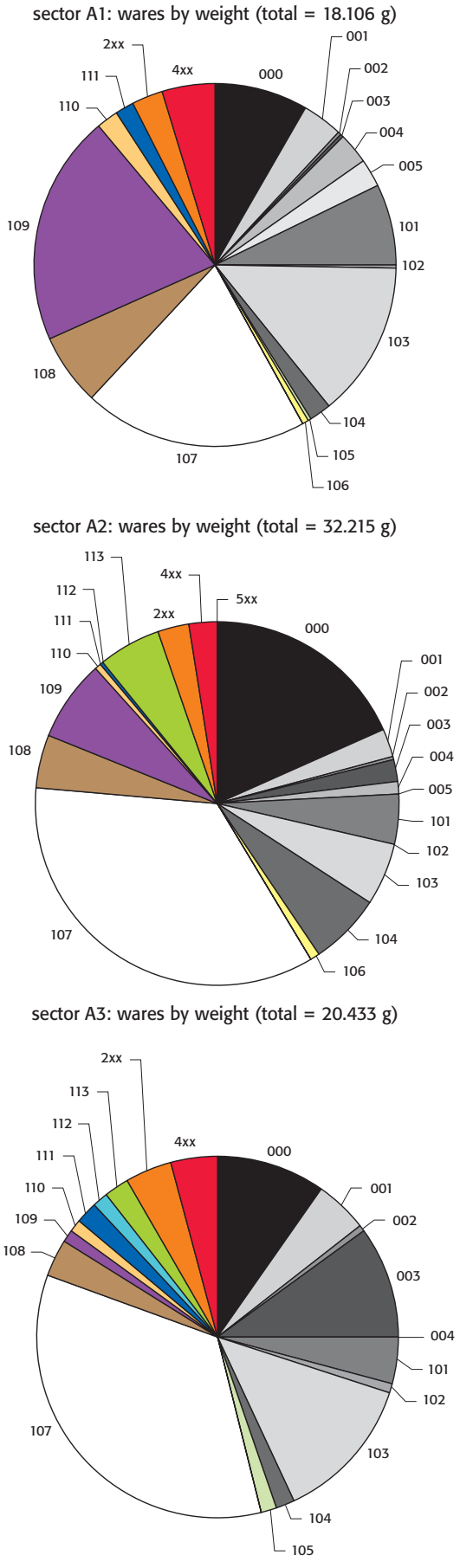


Fig. 16. *Ceramic ware distribution in the sectors A1–A3 (by weight).* — ***Obr. 16.*** *Zastoupení keramických tříd v sektorech A1–A3 (podle váhy).*

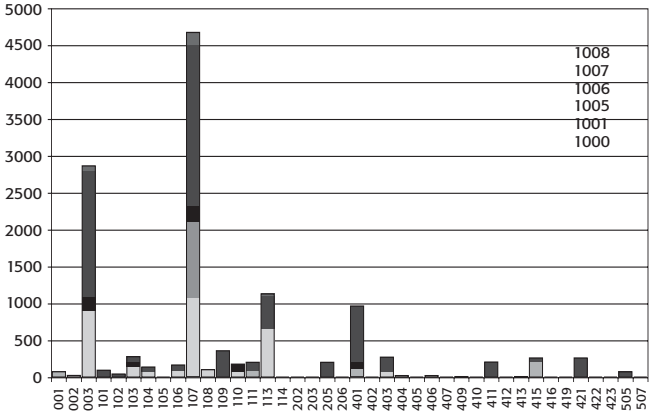


Fig. 17. *Ceramic ware distribution in the stratigrafic units of the section 1/06 (by weight).* — ***Obr. 17.*** *Zastoupení keramických tříd ve stratigrafických jednotkách řezu 1/06 (podle váhy).*

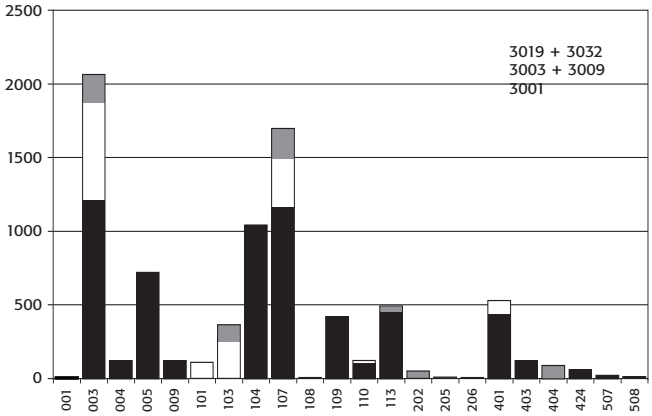


Fig. 18. *Ceramic ware distribution in the intervention 3/06 (by weight).* — ***Obr. 18.*** *Zastoupení keramických tříd v sondě 3/06 (podle váhy).*

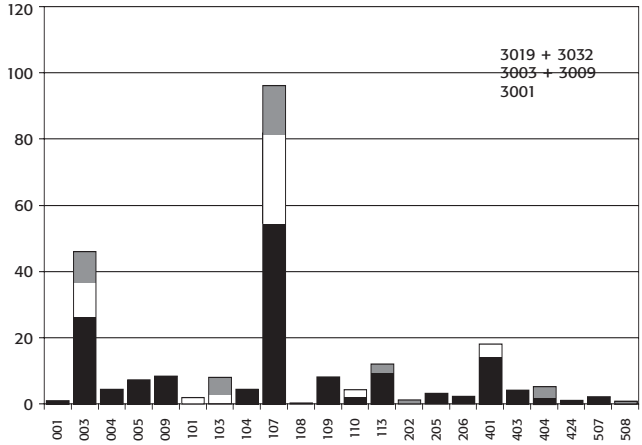


Fig. 19. *Ceramic ware distribution in the intervention 3/06 (by number of fragments). Fig. 14–19 by K. Nováček.* — ***Obr. 19.*** *Zastoupení keramických tříd v sondě 3/06 (podle počtu střepů). Obr. 14–19 K. Nováček.*

EC105 **grey, coarse** – clay with many grey to black sandy grains (to 1 mm), medium fired to light to dark grey, event. brown grey tone.

EC106 **red, burnished** – clay with white, beige and black, rounded grains to 1 mm, sporadically larger, medium fired to red ochre or red brown colour, outer

surface smoothed or burnished, sometimes with traces of faceting.

EC107 **creamy, finer** – fine, well levigated clay with sporadic visible particles (a few white or dark grey grains to 0.5 mm), medium to hard fired, creamy white with often yellowish, greenish or pinkish tones.

EC108 **creamy, coarser** – considerable ratio of inclusions in the clay (abundant quartz grains and grains of dark grey/brown minerals in sizes to 1 mm), medium to hard fired, creamy white to yellowish colour (rarely a light ochre tone), coarse surfaces.

EC109 **creamy, chaff tempered** – fine, well levigated clay with abundance of chaff and minimum of mineral inclusions (isolated grains to 0.5 mm), soft or medium fired, creamy white colour, sometimes with yellowish, pinkish or light ochre tones. Some fragments are inside covered by bitumen slip.

EC110 **red with slip, coarse** – well levigated clay with considerable amount of inclusions (beige, red, brown and dark grey grains to 1 mm), medium to hard fired, red brown, brick red or dark ochre colour with beige, white or reddish slip. Occasionally bitumen lining.

No morphologically diagnostic sherds.

EC111 **red, chaff tempered, with slip** – ditto 101, locally a more considerable non-plastic admixture (mostly white grains to 1 mm), outer, less often also inner, slip of white (creamy or light yellowish) colour.

EC112 **grey, fine** – well levigated clay without visible inclusions, medium fired, light grey colour.

No morphologically diagnostic sherds.

EC 113 **red, burnished –** well levigated clay with sparse white inclusions (chalk?), hard fired, orange red or red ochre colour, burnished outer surface.

No morphologically diagnostic sherds.

EC201 **black slip** – fine, thin-walled ware, well levigated clay with sparse inclusions (light and dark grains to 0.5 mm), hard fired, light ochre to grey colour, dark brown grey slip on both or inner surfaces.

EC202 **red slip** – ditto 201, dark red slip on both or inner surfaces.

EC203 **light, very fine, burnished** – fine, thin-walled ware, well levigated clay with inclusions (white, ochre and black grains, the latter considerably angular, to 1 mm), medium to hard fired, creamy or light ochre colour, eventually with greenish or reddish tones. Burnished surface.

EC204 ditto 203, thin-walled ware, less perfect burnishing (if any).

EC205 **white, thin-walled** – fine, well levigated clay without visible inclusions, hard fired, white to creamy colour, rarely greenish or reddish tones, very thin wall (1–3, 5 mm in maximum).

EC206 **creamy moulded ware** – ditto 205, considerably thicker wall, relief decoration.

Middle-sized globular bottles or jars on relatively tall, conical footring (*fig. 23: 49*).

EC207 **red moulded ware** – fine, well levigated clay without visible inclusions, hard fired, light red brown colour, relief decoration.

No morphologically diagnostic sherds.

EC209 **burnished chaff ware** – well levigated clay with sparse chaff temper, medium fired, fine to burnished surface, light grey to brown grey colour.

No morphologically diagnostic sherds.

EC210 **dark grey, burnished** – fine clay without visible inclusions, medium fired, dark grey to black colour, smooth to burnished outer surface.

No morphologically diagnostic sherds.

EC301 coarse, thick-walled sherd with abundant admixture of beige and dark grey angular grains (to 1.5 mm), medium fired, brittle, slate-like seclusiveness, dark green to blue green glaze on slip, covering both surfaces.

No morphologically diagnostic sherds.

EC401 **turquoise glazed ware** – beige, creamy or buff body, occasionally with pale reddish tone, hard to medium fired, with a minimum of visible grains (sporadically white quartz sand or feldspar of size to 0.3 mm). Either inner surface and rim or both surfaces covered with thin layer of light or dark turquoise alkali glaze (exceptionally thick layer to 2.3 mm), sometimes with prevalent dark green tones.

Mostly deeper, hemispherical or biconical bowls with straight, easily rounded rims (diameters 12–24 cm) and low ring bases (diameters 8–11 cm). Decoration is rare, vertical fluting (3x), incised, diagonal or horizontal lines, waves and nicks appear. Small amount of large jars with everted and rounded or outfolded rims.

EC402 **turquoise glazed on slip** – ditto 401, whitish slip under glaze. Straight, rounded rim of large, stretched bowl.

EC403 **green glazed ware** – reddish orange, reddish brown or reddish beige body, hard to medium fired, homogenous, almost without inclusions (white particles to 0.3 mm, exceptionally), either both surfaces or inner surface with rim (exceptionally only outer surface) covered with thin layer of green glaze (light green, pea-green, dark blue-green tones).

Several different forms: conical and biconical bowls with straight or everted rims, shallow cylindrical bowl/cup with flat base and large jars with beaded and rounded rims. Exceptionally, fragments are decorated (single incised lines or horizontal ribbing).

EC404 **green glazed on slip** – ditto 403, whitish slip under glaze.

Fragments of rims of deeper cylindrical, conical and biconical bowls.

EC405 **splash ware 1** – pale red brown to dark brick red, fine body with sparse visible inclusions (white, soft particles to 1 mm – chalk?), hard to medium fired, both surfaces covered with dirty white slip. Very light, transparent yellow glaze inside, decorated with inglaze green spots, thin, brown curved lines and brown purple splashes. Sometimes dark green glaze outside.

No morphologically diagnostic sherds.

EC406 **white glazed ware** – brick red, very fine body with exceptional inclusions (white, soft particles of size 0.3–1.5 mm – chalk?), transparent, clear* (light yellowish tone), probably alkali glaze on thick layer of slip (ca. 0.2 mm) on both outer and inner surfaces.

Nearly vertical rim of shallow conical bowl.

*the size of the fragments assessed is insufficient for ruling out the use of colorants

EC407 **brown (or yellow) monochrome glazed ware** – body similar to 406, medium fired, smooth surface, from dark amber to bright yellow lead glaze applied in thin layer on both surfaces (without slip).

No morphologically diagnostic sherds.

EC409 **turquoise or green glazed ware with black painting** – beige body (sometimes with pinkish tone) without visible inclusions, medium fired, dark grey painted lines under turquoise or blue-green alkali glaze.

Fragments of open forms, "hammer" rim of bowl. Black painted horizontal, parallel lines, spots and lined strip of triangles filled up with small circles and crosses.

EC410 **splash ware 2** – beige, fine ceramic body with reddish tone, hard fired, exceptional inclusions in clay (white grains (quartz?) to 1 mm), pea green lead glaze on both inner and outer surfaces, linear inglaze decoration of the same colour (small circles and spots). Eventually black inglaze painting.

Fragments of hemispherical and conical bowls with straight, rounded rim.

EC411 **yellow glazed ware with green painting** – reddish brown, hard fired body with sparse coarser inclusions (white grains to 1 mm), bright yellow lead glaze applied directly on surfaces or, sparsely, on very thin white slip, pea-green inglaze painting.

Smaller, conical or hemispherical bowls with straight, pointed or rounded (slightly beaded) rims. Many painted motifs (parallel horizontal lines, ornamental strips, radial motifs, spirals etc.).

EC412 **splash ware 3** – brick red to pale ochre, hard fired body, fine, with minimum of visible inclusions (sparse white and pale brown grains of size to 1 mm), clear, slightly opacified glaze on white slip, with light green, dark green, turquoise, purple and buff splashes. Glaze often highly degraded.

Conical bowls with straight or vertical rims, hollow form with ribbed, everted rim.

EC413 **slip painted ware –** body identical to 412, reddish brown painting on white slip, covered with clear or light yellow/greenish (alkali?) transparent glaze with cobalt and dark green (or turquoise) splashes or lines.

Small fragments of conical and segmental (?) bowls with simple, rounded rims. Distinctive design of red and cobalt blue painted horizontal lines, radial, foliate and floral shapes, hatching etc., complemented with inglaze turquoise/dark green dots, splashes and fillings.

EC414 **black or cobalt blue on white** – brick red to pale ochre body, very fine without visible particles, lightly porous, medium fired, covered with thick, white slip and transparent glaze with inglaze black or cobalt blue painting.

Straight, slightly everted bowl rims, wavy and floral-like decoration in horizontal, lines-bounded strips under the rim.

EC415 **slip-incised ware** – brick red, reddish brown to pale buff, hard or medium fired body, admixture of sparse, sub-microscopic white grains and coarser red grains (radiolarite? ground pottery?, size to 1 mm). Decoration incised to white slip or into the body, covered with transparent clear, light green, yellowish or brown glazes. Several sherds with buff splashes in green glaze.

Large bowl with vertical, slightly everted rim, small, cylindrical cup, large plate with carinated, everted rim, flat base. Mostly irregular, in broad strokes executed curvilinear design, spirals, parallel lines and line segments, in single case olive green leaf. Splashes have no relationship to incised design.

EC416 **white opaque glazed ware with blue** – fine, creamy or slightly reddish, medium fired body without visible inclusions, white, imperfectly opacified glaze with inglaze blue (cobalt) or green and dark grey painting.

Bowls with slightly recurved rim, rim of segmental bowl, low ring base, painting in straight or curvilinear strips.

EC419 **stonepaste with white and blue (or blue-green) opaque glaze** – light grey, porous, relatively coarse stonepaste body, covered by white opaque glaze, with blue (cobalt) or blue-green (copper) glaze, which is sometimes standing proud on base glaze surface.

EC420 **lustre painted ware** – thin, very fine, compact, hard fired stonepaste body of light grey colour, without visible particles, white opaque glaze and lustre painting on both surfaces. Small sherds (one probably from a carinated bowl) with linear painting either on both surfaces or inside only and dark blue alkali glaze out.

EC421 **yellowish green opaque glazed ware** – reddish brown body without visible inclusions (only sparse traces of chaff tempering), hard fired, yellowish green or leaf green opaque glaze applied in thin, "foamy" layer with many bubbles.

Jars with cylindrical neck and folded rim.

EC422 **underglaze painted ware** – beige, hard fired, coarser crystalline body (stonepaste), some with very thin, white quartz slip, and thick layer of transparent, clear alkali glaze on both surfaces: a – monochrome cobalt inglaze painting, b – dark grey (manganese) lines on slip, blue (cobalt), purple and dark green inglaze colours. Fragment of small cup, thick-walled bowl with slightly recurved rim, narrowing neck of bottle (*qumqum*?).

EC423 **aubergine glaze** – fine clay with some mineral inclusions (dark sand and soft, white grains), reddish or light brown colour, aubergine, opacified glaze inside and on the rim.

Only one fragment of conical bowl with slightly everted rim.

EC424 **sparsely glazed ware** – brick red to greyish brown, hard fired, fine sandy body without slip, covered on both surfaces and also on the ring foot bottom by very thin, locally vitrified yellow glaze (the red, grainy surface is often showing through).

No morphologically diagnostic sherds.

EC501 fine, well levigated thinware of beige, pinkish colour, soft or medium fired, outside (and less commonly also inside) covered by white or light ochre opaque glaze with slight iridisation. Probably a recent ware.

EC502 **"proto-stoneware"** – fine clay with inclusions (many, mostly beige grains to 2 mm), very hard fired to the phase of the surface fusing, ochre, greenish or yellow green surface colour, beige or grey core. Coarse ware, rugged surface with traces of modelation (*fig. 27: 33*).

EC503 fine, well levigated clay without visible inclusions, hard fired to yellow ochre, outer surface with splashes of the dark brown sprayed colour, bright red blots and painting with shiny, probably synthetic enamel colours (black and white curved lines). Recent.

EC504 **stoneware** – very hard fired, totally fused clay, creamy to dark grey colour, thin-walled, smoothed outer surface with random incision.

One small, morphologically not diagnostic sherd (*fig. 27: 34*).

EC505 **black tobacco pipes** – fine, well levigated clay without any visible particles, very hard fired, homogenous, dark grey colour, smoothed or burnished outer surface.

EC507 **red tobacco pipes** – fine, well levigated clay without any visible particles, very hard fired to light grey or brownish grey colour, red brown slip on outer surface, often smoothed or burnished.

6.1.3. Analysis and assessment

6.1.3.1. Neolithic to Middle Bronze Age Period (ca. 6000–1500 BC) (KN)

The long period of the earliest existence of the tell, stretching over the Neolithic (?), Chalcolithic and Early/Middle Bronze Age, is evidently the most poorly represented in the ceramic record. With a greater or lesser degree of certainty it is possible to identify only occasional sherds that might come from this period, anyway the lack of the painted pottery in the assemblage is significant. The greatest number of potentially Neolithic and Chalcolithic finds may be sought among the fragments of coarse, hand-made jars of classes EC001, 002 and 005 (*fig. 20: 1–8*; *27: 1–8*). The pottery is undecorated, of simple form, with occasional burnishing of the outer surface (variant EC002). Red or brown burnished, hand-made pottery similar in form to that from Arbil has been found among the artefacts from Soltaniya and dated to the 4th millennium BC (*Kleiss 1997, Abb. 28*). A possible connection might also be seen between class EC002 and the so-called Early Transcaucasian (earlier Khirbet Kerak) Ware, now dated to ca. 3500–1600 BC, but is impossible to prove this relationship without more diagnostic sherd collection (*Rothman – Kozbe 1997*; for the notice of ETC Ware we thank to P. Charvát).

The concrete indices of the Neolithic settlement are very uncertain at the moment: we can only mention the high degree of similarity between several thin-walled rims fragments of the class EC003 (*fig. 20: 9, 10*) and globular jars with cylindrical neck and incised decoration of the Hassuna period (*Gut 1995*, 160–185, Kat. Nr. 13, 16, 17, 225–232, Taf. 125B).

The identification of the Chalcolithic pottery seems to be much more reliable. The survey in sector A1 yielded an angular rim form everted at right angles from a strongly vegetable tempered jar (*fig. 22: 16*) that has close analogies from the Middle and Later Ubaid material from the North Jazira (ca. 4500–4200 BC; *Wilkinson – Tucker 1995*, Type 147, fig. 64: 18, 19). The bell-shaped bowl, one of the leading forms of the Late Chalcolithic Period in the North Tigris area (LC 1–5; 4200–3000 BC in Santa Fe chronology: *Joffe 2000*, 113, Fig. 1), is presented by rim fragments of the redware (EC101, *fig. 20: 34*) and greyware (EC105, *fig. 20: 63*), which can be linked with close analogies from Ninive (*Gut 1995*, Kat. Nr. 896, 901, 1498, Taf. 126F). The rims of the hole-mouth jars (*fig. 20: 5, 48*) could be also considered of Gawra / Uruk date (*Gut 1995*, Kat. Nr. 822, 824, 860), as well as several other fragments (*fig. 20: 1, 2, 60*; *21: 51*). We suppose that the majority of the chaff tempered fragments from the classes EC109, 101, 102 and 111 may belong to the LC-Period.[5]

The period of the late 3rd millennium BC (mainly the traditional period of Ur III, or, in temporary ARCANE chronology the phase Early Tigridian 9, 2100–2000 BC, cf. www.uni-tuebingen.de/arcane/) may be indicated by large jars with inverted, outfolded and triangular shaped rims (*fig. 22: 9* and other rims from sector A3, not illustrated), as well as chaff-tempered sherds with narrow combing (*fig. 22: 24, 25*; cf. *Postgate – Oates – Oates 1997*, Pl. 27b). The reddish fragment of ware EC204 with black paint and yellowish slip (?) (*fig. 23: 12*) may come from broadly the same period, a very similar painted jar having been found on Tell Asmar (*Delougaz 1952*, Fig. 115c).

6.1.3.2. Late Bronze and Iron Ages (Middle to Late Assyrian Periods, ca. 1500–600 BC) (KN)

Artefacts proving later Assyrian settlement of the tell appear both among plain wares EC109, 101, 104 and 107, and in the fine groups EC204 and 205, eventually 209. Fragments of shallow, conical bowls (EC107: *fig. 21: 15*; EC104: not illustrated), carinated bowls (*fig. 21: 17*; *22: 4*), deep bowls (*fig. 22: 5, 12*), so-called Hammerhead bowls (*fig. 20: 32, 33*), distinctive low ring bases (*fig. 22: 27, 28* and another six fragments of ware EC109 from sectors A2 and A3, not illustrated) and large jars with inverted, outfolded rims (*fig. 22: 10*) almost certainly all belong to the common pottery pro-

[5] A substantially greater degree of the chaff temper in Late Chalcolithic pottery fabric then in any other period was recorded in Tell es-Sweyhat microregion (*Wilkinson 2004*, 86).

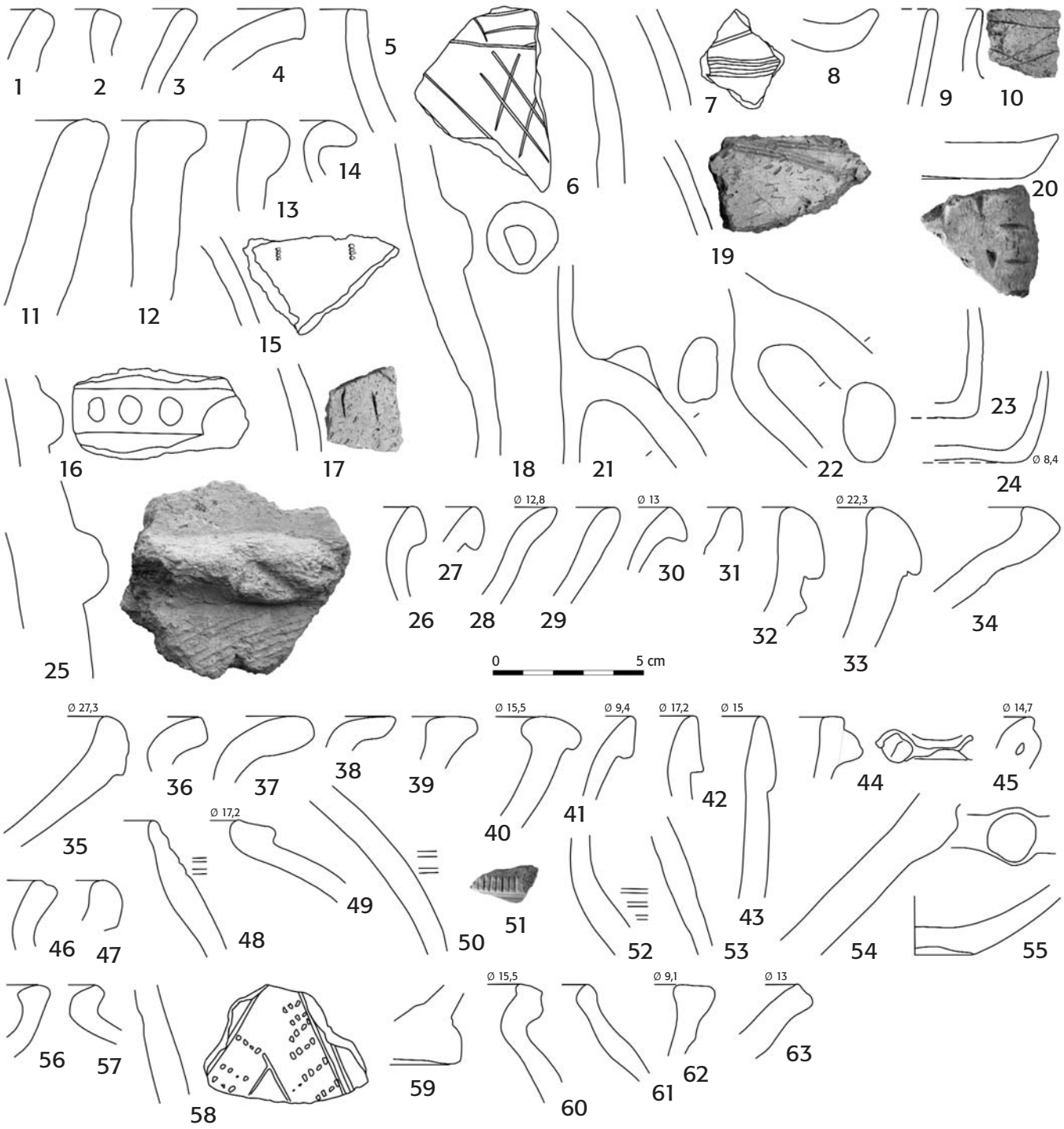


Fig. 20. *Hand made pottery: wares EC001 (1–8), EC003 (9–24), EC004 (25). Plain, wheel-made pottery: wares EC101 (28–35), EC102 (26, 27), EC103 (36–55), EC104 (56–59) and EC105 (60–63).* — ***Obr. 20.*** *V ruce zhotovená keramika tříd EC001 (1–8), EC003 (9–24) a EC004 (25). Běžná, na kruhu vyráběná keramika: třídy EC101 (28–35), EC102 (26, 27), EC103 (36–55), EC104 (56–59) a EC105 (60–63).*
Location: sector A1 (4, 7, 19, 25, 26, 31, 35–48, 50, 52, 54–57, 59, 61), sector A2 (3, 5, 9, 15, 17, 18, 23, 24, 30, 33, 34, 49, 51, 58), sector A3 (1, 2, 8, 10–12, 20, 32, 60, 62, 63), 1000 (6, 14, 21), 1006 (13, 16), 1007 (22, 27– 29, 53).

duction of these periods (*Killick 1988*, Fig. 28: 1, 7, 10; 30: 38–41; *Postgate – Oates – Oates 1997*, Pl. 28; Pl. 32: 82; Pl. 35; Pl. 85: 982, 983; *Wilkinson – Tucker 1995*, Fig. 73: 4–6; *Parker 2003*, Fig. 9A–C, F, Fig. 10H). Two bowl rims (*fig. 20: 32, 33*) are also attested in Syrian-Jazira region in the Late Bronze Age levels (Nuzi period, kind information of S. Valentini). Fragments of fine, thin-walled Neo-Assyrian beakers (the so-called Palace ware beakers) were also identified (*fig. 23: 10, 14, 26*; cf. *Wilkinson – Tucker 1995*, Type 60, Fig. 73: 9–11; parallels also in the exposition of the Museum of Civilisation in Arbil). Some other fragments can be classified to this period less securely (e.g. the red slipped rim on *fig. 22: 41* with parallels in the local ware of the mid- to late 2nd Millennium BC in the Amuq Valley: *Yener Ed. 2005*, Fig. 6.2.5).

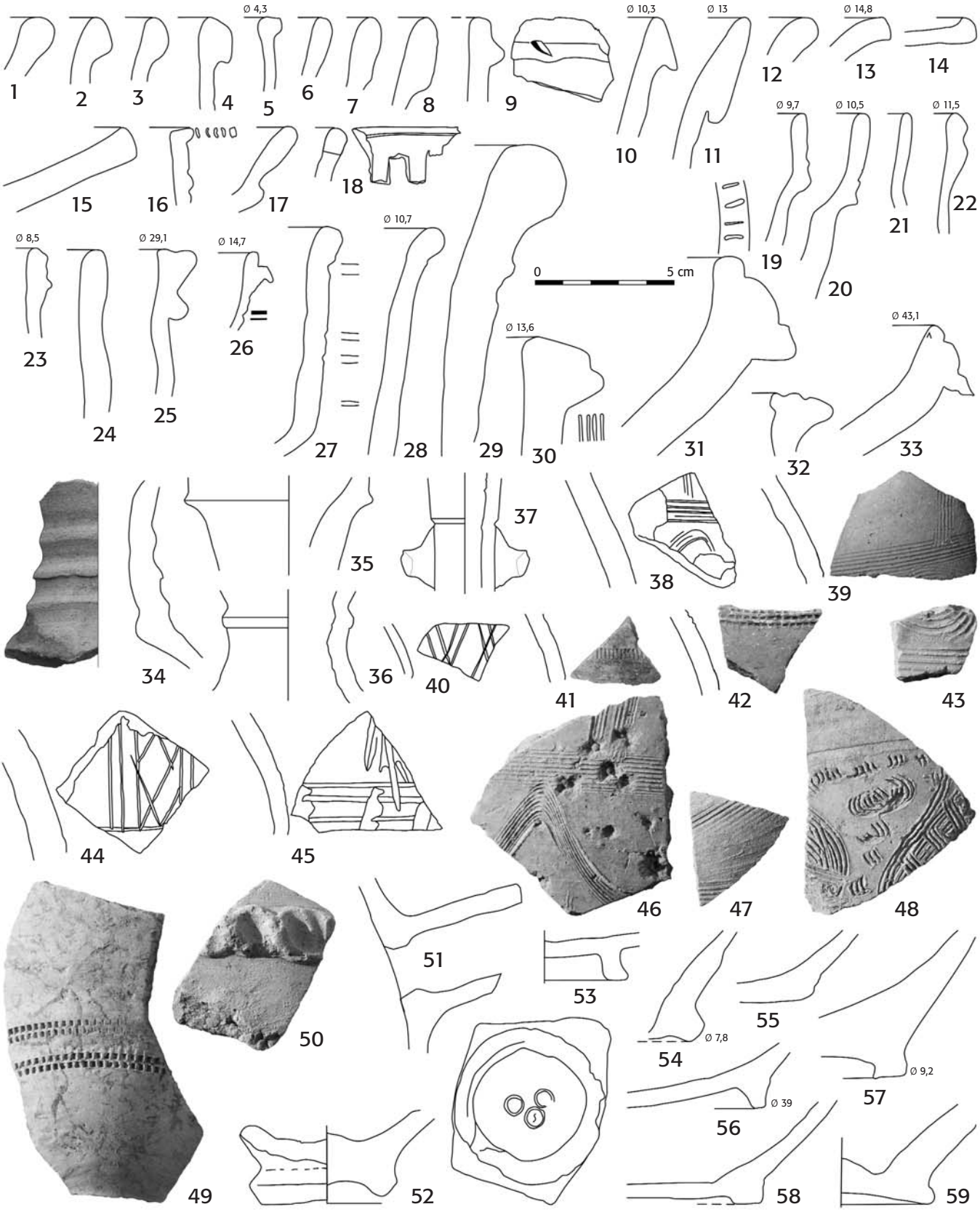


Fig. 21. *Plain, wheel-made pottery: ware EC107.* — ***Obr. 21.*** *Běžná, na kruhu vyráběná keramika: třída EC107.*
Location: Sector A1 (3–8, 12–14, 17, 26, 27, 31, 33, 34, 36–39, 41, 42, 45, 55, 59), sector A2 (1, 2, 9, 15, 18, 19, 30, 40, 44, 53), sector A3 (16, 24, 28, 29, 32, 35, 43, 46–50), layers 1000 (22, 23, 25, 54), 1005 (58), 1006 (21), 1006 (51, 56), 1007 (10, 11, 52, 57), surface find from 09/15/06 or 09/16/06 (20).

6.1.3.3. Hellenistic, Arsacid, Sassanid Periods (ca. 600 BC–600 AD) (MT, KN)

The ceramic sherds for which a chronological classification to the Hellenistic period may be considered are represented by ceramic classes EC201 and 202. These classes are characteristic particularly as fine, thin-walled, hard fired pottery with minimal inclusions in the ceramic mass, with colour varying from ochre to grey. The difference between them rests only on the colour of the slip; the former class is black to dark browny-grey with varying intensity, while the latter is marked by a dark red slip.[6]

The most conspicuous sherds in ceramic class EC202 are two fragments (*fig. 22: 47, 48*) with a characteristic recessing in the middle part of the inside of the base, coming from the flat, open shape. Although these are only base fragments, the upper parts of which have not survived, this characteristic profiling makes it possible to adjudge these vessels of the fish plate type. Vessels of this type are relatively abundantly represented in many parts of the Near East (*Dorna-Metzger 1996*, 364; n. 3, with further analogies from the sites of Nimrud, Tarsus, Hama, Tell Halaf or Tell Mohamed Arab). The chronological span of their production stretches from the 4th to 1st centuries BC, and they entered Mesopotamia through the Hellenised regions of the eastern Mediterranean, their most easterly occurrence being at Ai-Khanoum and Kandahar in Afghanistan (*Wilkinson – Tucker 1995*, 103). For the reasons set out above, the appearance of this type of material may be expected among the material from the citadel at Arbil.

Among the other fragments that can with a certain degree of probability be ascribed to specific types are two rim sherds from jugs (*fig. 22: 40, 41*).

The Hellenistic ceramics from northern Mesopotamia show the heavy influence in particular of the Greek region, and in particular of western Syria and Turkey (*Wilkinson – Tucker 1995*, 64). On several exemplars from class EC202, however, there is one element that differentiates the Mesopotamian pottery from the Hellenistic types of the eastern Mediterranean. The latter have for the most part the entire vessel surface covered by a slip of a certain colour, whilst having a slip only on certain parts of the vessel is relatively rare. By contrast, the technique of partial vessel slip was extremely widespread in Mesopotamia (Tell Sweyhat, Nimrud, Tell Mohammed Arab, Dura Europos), with slips applied only to the most prominent, or only certain parts, of the vessel (*Dorna-Metzger 1996*, 365). This characteristic phenomenon is also apparent on some pieces from class EC202 (*fig. 22: 41, 47, 48*).

The technological properties of some pieces from class EC202 are in their rough indicia also similar to ceramics of the Eastern Sigillata A (ESA) type, which appears in the eastern Mediterranean from the 2nd half or end of the second century BC.[7] Whether some examples of class EC202 actually fall within this type is however difficult to assess at this early stage of research. It must also be borne in mind that the material comes from surface artefact collection, rather than from chronologically defined contexts.

A characteristic trait of pieces from class EC201 is a slip that is black to dark browny-grey in colour. This slip is distantly reminiscent of the slips of black glazed vessels made in several eastern Mediterranean centres after the dominant influx of the Attic Black Glazed wares has been ceased from the 2nd century. The quality of these wares, however, was somewhat lower than that of the Attic pottery, as is often apparent in particular from the slip colour varying to various shades of brown-black or browny-grey. It is hard to determine whether the appearance of the similar dark slips on the fragments from class EC201 is related to the black glazed ceramics produced at eastern Mediterranean centres, in Syria and Palestine. While several ceramic shapes seem atypical when compared to the morphological range of the Hellenistic black glazed ceramics from these areas (*fig. 22: 37, 39*), for other types (*fig. 22: 36, 38*) numerous parallels can be found. One of the shapes that is fairly characteristic of Hellenistic pottery is the thin-walled fragment, partially covered with a black slip (*fig. 22: 38*). On the basis of the profile and the two horizontal grooves on the inside of the vessel, this may be judged to be part of a semi-globular bowl. Examples of this type from the Near East are given by *Wilkinson – Tucker* (*1995*, 103, 119) from, for example, the sites at Failaka, Mohammed Arab, Nimrud and Seleucia (*Hannestad 1983*, tab. 4: 43–48; *Roaf 1984*; *Oates – Oates 1958*, tab. XXIV: 4, 9; *Valz 1984*, fig. 1: 1–4), and for Greece and the Levant they give a temporal span from the mid-2nd to 1st centuries BC. Among the more conspicuous pieces in this class is a single rim sherd (*fig. 22: 36*) that evidently comes from a plate-like vessel. This is not the characteristic pointed rim of the fish plate vessels, however, but flat, plate-like vessels of various profiling are also known from the ceramic inventories of many areas under Hellenistic influence. It must however be emphasised that these types also appear in other chronological contexts.

At the same time, several of the Arbil exemplars of class EC201 have a slip that appears only on some parts of the vessel (*fig. 22: 38*), which corresponds to the aforementioned phenomenon characteristic of Mesopotamian Hellenistic ceramics, and also visible in certain pieces from class EC202.

In conclusion, assessment of the ceramics of these two classes may be complemented by a few further notes. Among the fragments from the Arbil citadel that fulfil the general technological norms of ceramics of the Hellenistic period, no direct imports were identified from eastern Mediterranean region, e.g. black glazed ceramics, Hellenistic relief pottery of the Megarian type etc. The Arbil ceramics also lack some of the very fre-

[6] On the basic characteristics of Hellenistic pottery in northern Mesopotamia, cf. e.g. *Dorna-Metzger 1996*, 363; *Gerber 1996*, 304–305; *Wilkinson 2004*, 97–98 or *Holland 2006*, 165–171.

[7] The basic characteristics of this ceramic type are given by *Waagé 1948*, 21, 32 and *Kenyon 1957*, 284; the place of production of these ceramics remains unknown, one theory being that they come from the Syrian/Turkish border around Iskenderun (*Hayes 1985*, 8; *1997*, 54; *Hayerová 2002*, 46).

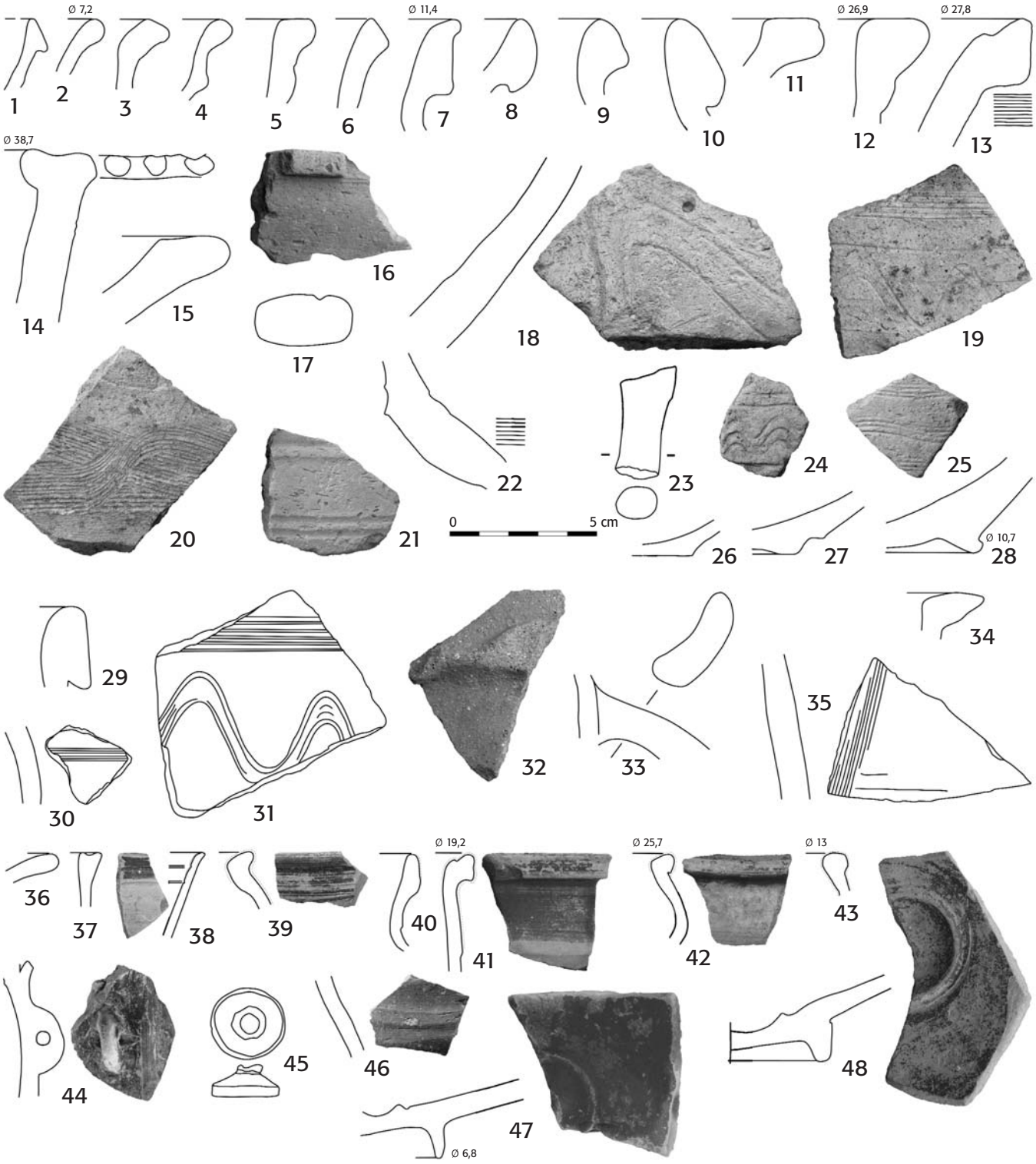


Fig. 22. *Plain, wheel-made pottery: wares EC109 (1–28), EC108 (29–33), EC111 (34, 35). Fine unglazed pottery: wares EC201 (36–39), EC202 (40–48).* — ***Obr. 22.*** *Běžná, na kruhu vyráběná keramika: třídy EC109 (1–28), EC108 (29–33), EC111 (34, 35). Jemná, režná keramika: třídy EC201 (36–39), EC202 (40–48).*
Location: sector A1 (4–10, 11, 13, 15–28, 30–37, 48), sector A2 (14, 38–42, 47), sector A3 (1–3, 29, 43, 44, 46), 1007 (12, 45).

quent Hellenistic shapes, e.g. bowls with everted rims. In the same way, there is as yet no evidence for the relatively widespread decorative elements from Hellenistic ceramics, such as rouletting or stamped decoration.

The fragments of ceramic classes EC201 & 202, which on the basis of their technological properties and partially on their morphological characteristics are assigned to the Hellenistic period, can at the moment be dated only approximately to the end of the 4th or the

course of the 3rd–1st centuries BC. In terms of their origin, they are likely to have been rather local products or products from Mesopotamia more generally.

The post-Seleucid periods seem to be relatively poorly represented in the ceramic record. No typical Parthian, Sassanid (or Sassanid/Early Islamic) wares were recognised, e.g. Smeared ware, Parthian or Sassanid stamped jars, Honeycomb ware or glazed pottery. Many fragments of the EC108 group (hard-fired with coarse, sandy surface) could be of post-Hellenistic date, similarly as in other northern Mesopotamian Arsacid or Sassanid assemblages. Some of the morphologically diagnostic fragments of this ware might confirm its presence: the outfolded and rounded rim of a jar (*fig. 22: 29*) or a strap handle with a central hollow (*fig. 22: 33*) (cf. *Hauser 1996*, Fig. 5e, 6d; *Wilkinson – Tucker 1995*, Type 127, Fig. 76: 18). The rims on *fig. 20: 40, 41* (EC103) and *21: 8* (EC107) might be also classified as Sassanid (*Simpson 1996*, Fig. 3: 5; *Falkner 1987*, Fig. 10: 37), but these obviously have a broader interval of occurrence and their fragmentary nature does not enable verification of their post-Hellenistic date.

6.1.3.4. Islamic period[8] (KN)

6.1.3.4.1. Unglazed earthenware

From the chronological continuum of the unglazed pottery we can single out only several type pieces that represent Islamic pottery. We suppose that, first of all, the light, hard fired ware EC107 and some of the creamy, shaff tempered ware EC109 can be dated to the Islamic period. The moulded wares EC206 and 207 and some of the fine thinware EC205 are obviously linked to the EIP/MIP, while the thick-walled variant of the coarse, hand-made, called *tūb achdar* ware (EC003) seems to be (exclusively?) of Late Islamic date or even later.[9]

We did not find many direct morphological parallels between Arbil's unglazed, possibly Islamic pottery and the published material from better datable contexts because little attention has traditionally been paid to plain ceramics in North Mesopotamia. We consider that the most diagnostic Islamic forms are:

- Jugs with high, narrow, cylindrical necks and with straight or staggered rims (EC107 only, *fig. 21: 19, 20, 27?, 28, 34–37*), a common form with many variants, without the possibility of more precise dating.
- Cooking pots of red fabrics, incl. Brittle ware (EC103, 104 /?/ and finer variant EC113). However, the diagnostic fragments of the Brittle ware (*fig. 20: 49, 57* and one rim sherd from sector A3, not illustrated) belong to the coarser wares EC103 and 104 and do not seem to represent the typical Early Abbasid Brittle ware (*Whitcomb 2004*, 99; *Miglus 1999*, 34; *Bartl 1994*, 132; *Falkner 1987*, 163, Fig. 11: 44, etc.), more probably might have had a broader period of occurence (e.g. Parthian, Sassanid or, vice versa, Middle Islamic, cf. *Wilkinson – Tucker 1995*, Type 129 and 164, Fig. 76: 20, 21, 30; *Killick 1988*, 71; *Redford 1998*, Fig. 3: 12D; *Tonghini 1998*, Fig. 147c).
- Conical bowls with inverted, thickened and outfolded rims (EC101 only, *fig. 20: 35*), with parallels from the EIP and MIP at Tell Aswad (Gruppe AC, *Miglus et al. 1999*, Taf. 38–39), Nasibin (*Guérin 1996,* Groupe I, 8th–9th c., Fig. 3: 1–4), Qal'at Ja'bar (*Tonghini 1998*, Fig. 108a, b, d) and Dhra' al-Khan in Palestine (very similar, but hand-made sugar vessels, so-called *abaleegs*, *Kareem 2000*, Fig. 57).
- Conical basins with inverted, triangular, profiled rims (EC107 only, *fig. 21: 31–33*); a similar form has been published from Sāmarrā and dated tentatively to the 11th century (*Falkner 1990*, Fig. 15: 1).
- Conical basins with everted rims and vegetable temper (EC109: *fig. 22: 14, 15*; EC111: *fig. 22: 34*), probably dating to the EIP (Abbasid city of Sāmarrā: *Falkner 1987*, Fig. 11: 50; Balīh basin: *Bartl 1994*, Taf. 3; 6: 2, 5 and 10: 1; Tall Aswad: *Miglus et al. 1999*, Taf. 11f, 12m, 13m).
- Jar with a perforated neck (EC107, *fig. 21: 18*); occurs in a different form at Tall Aswad (*Miglus et al. 1999*, Taf. 71g) and on the reportedly Late Abbasid storage jar in the Museum of Civilisation in Arbil
- Some sherds from EC103, 104, 107, 111 and partly 109, decorated with combing (*fig. 21: 38, 39, 43, 46–48*; *fig. 22: 19, 20, 31, 35*), incised bands filled by combed punctures (*fig. 20: 58*), applied and impressed strips (*figs. 20: 54* and *21: 50*), carving (*fig. 20: 51*) or rouletting (*fig. 21: 41, 42, 49*).
- Fragment of a "pilgrim flask" (EC202, *fig. 22: 44*), probably Middle Islamic.
- Containers, perhaps from the LIP (EC107, *fig. 21: 29, 30*; cf. *Kareem 2000*, Fig. 45).
- Rims of storage amphorae (EC107, *fig. 21: 11, 10?*) with very close analogies from Tell al-Rimah, there tentatively dated to the 12th–13th century AD (*Postgate – Oates – Oates 1997*, Pl. 84: 972).

Corn containers (EC004)

Reportedly (according to local informators) Late Islamic (*fig. 20: 25*). A thick-walled container of globular form with an identical fabric is exhibited in Museum of Civilisation in Arbil, labelled as coming from the Late Abbasid period.

Thinware or "Eggshell ware" (EC205)

Cylindrical or slightly flaring rims and necks of small jugs, some with horizontal incised lines, combing (*fig. 23: 19, 25, 29*) or relief decoration (cf. next para-

[8] The simple periodisation of Islamic ceramics proposed by *Whitcomb* (*1978*, 96–98) and *Larsen* (*1983*, 252–253) is quite sufficient for the chronological assessment of the surface pottery finds from Arbil. We therefore distinguish Early Islamic (EIP; 7th–11th c. AD), Middle Islamic (MIP; 11th–15th c.) and Late Islamic Periods (LIP; 16th–19th c.).

[9] This presumption is based on the fact that the ware EC003 was, apart from the omnipresent EC107, the second most abundant in the 20th century horizons uncovered in the intervention 3/06 in the *qal'a* (upper layer 3001: 16,4 %, 3003 + 3009: 24 %, 3019 + 3032: 24 %). However, a considerable part of the pottery assemblage from the trench is residual.

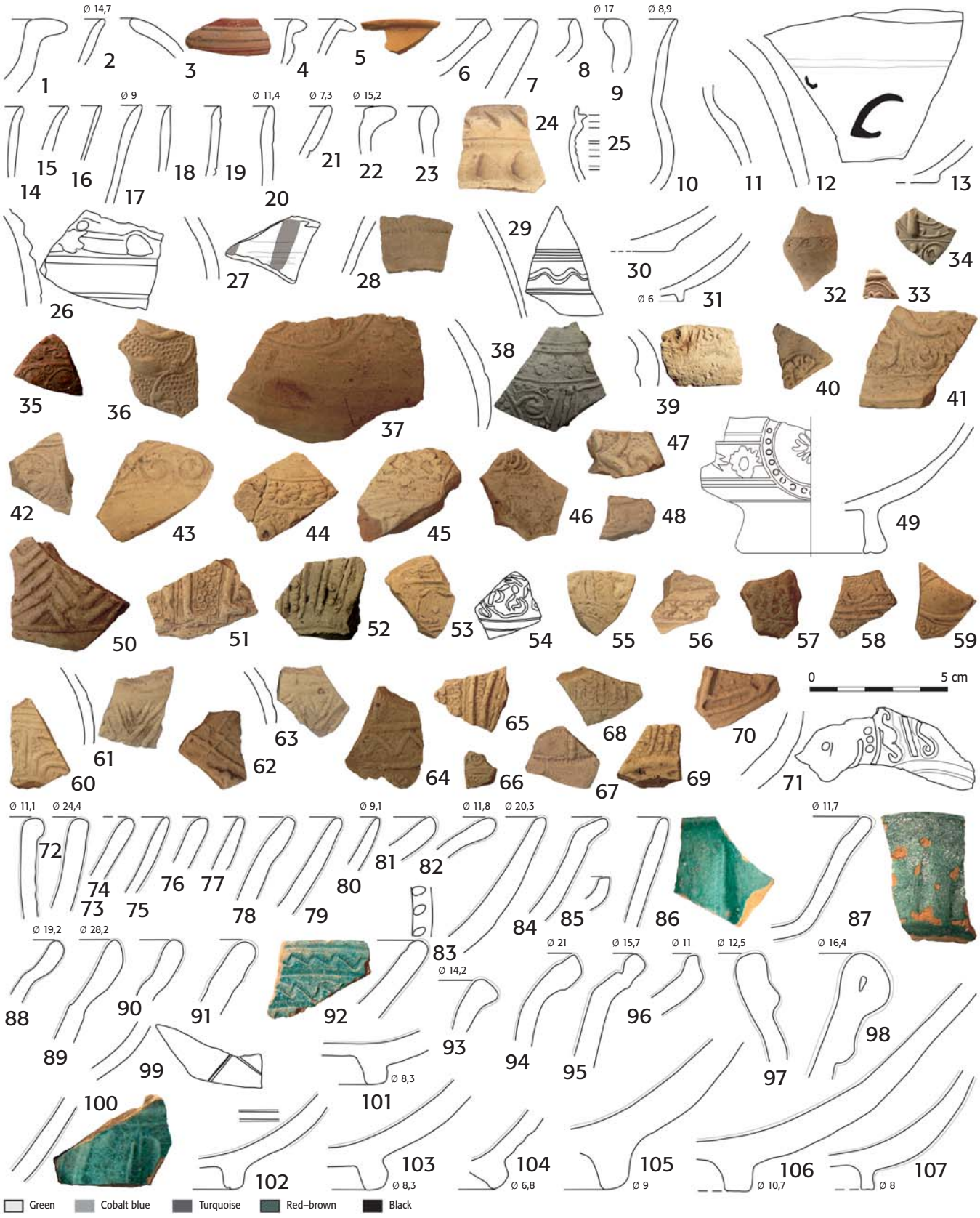


Fig. 23. *Fine unglazed pottery: wares EC204 (2–13), EC203 (1), EC205 (14–31). Relief decorated ware: EC205 (32–34), EC206 (36–71), EC207 (35). Monochrome glazed earthenware: ware EC401 (72–107).* — ***Obr. 23.*** *Jemná, režná keramika, třídy EC204 (2–13), EC203 (1) a EC205 (14–31). Reliéfně zdobená keramika: třídy EC205 (32–34), EC206 (36–71) a EC207 (35). Monochromně glazovaná hrnčina, třída EC401 (72–107).*
Location: sector A1 (1, 6–9, 12, 13–15, 17–20, 22, 26, 29–31, 38, 39, 49, 51, 54, 56, 61, 63, 71, 83, 86, 89, 90, 98, 99, 102, 103), sector A2 (2, 4, 5, 11, 13, 16, 21, 25, 27, 28, 32, 33, 35, 37, 40, 42, 44–46, 48, 50, 52, 53, 55, 57–59, 62, 64–70, 73–75, 87, 92, 93), sector A3 (34, 41, 43, 47, 60, 72, 100, 107), layers 1001 (80), 1005 (88), 1006 (84, 85, 101, 104), 1007 (36, 82, 91, 94–96, 105), surface find 09/15/06 or 09/16/06 (3, 76–78, 97).

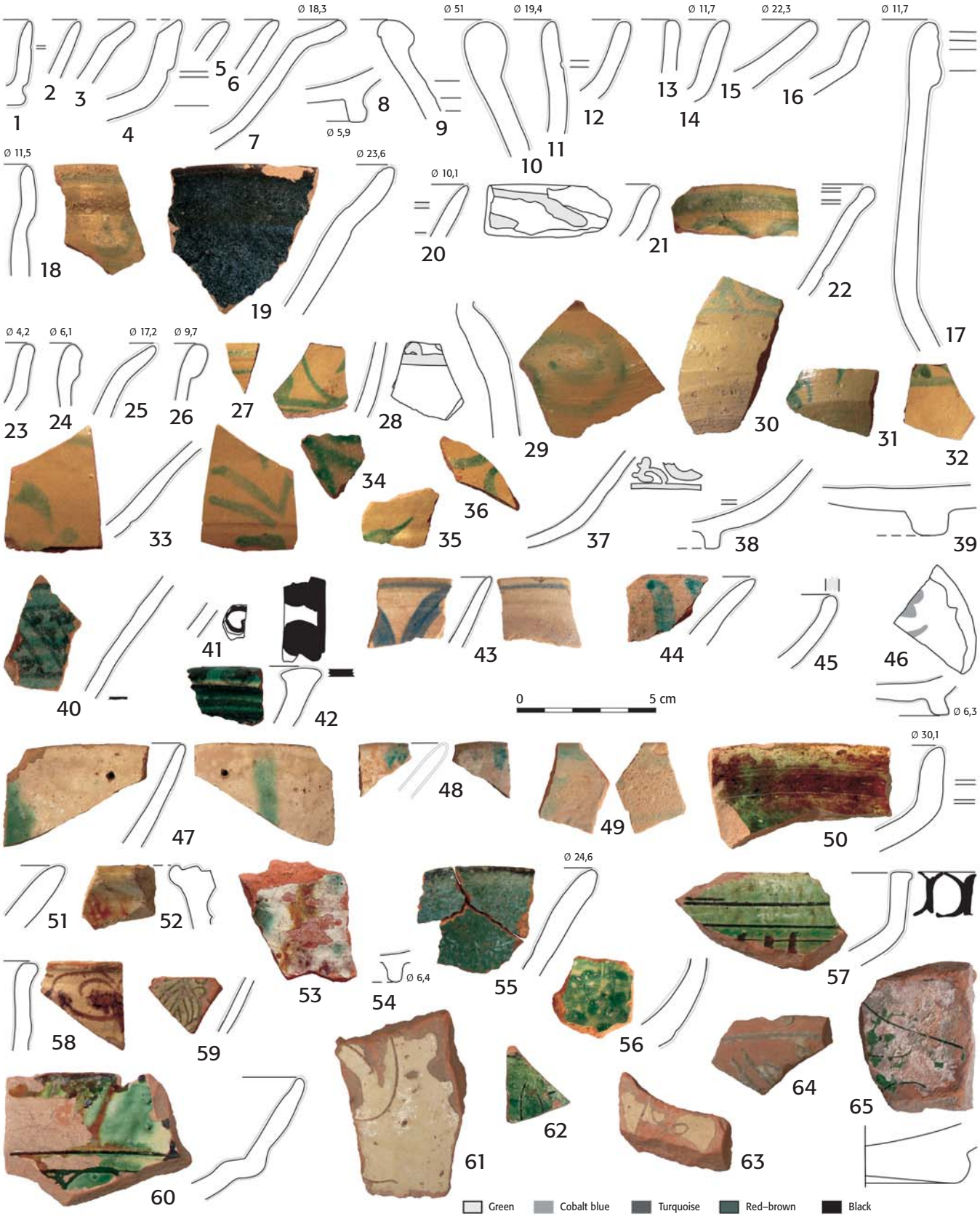


Fig. 24. *Monochrome glazed earthenware: wares EC403 (1–10), EC404 (11–14), EC402 (15), EC406 (16), EC421 (19) and EC423 (17, 18). Inglaze painted earthenware: wares EC411 (20–39), EC409 (40–42), EC416 (43–46). Splash and/or slip incised earthenware: wares EC412 (47–54), EC410 (55, 56), EC415 (57–65).* — ***Obr. 24.*** *Monochromně glazovaná hrnčina: třídy EC403 (1–10), EC404 (11–14), EC402 (15), EC406 (16), EC421 (19) a EC423 (17, 18). Glazovaná hrnčina s malbou do glazury: zboží EC411 (20–39), EC409 (40–42), EC416 (43–46). Glazovaná hrnčina s výzdobou potékanou a/nebo rytou do nástřepí: zboží EC412 (47–54), EC410 (55, 56), EC415 (57–65).*
Location: sector A1 (2, 3, 8 , 13, 16, 21, 22, 28, 32, 33, 41, 43, 48, 49, 51, 54, 56, 65), sector A2 (1, 4, 9, 11, 12, 14, 15, 20, 37, 30, 31, 40, 42, 47, 52, 57, 59–61, 63, 64), sector A3 (10, 27, 34–36, 50, 58, 62), 1000 (45), 1001 (53), 1006 (23, 24, 26, 46), 1007 (5–7, 17–19, 25, 29, 39, 44, 55), surface find 09/15/06 or 09/16/06 (38).

Fig. 25. *Glazed, slip painted earthenware, stonepaste and porcelain: wares EC413 (1–13), EC414 (14–17), EC419 (21–23), EC420 (18–20), EC422 (24–26), porcelain (27, 28). Tobacco pipes: wares EC507 (29–38, 40–44) and EC505 (39).* — ***Obr. 25.*** *Glazovaná hrnčina s malbou na nástřepí, fajáns (stonepaste) a porcelán: třídy EC413 (1–13), EC414 (14–17), EC419 (21–23), EC420 (18–20), EC422 (24–26), porcelán (27, 28). Dýmky: třídy EC507 (29–38, 40–44) a EC505 (39). Location: sector A1 (7, 8, 10, 13, 14, 15, 20, 22, 25, 29–34), sector A2 (3, 5, 11, 12, 17, 23, 35), sector A3 (2, 9, 16, 18, 19, 21, 26, 36–38), 1001 (1), 1007 (24, 39, 44), surface finds 09/15/06 or 09/16/06 (4, 6, 27, 28, 40–43).*

Fig. 26. *Arbil citadel, small finds: ceramic button (1; sector A2), fragment of turned vessel (2; sector A2), brass (?) personal stamp (3; sector A3). Drawings on figs. 20–26 by R. Balý, L. Janíček, J. Milt, K. Nováček, O. Švejcar and P. Vařeka.* — ***Obr. 26.*** *Drobné nálezy: keramický knoflík (1; sektor A2), fragment soustružené nádobky (2; sektor A2), mosazné (?) osobní pečetidlo (3; sektor A3). Obr. 20–26 R. Balý, L. Janíček, J. Milt, K. Nováček, O. Švejcar a P. Vařeka.*

graph); flat and ring cup bases (*fig. 23: 30, 31*). This ware is traditionally ascribed to the Early Islamic Period, mainly to the Early Abbasid and "Sāmarrā" horizons (8th–9th centuries AD; cf. *Falkner 1987*, Fig. 11: 40–43; *Tampoe 1989*, 25–26; *Bartl 1994*, 132; *Miglus et al. 1999*, Type AA/AB, Taf. 34–37).

Moulded ware (EC205, 206 and 207)

The collection of 74 fragments consists of three different groups. Fine, creamy, medium fired, unglazed, relatively thick-walled ware has absolute dominance, followed by a red fabric ware (EC207; only 1 fragment, *fig. 23: 35*) and well levigated, moulded "Eggshell ware" (EC205) with relief executed in supreme quality and with a wall thickness of around 1 mm (3 frgm., *fig. 23: 32–34*).

The only recognizable form of moulded pottery is the globular bottle or jar on a high footring (*fig. 23: 49*). Decoration was rather roughly manufactured; in the

Fig. 27. *Appearance of some ceramic wares: EC001 (1–4), EC002 (5–7), EC005 (8), EC101 (9, 10), EC102 (11), EC103 (12), EC104 (13), EC105 (14), EC106 (15), EC107 (16), EC108 (17), EC109 (18, 19), EC110 (20, 21), EC111 (22), EC112 (23), EC113 (24), EC203 (25), EC204 (26, 27), EC209 (28), EC210 (29), EC407 (30, 31), EC424 (32), EC502 (33), EC504 (34). All fragments are from sector A1, except of 26, 30, 31, 34 (sector A2), 28, 29 (sector A3) and 32 (layer 3001). Photo and procession by K. Nováček. —* ***Fig. 27.*** *Vzhled některých keramických tříd: EC001 (1–4), EC002 (5–7), EC005 (8), EC101 (9, 10), EC102 (11), EC103 (12), EC104 (13), EC105 (14), EC106 (15), EC107 (16), EC108 (17), EC109 (18, 19), EC110 (20, 21), EC111 (22), EC112 (23), EC113 (24), EC203 (25), EC204 (26, 27), EC209 (28), EC210 (29), EC407 (30, 31), EC424 (32), EC502 (33), EC504 (34). Všechny zlomky pocházejí ze sektoru A1 kromě 26, 30, 31, 34 (sektor A2), 28, 29 (sektor A3) a 32 (vrstva 3001). Foto a zpracování K. Nováček.*

group of the vegetable motifs the arabesque with leaflets (*fig. 23: 33*, *34*, *36 – 39*, *42*, *43*), arabesque (*fig. 23: 32*) or small flowers (*fig. 23: 35*) occurred, as well as rosettes (*fig. 23: 40*) and horizontal bands filled with flowers (*fig. 23: 38*, *44*, *45*, *48*, *56*). The background of the tendrils is often densely filled by small circles (*fig. 23: 33*, *36*, *42?*, *47?*). Geometrical motifs are represented by beaded roundels with rosettes in the centre (*fig. 23:*

49, 55, 71), zigzag motifs, vertical ribs and rows of circles or beads (*fig. 23: 50–52, 61, 63, 65, 68, 69*). Several fragments bore calligraphy, one with distinctive punctuation in the intervening space (*fig. 23: 57, 58, 60*). An animal motif occurred once (*fig. 23: 41*).

Despite the popularity and easy identification of relief decorated ceramics this ware has been only sparsely published, and the internal chronology within the main interval of its occurrence (ca. 8th–14th century AD) has not been established (*Gonella 1999*, 57). The Arbil assemblage, however, has nearly nothing in common with the relief ceramics from well-known Early Islamic sites, with their thoroughly elaborated bas-relief, consisting mainly of individual, isolated decorative elements (Raqqa-Tall Aswad, Sāmarrā, Istakhr etc.). The continuous conception of the decoration, filling the background with circles or dots and also some specific motifs (beaded roundels, rosettes, vertical S-shaped tendril with trims: *fig. 23: 71*) are characteristic of Syrian and Iranian moulded wares of the 12th–13th centuries, amongst other things for the group formerly known as "cruches de Mossoul" (*Lane 1938*, Pl. XX1.D; *Watson 2004*, 125; jars Cat. Ab.7 and Ac.4 are direct parallels to our finds). The motifs of the moulded ware from Qal'at Ja'bar (late 11th to 14th cent.) are very well paralleled by several fragments of EC206 (e.g. *fig. 23: 43, 46, 49, 50*; cf. *Tonghini 1998*, Pl. 74, 77, 82, 80). At Qasr al-Hayr al-Sharqi too there are comparanda for the Arbil material among the latest exemplars of the 13th century relief ware, with zigzag motif, running animals and stylised tendrils in the shape of the number three (*Grabar et al. 1978*, A-8/12, 14, 15 – compare with *fig. 23: 39, 41, 43, 50, 61, 63*). Only the aforementioned "Eggshell ware" with moulded decoration could be tentatively posed as coming from the Early Islamic Period, along with the distinctive fragment with arabesque and red fabric (*fig. 23: 35*), which has a close parallel at Early Abbasid ar-Raqqa (*Gonella 1999*, Taf. 78h, 82h).

Tobacco pipe bowls (EC505 and 507)

A small but highly heterogeneous group of pipe fragments represents the latest Ottoman ceramics. The assemblage contains very narrow, cylindrical or funnel-shaped pipes, as well as broad, lily-shaped, biconical and round profiles. There are examples with filters (*fig. 25: 38, 39*) and without filters, and with partially covered necks. With exception of one example (*fig. 25: 40*) all of the bowls were decorated – by moulded or appliqué decoration (*fig. 25: 29–32, 42*), rouletting (*fig. 25: 37, 41, 42*), carving and incisions (*fig. 25: 35, 36, 39, 43, 44*) and slip "marbling" (*fig. 25: 33, 34*). The oldest pipes probably include fragment on fig. 25: 41, which has a parallel in the pipe collection obtained from the Sadana Island shipwreck in the Red Sea, which sank around 1765 AD (*Ward 2000*, Fig. 7.6.b). Comparison with the published typological chronology of pipes (*Hayes 1992*, 391–394; *Baram 2000*, 152) leads to the conclusion that most of the other finds come from the very end of Ottoman production, i.e. the second half of the 19th to early 20th centuries. Also characteristic of this period are, for example, the undecorated, red burnished pipes with a lily shape (*fig. 25: 40*; cf. *Hayes 1992*, Fig. 149, type VIII), pipes with filters (*fig. 25: 38, 39*) and products with makers' stamps (*fig. 25: 43*).

6.1.3.4.2. Glazed pottery

Glazed ceramics are represented by 489 fragments in total (6.2 % of the total number of ceramic finds), the highest absolute frequency coming from sector A2 (127 fragments, 3.5 % of the assemblage), followed by sector A3 (95 pcs, 4.6 %), layer 1007 (87 pcs, 18.3 %) and finally in sector A1 (86 pcs, 7.3 %). In all, 21 wares have been distinguished, but the frequency of these wares is very uneven. Ware EC401 – a turquoise glazed ware – showed absolute number prevalence (226 fragments in total, or 46 % of the whole glazed pottery assemblage), while wares EC403 (green glazed, 66 pcs – 13.5 %), EC411 (yellow glazed with green splash and/or painting, 49 pcs – 10 %) and EC404 (green glazed on slip, 39 pcs – 8%) were also common. On the other hand, 10 wares are represented by 5 or fewer fragments (*table 2*).

The glazed wares were divided into four categories:

a) earthenware with a monochrome glaze (wares EC401–404, 406, 407, 421, 423, 424)

b) polychrome glazed and/or painted earthenware (wares EC405, 409–416)

c) stonepaste (EC419, 420, 422)

d) porcelain (not classified, random surface finds).

Monochrome glazed earthenware

The dominant turquoise, blue or green glazed wares (EC401–404, representing 70 % of the assemblage) apparently cover a long period of use. The collection is morphologically poorly differentiated and almost without decoration, which complicates identification. The medium size jar with inverted, rounded rim and dark blue-green glaze (*fig. 24: 9*) resembles small Sassanid/Islamic jars (the so-called "Hib"-jars: *Mason forthcoming*; *Horton 1996*, Fig. 195i). The low, cylindrical cups (*fig. 24: 1*) have Early Abbasid analogies (Tall Aswad: *Miglus et al. 1999*, Taf. 92n), while carinated bowls or basins with vertical rims (*fig. 24: 4, 12, 14, 16*) occur more often in Middle and Late Islamic contexts (for example at Soltaniya: *Kleiss 1997*, Abb. 16: 2–4; Middle Islamic Sāmarrā: *Falkner 1990*, fig. 16: 13, 15–17, or Gritille: *Redford 1998*, Fig. 3: 16B, D, E, H). Broad vertical fluting, although it occurred only three times at Arbil, is a conspicuous detail, at present without direct parallels (*fig. 23: 86, 87, 100*): narrower fluting on the monochrome glazed bowl with everted rim is known from Nippur assemblage of the 14th century AD (*Gibson – Armstrong – McMahon 1998*, fig. 20: 6). Storage jars with inverted, thickened and rounded rims (*figs. 23: 97* and *24: 10*) seem to be a recent, local ware, as are, probably, most of the other fragments, which might be classified as plain "Ottoman green glazed ware" (*Wilkinson – Tucker 1995*, type 101).

Other monochrome, sporadically represented glazed wares come from the common repertoire of Islamic

Fig. 28. *Plan of the citadel, version of 2008, with location of the archaeological sections (1–3/06), transect of the surface finds collection (A1–A3) and profiles of the geophysical survey (dashed lines). Drawing by K. Pavelka and K. Nováček. —* ***Obr. 28.*** *Plán citadely, verze z roku 2008, s lokalizací archeologických sond (1–3/06), transektu povrchových sběrů (A1–A3) a profilů geogyzikální prospekce (čárkované linie). Zaměření a kresba K. Pavelka a K. Nováček.*

	A1	A2	A3	1000	1001	1005	1006	1007	1008	2000	2001	2003	3001	3003+3009	3019+3032	Total
401	44	49	40	6	6	2	7	43	1	9		1	14	4		**226**
402	4	3	1				1	1								**10**
403	15	22	8	4				13					4			**66**
404		15	14		2			3						2	3	**39**
405	1	3	1		1			1								**7**
406	1		1		1				3							**6**
407	1	2						1								**4**
409		2			1			1								**4**
410	1	1						1								**3**
411	4	8	12		1	1	3	13	1	2	1	3				**49**
412	3	3	2		2											**10**
413	4	4	2		2											**12**
414	2	1	2													**5**
415	1	10	4		2			1								**18**
416	2			1			1	1								**5**
419	1	1	2		1											**5**
420	1		2													**3**
421		3	3					6								**12**
422	1		1					1								**3**
423								1								**1**
424													1			**1**
Total	**86**	**127**	**95**	**11**	**19**	**3**	**12**	**87**	**5**	**11**	**1**	**4**	**19**	**6**	**3**	**489**

Table 2. *Quantitative overview of glazed ceramics. —* ***Tab. 2.*** *Kvantitativní přehled glazované keramiky.*

Fig. 29. *Settlement tell and citadel (qal'a) of Arbil, aerial view from southwest, photo by K. Pavelka, September 2006.* — ***Obr. 29.*** *Sídlištní pahorek a citadela ((qal'a) v Arbílu, letecký pohled od jihozápadu, stav v září 2006, foto K. Pavelka.*

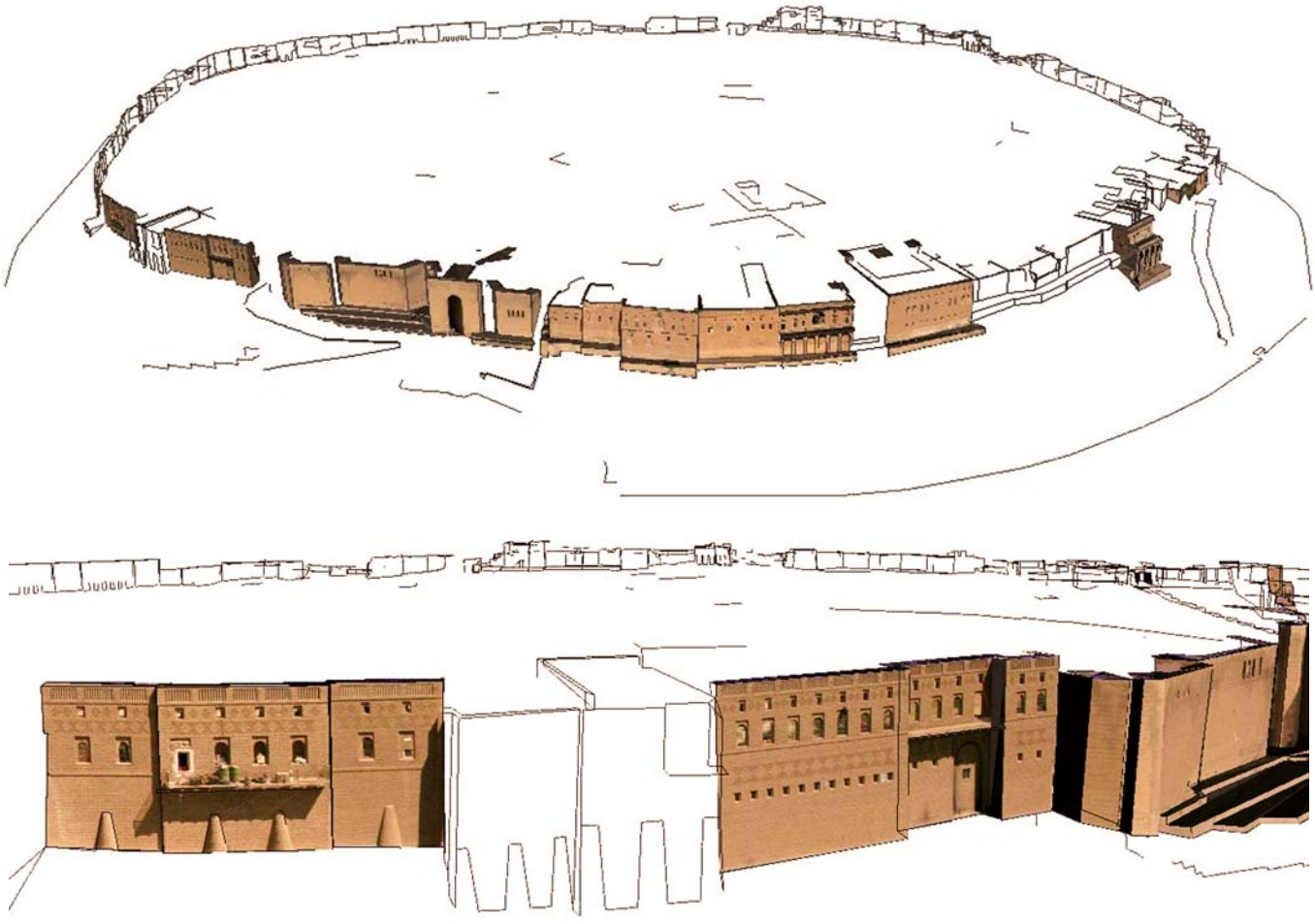


Fig. 30. *Virtual 3D model – a part of the interactive database system of the citadel, drawing by V. Králová and K. Nováček.* — ***Obr. 30.*** *Virtuální 3D model, část interaktivního databázového systému citadely, kresba V. Králová a K. Nováček.*

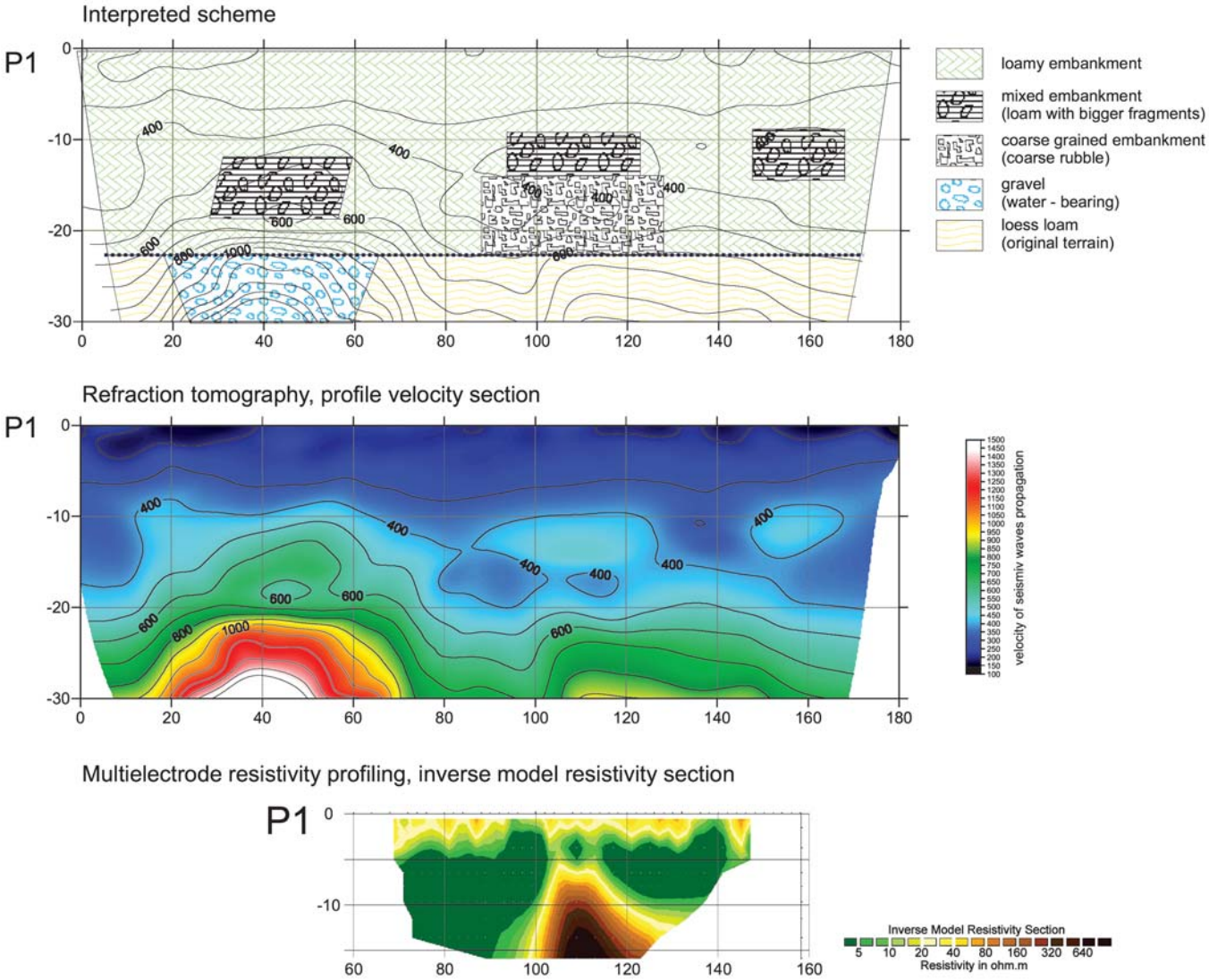


Fig. 31. *Results of the geophysical survey – profile 1: seismic prospection (in the middle), geoelectric resistivity profiling (bottom), joined interpretational scheme (above). Drawing by T. Chabr and D. Filipský.* — ***Obr. 31.*** *Výsledky geofyzikální prospekce – profil 1: seismika (uprostřed), elektroodporové profilování (dole), sloučené interpretační schéma (nahoře). Kresba T. Chabr a D. Filipský.*

ceramics without any more precise possibilities for dating. The appearance of ware EC424 (*fig. 27: 32*) is similar to that of the distinctive, sparse glazed pottery from Tall Aswad, of Early Abbasid date (*Watson 1999*, 82); the two fragments from Arbil do not enable unambiguous identification. The jars with a yellow green opaque glaze of inferior quality (EC423) are felt to be a very unusual local ware of later date (*fig. 24: 17, 18*).

Polychrome glazed and/or painted earthenware

We distinguish four main sub-categories of polychrome glazed earthenwares: splash, slip-incised, slip painted and inglaze painted wares. Excepting yellow ware EC411, all the groups are represented by only a few fragments each.

Splash wares (EC405, 410, 412) do not create clearly defined groups because of the high diversity, low number and fragmentariness of the sherds. The most distinctive examples include the rim of a conical bowl of light ochre fabrics covered inside and out by a white, opacified glaze with simple decoration of green vertical streaks (*fig. 24: 47*). Two other rim fragments from sector A1 are similar in character, with turquoise splashes (*fig. 24: 48, 49*). These examples seem to be typical products of the so-called Sāmarrā-horizon, probably of Basra origin, and introduced c850 AD (*Hallett 1999*, 196; *Mason forthcoming*).

Bowls of red fabric, densely covered inside by small circles and curved lines executed in green glaze (ware EC410) are a specific form of splash ware, apparently of later date (*fig. 24: 55, 56*).

All of the fragments of *slip-incised earthenware* (EC415; *fig. 24: 57–65*), with possibly one exception (*fig. 24: 59*), come from the "late sgraffiato" category, which is characterised by a mostly red fabric, monochrome (or irregularly splashed) glaze and dynamically executed decoration, consisting only of curvilinear incisions, spirals and squiggles. The glaze is both mono-

Fig. 32. *Arbil, minaret of al-Mudhaffar („Shexi Choli") view from east (1), 3D model from west (2), photo by K. Nováček, drawing by K. Pavelka.* — ***Obr. 32.*** *Arbíl, al-Muzaffarův minaret („Shexi Choli") pohled od východu (1), 3D model od západu (2), foto K. Nováček, kresba K. Pavelka.*

chrome green or white and splashed.[10] This category, developed from the early Abbasid slip-incised pottery of the 9th century, became during late 11th and 12th century one of the most abundant glazed wares of the Near East and eastern Mediterranean, perhaps with many local production centres (*Redford 1998*, 275; *Tonghini 1998*, 61–62; *Kennet 2004*, 76; *Wilkinson – Tucker 1995*, Type 82). The Arbil examples can most likely be dated to the 12th–13thcenturies; during the 14th century sgraffiato production seems to cease completely throughout Iraq, Iran and Central Asia (*Kennet 2004*, 76), while in the Eastern Mediterranean, Egypt and the Golden Horde, the revival of slip-incised earthenware had a longer duration (*Scanlon 1984*, 124; *Watson 2004*, 406–416; *Fedorov-Davydov – Bulatov, 1989*, 199–202). In the case of the carefully made inner and outer, olive-green glazed fragment with leaf decoration (*fig. 24: 59*) an earlier date cannot be ruled out.

Slip painting occurs in two variants: manganese black or cobalt blue under a clear glaze (EC414) and red under a clear glaze with inglaze cobalt lines and turquoise (or green) dots or splashes (EC413). While the former is a widespread ceramic type known from Middle and Late Islamic sites (for example Soltaniya and Tepe Nahur: *Kleiss 1997*, Abb. 17: 5; 33: 2, 9, 10; 54: 7; Shanga: *Horton 1996*, Fig. 216g, i), the latter represents a peculiar, clearly defined category of simple trichromatic ware without known direct analogies, probably of local origin. It will need to be dated more precisely in future.

Three variants are classified as *inglaze painted*: black painted with turquoise or blue-green alkali glaze (EC409), white opacified glaze with cobalt blue, turquoise or black painting (EC416) and green painted with bright yellow lead glaze (EC411). The latter has many analogies in Early to Late Islamic assemblages, inclu-

[10] The „late sgraffiato" of the eastern Mediterranean origin has mostly different character (cf. *Grabar et al. 1978*, 115; *Bartl 1995*, 28–29; *Redford 1998*, 275–276; *Tonghini 1998*, 57–61; *Ben-Tor– Avissar – Portugali 1996*, 87–90), among Arbil finds did not occur.

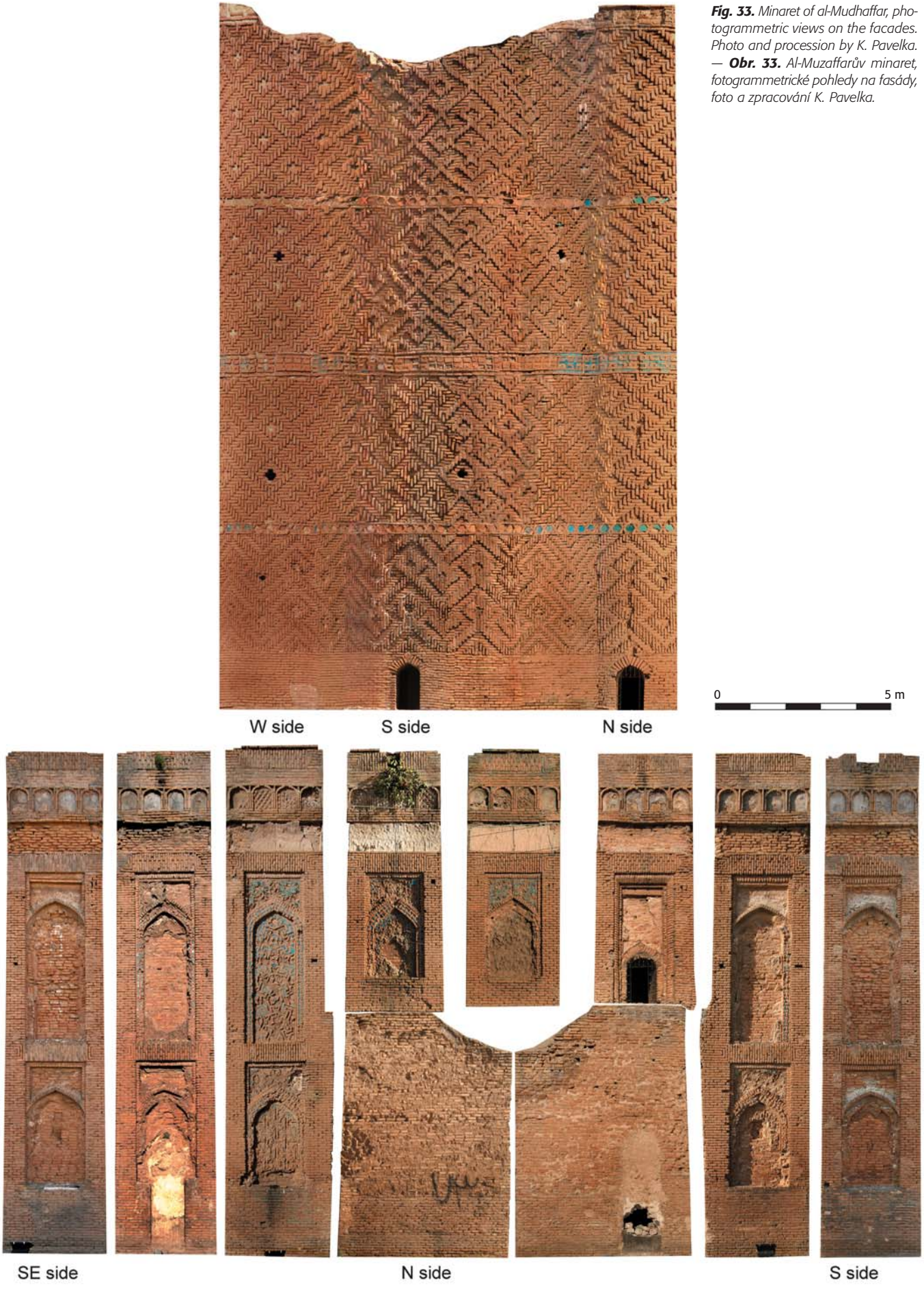


Fig. 33. *Minaret of al-Mudhaffar, photogrammetric views on the facades. Photo and procession by K. Pavelka.* — ***Obr. 33.*** *Al-Muzaffarův minaret, fotogrammetrické pohledy na fasády, foto a zpracování K. Pavelka.*

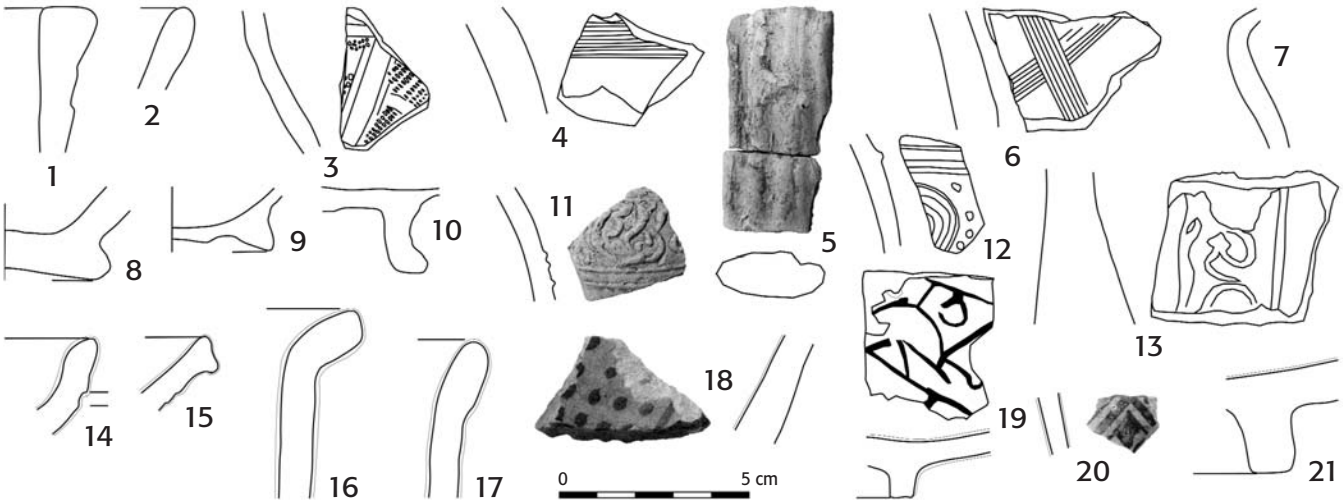


Fig. 34. *Minaret of al-Mudhaffar, surface finds: wares EM105 (1–10), 106 (11–13), 107 (14–16), 108 (17), 109 (18), 110 (19), 111 (20), 112 (21). Drawing by R. Balý, L. Janíček, J. Milt and K. Nováček. —* ***Obr. 34.*** *Al-Muzaffarův minaret, povrchové nálezy: třída EM105 (1–10), 106 (11–13), 107 (14–16), 108 (17), 109 (18), 110 (19), 111 (20), 112 (21). Kresba R. Balý, L. Janíček, J. Milt a K. Nováček.*

ding a green splashed bowl in the exposition of the Museum of Civilisation in Arbil (No. 10072), which apparently belongs to the earliest group of Abbasid splashed ware. Ware 411 is, however, different (red brown fabric with an absence of glaze on the lower part of the outer surface and on the bottom, thin pale green painted lines and curves) and might be considerably later. Similarly, EC416 seems to be a later result of the tradition of blue/green/black painting on a white glaze. EC409 represents a common, widespread Middle and Late Islamic type, which occurred during 13th century (*Falkner 1990*, Fig. 16: 18, 19). We cannot rule out the possibility that some of the fragments classified as earthenware EC416 and EC409 are in fact stonepastes, indistinguishable to the naked eye.

Stonepaste

Stonepaste fragments occurred surprisingly rarely, either among the surface finds or in the excavation assemblage. The mere 11 fragments are divided into three groups: lusterware (EC420), white or blue opaque glazed ware (EC419) and underglaze painted ware (EC422). The form of the lustre-painted bowls cannot be identified. The colour of the lustre is red brown (*fig. 25: 20*) or aureate yellow (*fig. 25: 18, 19*). The sherds can most probably be classified into the later lusterwares of Syrian or Iran provenance (2nd half of the 12th – beginning of the 14th centuries). The opaque glazed ware has cobalt drop or splash decor, applied either on the surface of the glaze (*fig. 25: 21*) or sunken into the glaze (*fig. 25: 22*, the "ink-on-snow" technique: *Mason forthcoming*). The coarse, porous stonepaste with cobalt or polychrome painting and transparent glaze (EC422) is too fragmentary for reliable assessment; two of the fragments, nevertheless, resemble the Iranian Timurid and Safavid imitations of Chinese porcelain (*fig. 25: 24, 25*), while the polychrome floral decoration of the cup (*fig. 25: 26*) is similar to the Kubachi polychrome ware of the 17th century (*Watson 2004*, Cat. U11).

Porcelain

Porcelain is represented extremely modestly: two pieces are of recent date, another two with a cobalt painting might be medieval (*fig. 25: 27, 28*). Celadon was not identified at all.

6.2. Stone industry (PŠ)

The evaluation of the stone industry obtained from the research at Arbil took in a total of 69 chipped stone artefacts. For the time being assessment has been possible only on the basis of photographic documentation, which all the attendant reservations that this implies. Above all, it has not been possible to study the artefacts in three dimensions, which sometimes decreases their assessability, meaning that they are classified as amorphous raw material fragments. Further imprecisions arise in the determination of the raw materials. For precision, it is necessary to study an artefact directly, so the determinations given here should be taken as preliminary, and in need of future verification. No direct conclusions can presently be drawn with respect to raw materials, and the state of knowledge at present makes it possible only to state that in the great majority of cases, the raw material was apparently of local origin from sources less than 50 km distant.

The assemblage has been divided into two parts according to the potential for dating, into Palaeolithic and other industry.

An overview of the other industry from unidentified and later (non-Palaeolithic) periods is given in *table 3*. Three artefacts can evidently be assigned to the historical period of the existence of the tell – a fragment of an alabaster vessel (*fig. 26: 2*) and two flakes, which most likely come from a piece of worked stone. There are 34 chronologically unclassifiable artefacts, mostly amorphous fragments (which are chronologically indifferent, and might relate to the Palaeolithic). A chopper and a transitional form between core and chopper were

Description	Historical period	Unidentified, apparently historical period	Unidentified	Palaeolithic to Bronze Age	Total
amorphous fragment			32		**32**
mace				1	**1**
chopper			1		**1**
chopper or core			1		**1**
Flake		2			**2**
fragment of turned vessel	1				**1**
Total	**1**	**2**	**34**	**1**	**38**

Table 3. *Overview of the stone industry of unknown and later periods.* — ***Tab. 3.*** *Přehled kamenné industrie neurčitelného či mladšího stáří.*

Description	Middle Palaeolithic	Middle Palaeolithic (uncertain)	Palaeolithic	Total
Blade			1	**1**
Middle blade fragment, heavily corroded		1		**1**
Aeolised flake	1			**1**
Blade-like flake	2			**2**
Flake	1	8	4	**13**
Heavily aeolised		1		**1**
amorphous fragment				
Core	1			**1**
Rounded micro-core			1	**1**
Flake core	2			**2**
Debitage	7	10	6	**23**
Scraper	1			**1**
Bifacial chopper	1			**1**
Chopper	1	2		**3**
Flake scraper	2			**2**
Flake awl, slightly aeolised	1			**1**
Tools	6	2		**8**
Total	**13**	**12**	**6**	**31**

Table 4. *Overview of the Palaeolithic stone industry.* — ***Tab. 4.*** *Přehled paleolitické kamenné industrie.*

included in the same group – these too might relate to the Palaeolithic, but might also be much later. The last artefact that is difficult to classify chronologically is a large mace, the sides of which bear traces of notching for the purposes of securing, and which on the blade is heavily worn. Similar artefacts are known from as early as the Middle Palaeolithic, but could also have been used in later prehistory for working stone (*fig. 35: 16*).

A total of 31 artefacts are definitely Palaeolithic (*table 4*). Six artefacts were ascribed to the Palaeolithic generally, including 1 blade, 4 flakes and a rounded micro-core. The latter can clearly be ascribed to the very end of the Palaeolithic. A total of 13 artefacts can securely be classified to the Middle Palaeolithic. The remaining 12 artefacts can also be ascribed to the Middle Palaeolithic with a certain degree of likelihood. Debitage seems to be represented by a total of 17 artefacts (7 clearly classifiable, 10 uncertain). There are 8 tools in all (six ascribable to the Middle Palaeolithic, 2 uncertain).

Among the securely classifiable artefacts are a total of four flakes (two blade-like, one common flake is aeolised). A further eight flakes can be ascribed conditionally to the Middle Palaeolithic – like a blade fragment, the metrics of which match this period, and an aeolised amorphous fragment. Three cores (two of which are blade cores) are clearly Middle Palaeolithic (*fig. 35: 6*).

Dominant among the tools are the scrapers, represented by three individuals (*fig. 35: 5, 10*). Scrapers are a typical tool of the Middle Palaeolithic. Other Middle Palaeolithic types are represented by a flake awl (*fig. 35: 13*). The remaining four tools are choppers (*fig. 35: 4, 7*).

The Middle Palaeolithic can further be classified into the Mousterian industry of the Later Middle Palaeolithic, which is reflected in the relatively small size of the industry. The closed analogy to the studied assemblage is that from the nearby cave of Shanidar, which has yielded a large number of Middle Palaeolithic human burials. It is not clear how the industry came to the tell, but it is certain that it is in a secondary position. It probably arrived during the transport or shifting of building materials (apparently for road mending purposes).

The stone industry assemblage obtained during research at the tell at Arbil is not large in number, but is approximately well datable, and documents both a phase in the building up of the tell, and a period substantially earlier. Indirectly, it is evidence for settlement nearby as early as during the Middle Palaeolithic.

6.3. Other finds (KN)

Besides pottery and stone tools, only sporadic artefacts of other materials were found on the slope of the tell and during the excavation, mostly of Late Islamic date. These include a ceramic button (*fig. 26: 1*), a small, brass (?) personal stamp with the inscription "*Mariam chān 38*" (Madame or Princess Mariam) (*fig. 26: 3*), several pieces of colourless, transparent glass, a fragment of a glassy bracelet with a rod profile and a carved bone fragment, all from sector A1.

7. Survey of the al-Mudhaffar Din Kokburi Minaret (KN, KP)

The minaret (locally named also "Shexi Choli") stands 900m west of the southern gate of the citadel. Its construction is ascribed to the atabeg al-Mudhaffar Din Kokburi (c1190 AD), and the structure is the only remaining relic of a large congregational mosque (*fig. 32, 33, 36*), the earliest phase of which might, however, according to the unpublished 1960 excavation of the General Directorate of Antiquities, be of late Umayyad or early Abbasid date.[11] The layout and decoration of the minaret was described several times from early 19th century onwards, most thoroughly by Ernst Herzfeld in 1916 (*Sarre – Herzfeld 1920*, 314–318). On the occasion of the complex recording and survey of the monument preceding its planned reconstruction (static, geophysical and restoration surveys, all arranged by

[11] Further information on these unpublished excavations is unavailable; this dating of the mosque is given in, e.g. *Ismail 1998*, 8.

No. catal.	No. of evid.	Localization	Description	Raw-material	Lenght	Datation	Fig.
1	a2_29	total collecting, sector A2	a.f.	?	5,4 cm	?	
2	a2_34	total collecting, sector A2	a.f.	jasper	1,9 cm	?	
3	a2_37	total collecting, sector A2	a.f.	jasper	2,3 cm	?	
4	a1_8	total collecting, sector A1	a.f.	quartzite	2,8 cm	?	
5	a2_15	total collecting, sector A2	a.f.	quartzite	2,2 cm	?	
6	a2_16	total collecting, sector A2	a.f.	quartzite	4,5 cm	?	
7	a2_36	total collecting, sector A2	a.f.	quartzite	2 cm	?	
8	a3_7	total collecting, sector A3	a.f.	quartzite	3,9 cm	?	
9	a3_8	total collecting, sector A3	a.f.	porphyr	4,3 cm	?	
10	a1_7	total collecting, sector A1	a.f.	silicite	3,2 cm	?	
11	a2_5	total collecting, sector A2	a.f.	silicite	2,4 cm	?	
12	a2_9	total collecting, sector A2	a.f.	silicite	3,4 cm	?	
13	a2_21	total collecting, sector A2	a.f.	silicite	2,2 cm	?	
14	a2_22	total collecting, sector A2	a.f.	silicite	1,7 cm	?	
15	a2_23	total collecting, sector A2	a.f.	silicite	3,5 cm	?	
16	a2_25	total collecting, sector A2	a.f.	silicite	4,2 cm	?	
17	a2_26	total collecting, sector A2	a.f.	silicite	2,3 cm	?	
18	a2_27	total collecting, sector A2	a.f.	silicite	2,2 cm	?	
19	a2_30	total collecting, sector A2	a.f.	silicite	1,6 cm	?	
20	a2_33	total collecting, sector A2	a.f.	silicite	1,6 cm	?	
21	a3_5	total collecting, sector A3	a.f.	silicite	3,8 cm	?	
22	3	random survey on northern slope	a.f.	silicite	3 cm	?	
23	1007_4a	section 1/06, context 1007	a.f.	silicite	1,5 cm	?	
24	1007_4b	section 1/06, context 1007	a.f.	silicite	3,6 cm	?	
25	1007_6	section 1/06, context 1007	a.f.	silicite	2,4 cm	?	
26	1007_8	section 1/06, context 1007	a.f.	silicite	3,3 cm	?	
27	1007_9	section 1/06, context 1007	a.f.	silicite	5 cm	?	
28	a2_4	total collecting, sector A2	a.f.	limestone	4,2 cm	?	
29	a2_6	total collecting, sector A2	a.f.	limestone	7,8 cm	?	
30	a2_10	total collecting, sector A2	a.f.	limestone	3,1 cm	?	
31	a2_12	total collecting, sector A2	a.f.	limestone	3,1 cm	?	
32	a2_38	total collecting, sector A2	a.f.	limestone	4,1 cm	?	
33	3001	intervention 3/06, context 3001	chopper	limestone	15,7 cm	?	35: 1
34	a1_10	total collecting, sector A1	chopper or core	limestone	30 cm	?	
35	1	random survey on northern slope	flake	limestone or marlite	8,6 cm	?, perhaps h.p.	
36	2	random survey on northern slope	flake	vulcanite	10 cm	?, perhaps h.p.	
37	a2_3	total collecting, sector A2	a.f., slightly aeolised	silicite	2,4 cm	MP?	
38	a2_32	total collecting, sector A2	chopper	quartzite	2,9 cm	MP?	
39	a1_5	total collecting, sector A1	chopper	silicite	3,5 cm	MP?	35: 4
40	a2_7	total collecting, sector A2	middle blade fragm., heavily corroded	silicite	2,1 cm	MP?	35: 8
41	a1_3	total collecting, sector A1	flake	quartzite	4 cm	MP?	35: 12
42	a2_31	total collecting, sector A2	flake	quartzite	1,9 cm	MP?	
43	1007_1	section 1/06, context 1007	flake	quartzite	6,4 cm	MP?	
44	a1_4	total collecting, sector A1	flake	silicite	3,9 cm	MP?	35: 3
45	a1_6	total collecting, sector A1	flake	silicite	3,7 cm	MP?	35: 2
46	a2_24	total collecting, sector A2	flake	silicite	3,2 cm	MP?	35: 11
47	1007_2	section 1/06, context 1007	flake	silicite	1,5 cm	MP?	
48	1007_3	section 1/06, context 1007	flake	silicite	2 cm	MP?	
49	a2_28	total collecting, sector A2	fragment of tumed vessel	alabaster ?	2,4 cm	h.p.	26: 2
50	a3_3	total collecting, sector A3	blade	silicite	2,8 cm	Palaeolithic	35: 9
51	1007_7	section 1/06, context 1007	rounded micro-core	silicite	2,1 cm	Palaeolithic	
52	a3_4	total collecting, sector A3	flake	quartzite	2,8 cm	Palaeolithic	35: 15
53	a3_6	total collecting, sector A3	flake	quartzite	2,6 cm	Palaeolithic	
54	a2_19	total collecting, sector A2	flake	silicite	1 cm	Palaeolithic	
55	a2_20	total collecting, sector A2	flake	silicite	2,3 cm	Palaeolithic	
56	a1_9	total collecting, sector A1	mace	quartz?	21,2 cm	P to Bronze Age	35: 16
57	a2_8	total collecting, sector A2	blade-like flake, ferrous wipes	silicite	3,9 cm	MP	
58	a2_18	total collecting, sector A2	blade-like flike	silicite	2,5 cm	MP	
59	a2_13	total collecting, sector A2	scraper	porphyr	3,6 cm	MP	35: 10
60	a3_2	total collecting, sector A3	aeolitised flake	silicite	3 cm	MP	35: 14
61	a1_1	total collecting, sector A1	core	silicite	5,9 cm	MP	35: 6
62	a3_1	total collecting, sector A3	bifacial chopper	limestone pebble?	7,8 cm	MP	35: 7
63	a2_11	total collecting, sector A2	chopper	pebble of silicite	2 cm	MP	
64	a2_17	total collecting, sector A2	flake	silicite	6,6 cm	MP	
65	a1_2	total collecting, sector A1	scraper on flake	quartzite	5,8 cm	MP	35: 5
66	1007_5	section 1/06, context 1007	scraper on flake	silicite	3,7 cm	MP	
67	a2_1	total collecting, sector A2	flake core	silicite	4,2 cm	MP	
68	a2_14	total collecting, sector A2	flake core	silicite	3,6 cm	MP	
69	a2_2	total collecting, sector A2	flake awl, slightly aeolised	silicite	4,4 cm	MP	35: 13

Table 5. *Catalogue of stone industry. MP – Middle Palaeolithic, h.p. – historical period, a.f. – amorphous fragment.* — ***Tab. 5.*** *Katalog kamenných nástrojů. MP – střední paleolit, h.p. – historické období, a.f. – amorfní fragment.*

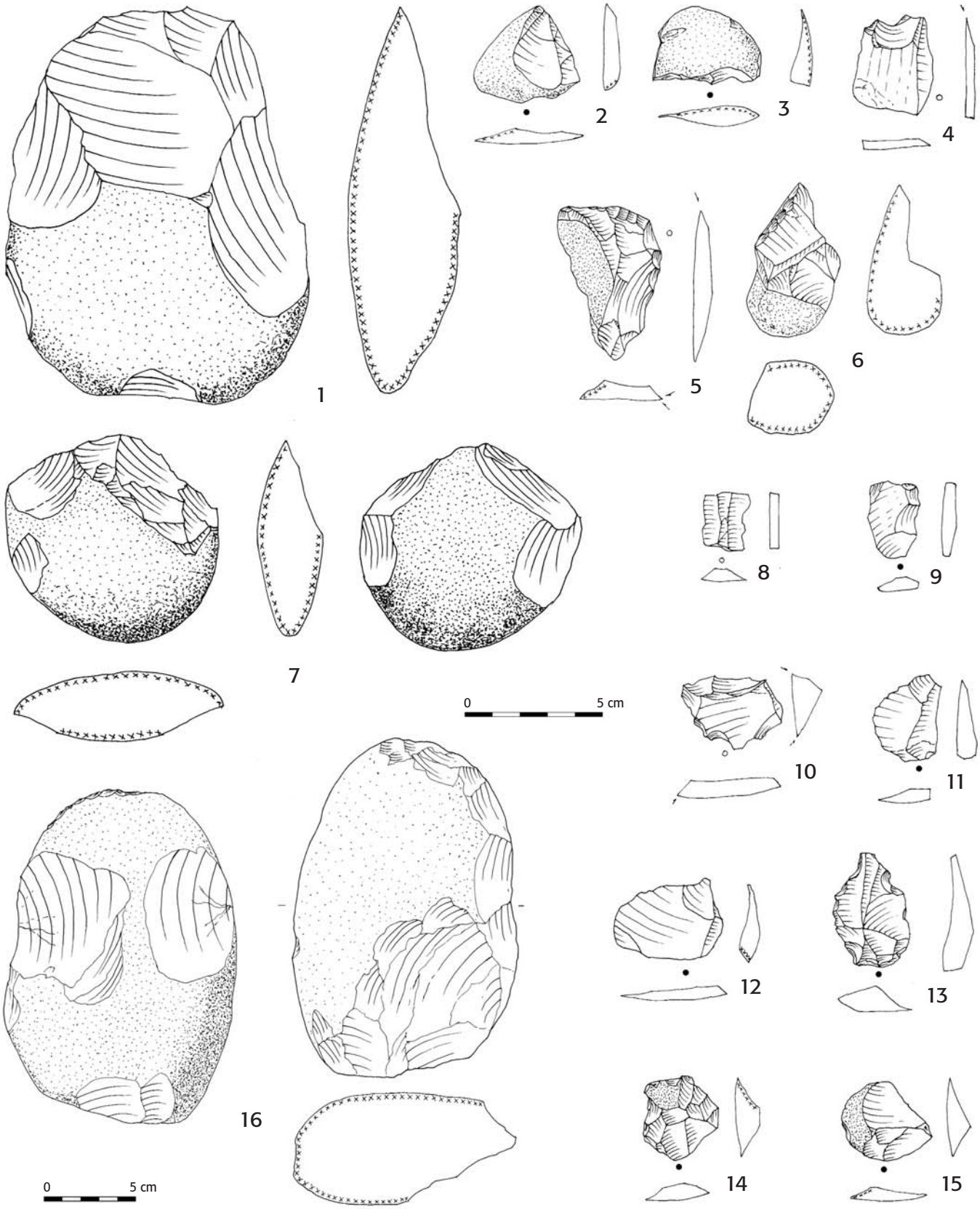


Fig. 35. *Chipped stone industry. Location and description see the table 5. Drawing by P. Šída, L. Janíček and K. Nováček.* — ***Obr. 35.*** *Štípaná industrie, lokalizace a popis viz tabulka 5. Kresba P. Šída, L. Janíček a K. Nováček.*

Ware No. (EM)	Ware No. (EC)	Number of sherds
101	1	2
105	107	51
104	109	2
102, 103	111	2
106	206	4
108	401	1
107	403	6
110	415	1
109	409	1
111	422	1
112	411?	1
0		5
Total		77

Table 6. *Concordance of the al-Mudhaffar minaret wares (EM) and Arbil citadel wares (EC) with quantities of ceramic finds.* — ***Tab. 6.*** *Srovnání počtů nálezů keramických tříd z minaretu al-Mudhaffar (EM) a arbilské citadely (EC).*

Czech specialists supervised by Gema Art Group Prague), we too undertook an elementary archaeological evaluation.

The lower seven-angle part of the minaret is 12 m high. The cylindical part of the minaret is about 24 m high and shelters a double spiral staircase. As stated by the owner, the thickness of the wall is ca. 36 cm. The minaret lost its upper part in a distant past and since then it has been open to weathering and to rainwater leakage in particular. Precious historic fragments of renderings and embossments have been identified on the lower part of the structure; particularly large-scale findings of stucco decoration were found in niches of the tower. All these fragments are seriously affected by weathering and mechanical damage. The upper part of the minaret diverts from the vertical axis to 65cm and there is a substantial threat of its collapsing.

Calibrated digital cameras, rerearch photogrammetric camera RolleiMetric 6006 and total station were used for the basic documentation of the minaret. A small provisional geodetic network consisting of 4 points was stabilised. First of all, network point adjustments have been made on site (all calculations have been carried out in Arbil for the control), the results were satisfactory for this purpose: about 7 mm in position. After all the necessary control points and object points were measured with accuracy of about 1–2 cm in position, altogether approximately 250 points were measured. Sets of 25 digital photogrammetric images have been taken using the Canon 20D digital camera with a resolution of 8 MegaPixels, calibrated by using Photomodeler software in the Laboratory of Photogrammetry at the CTU Prague.

The facades of the minaret were measured and processed by using intersection terrestrial photogrammetry in the Photomodeler software (residuals on control points were about 2 cm, indoor parts were measured with tape for construction in AutoCAD only). From these measurements the following outputs were created: a real 3D model for static modelling and calculations, true-photo rendered 3D model with animation, classical photo plans of lower part and unwrapping of upper minaret's cylinder (*fig. 33*). All construction, animation and editing of photogrammetrical measured items were processed in AutoCAD.

A dendrochronological sample was taken from the teak-wood lintel of a small window opening to north-east, situated just under the coping of a destroyed minaret. The sample has been recieved in M. and C. Wiener Laboratory for Aegean and Near Eastern Dendrochronology, Cornell University, Ithaca, New York (Prof. P. I. Kuniholm), unfortunately no information about the result is available as yet.

A small collection of pottery (77 fragments) was found on the previously reworked surface around the minaret. A plain, wheel-made and hard fired ware of Islamic date (EC107) with combed and incised decoration (*fig. 34: 1–10*) dominates the assemblage. Sherds with moulded decoration of Middle Islamic appearance (*fig. 34: 11–13*) are more diagnostic, along with several glazed fragments – especially black, inglaze painted red earthenware covered by a transparent, dark green glaze (*fig. 34: 18*), slip incised earthenware with a dark green glaze – "late sgraffiato" (*fig. 34: 19*) and stonepaste with black painting and green glaze (*fig. 34: 20*). Most of the finds can be well ascribed to the Middle Islamic Period (12th–14th centuries), documenting the early phase of the existence of the minaret.

8. Closing summary and prospects for further research (KN)

The archaeological expedition to Arbil in September and October 2006 was the first step in co-operation between archaeological, teaching and heritage management institutions in the Czech Republic and the Autonomous Kurdish Region of Iraq. The expedition revealed the first information of its kind regarding the settlement of one of the most significant centres of northern Mesopotamia, laid the methodological groundwork for further research and established contacts with the local scientific community and with students, as well as with members of the heritage conservation office. The basis for a geodetic plan and a digital model of the Arbil citadel was created, and the first phase of geophysical research was carried out. Using a combination of three methods – microgravimetry, shallow refraction seismicity, and direct current electrical resistivity profiling – evidence of non-homogeneities was found at several locations on the tell at depths of between 9 and 21 meters. This evidence should structurally correspond to the large destruction of stone blocks and the link with the ancient (Neo-Assyrian?) monumental architecture seems to be very probable.

An extensive collection of pottery and other artefacts was obtained by surface survey on the western slope of the citadel, reflecting the majority of the settlement stages from the time of Neolithic cultures to the Late Islamic period. Another important result of the season was the creation of a draft for a classification system of the local ceramics. Despite the limited information which can be obtained from unstratified finds, the analysis of pottery does provide the first insight into the chronological development, local ceramic traditions and some trans-regional contacts. The earliest reliably

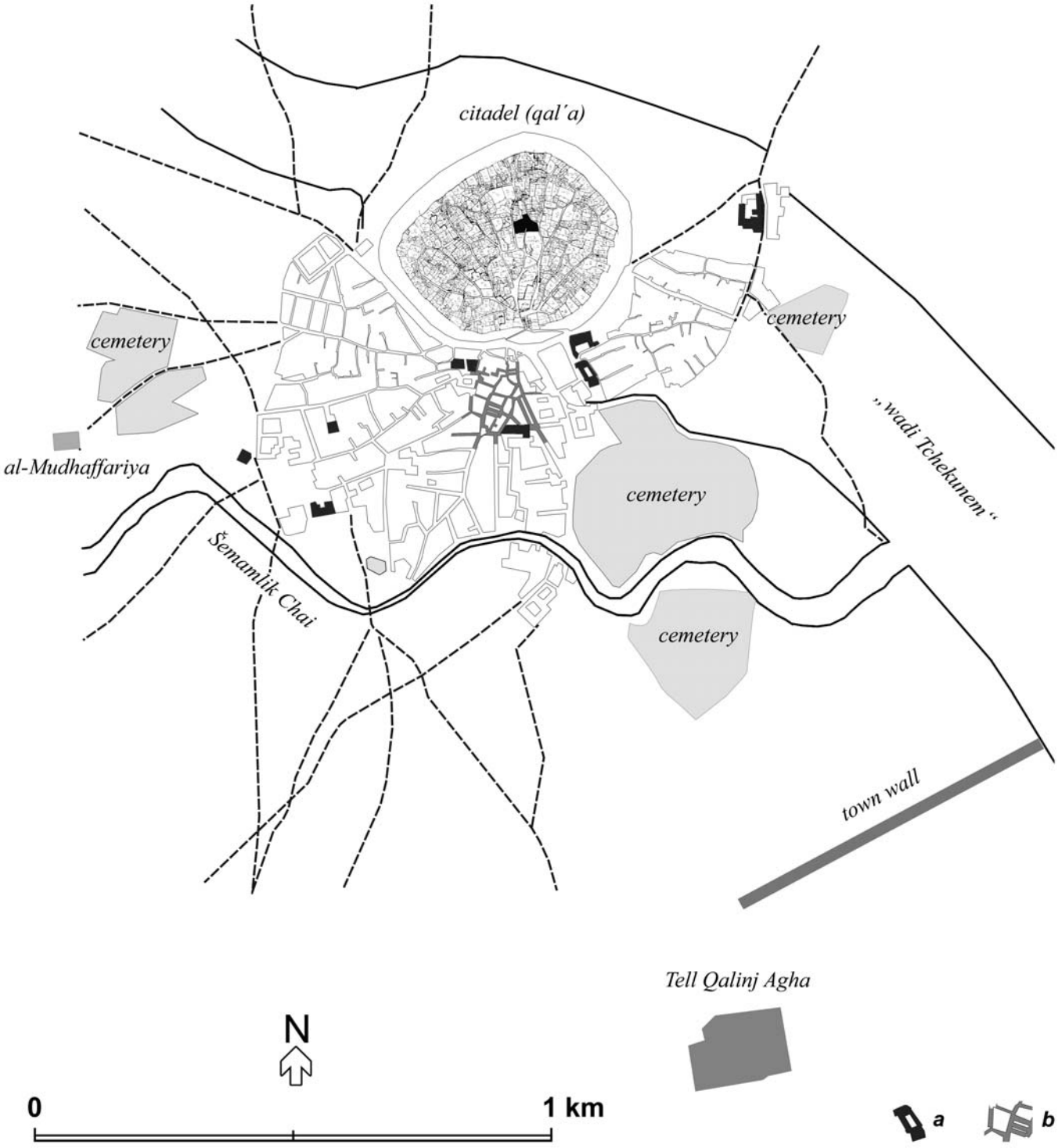


Fig. 36. *Reconstruction of Arbil topography before 1950. Location and size of the deserted congregational mosque of al-Mudhaffariya and relics of the (medieval?) town wall are conjectural, the latter deduced from the sketch map of E. Herzfeld (Sarre – Herzfeld 1920, Abb. 294); a – mosques and other religious buildings, b – current area of the covered bazar (arasta or bedesten). Drawing by K. Nováček. Map sources used: British map of Arbil from 1944, Naval Intelligence Division, Perry-Castañeda Library Map Collection, University of Texas, http://www.lib.utexas.edu/maps/historical/erbil_1944.jpg; Cadastral plan of the citadel and town from 1920s, scale 1 : 1000, photo-copy from the archive of the General Directorate of Antiquities at Arbil; QuickBird satellite image (date of image acquisition: 2005, Aug. 23rd).* — ***Obr. 36.*** *Rekonstrukce topografické situace města Arbílu před rokem 1950. Poloha a velikost zaniklé kongregační mešity al-Muzaffaríja a relikty městských hradeb jsou hypotetické; hradební linie odvozena z mapového náčrtu E. Herzfelda (Sarre – Herzfeld 1920, Abb. 294); a – mešity a ostatní náboženské stavby, b – současný rozsah krytých bazarových ulic (arasta neboli bedesten). Kresba K. Nováček, prameny: britská mapa Arbílu z roku 1944, Naval Intelligence Division, Perry-Castañeda Library Map Collection, University of Texas, http://www.lib.utexas.edu/maps/historical/erbil_1944.jpg; katastrální plán citadely a města ze 20. let 20. století v měřítku 1 : 1000, kopie z archivu Nejvyššího ředitelství památek v Arbílu; snímek ze satelitu QuickBird, pořízený 23. 8. 2005.*

datable ceramics come from the Late Chalcolitic period (ca. 4200–3200 BC), while numerous finds come in particular from the Neo-Assyrian horizon, from which there is also occasional evidence for fine pottery. Only sporadically was it possible to identify ceramics from the end of the 3rd millennium BC, and finds from the Middle Assyrian, Hellenistic and Sassanid periods. Islamic wares support the idea of importance and intensity of the settlement of the *qal'a* during the Middle Islamic Period (12th–13th century AD), but finds of the "Sāmarrā-horizon" of the 9th century AD also revealed indicators of contacts between Arbil and southern Iraq in the Early Abbasid period. The classification of the glazed earthenware provided interesting indices of the Middle Islamic regional production.

The small collection of stone industry is extremely important, the oldest part of this being of Middle Palaeolithic origin (ca. 110 000–40 000 BP); for the time being, this is the earliest evidence for human presence in the region.

Complementary information was yielded by three small archaeological trenches: two originating in the cleaning of earlier excavations at the foot of the citadel slopes, and one opened in the middle of the area, on the site of a recently lost house, showing the structural transformations of the building during the 20th century and the rapid rise in the terrain of the public areas during the very recent decades.

This first campaign of the archaeological project at the citadel also brought the need to deal with the question of the wider settlement context of this unique monument. The data for the reconstruction of the settlement structure and dynamics in the background of the *qal'a* in all historical periods have hitherto been quite insufficient. Nevertheless, from the comparison with other similar Assyrian centres, it may be deduced that a lower town or suburb with dwellings and production areas had to exist, as well as large gardens and outer city fortifications. Perhaps even the secondary citadel, a common structural part of the Assyrian residential town foundations, cannot be excluded at Arbil.[12] In the Middle Islamic period (12th–14th centuries AD) there was a lower town with a complex settlement structure, adjacent to a well-fortified upper town, as documented by written sources. We have proposed the hypothesis of the existence of an early Islamic Arabic town foundation (*misr*) in the surroundings of the large congregational al-Mudhaffariyya mosque (900m west of the southern gate of citadel, fig. 36), the earliest phase of which might be late Umayyad or early Abbasid according to the unpublished excavations of the General Directorate of Antiquities in 1960.[13] In assessing the possible reasons for the foundation of the *misr*, it is necessary to take into account the heyday of the highly influential Christian establishment of Arbil during the 6th and 7th centuries, which could reinforce the bias for insulating newly converted Arabs and creating an exclusively Muslim community. The most serious obstacle for the further verification of this hypothesis is the current, explosive development of the town, destroying all the potential archaeological situations without any record.

The next phase of archaeological research at Arbil should aim to deepen knowledge of the later phases of the citadel's development, and to continue research into the ancient settlement horizons using non-destructive methods, in particular with the aide of systematic geophysical prospection. In terms of approach to excavation, it is necessary to prefer smaller, preventative investigations and trenching, required by the advancing reconstruction of buildings and engineering networks. This less invasive approach enables a rapid evaluation of information, and is less demanding in terms of time, organisation and financing than large-scale, wide-area excavations. The primary task in the immediate future must be the creation of an information system for the citadel, and this is currently being done in the Czech Republic at the Czech Technical University in Prague, in the form of an interactive digital database integrating the archaeological, historical, architectural and technical information available regarding the buildings in the area. Among other priorities is the survey and documentation of the remains of the historical structures in the citadel, for which conditions are presently ideal with house interiors accessible. Finally, as noted above, we regard it as essential to research other presumed ancient and medieval parts of the Arbil agglomeration in the hinterland of the tell, as these remnants are rapidly vanishing to expanding urbanisation.

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Souhrn

Archeologický výzkum tellu a citadely v Arbílu, hlavním městě Kurdského autonomního regionu v severním Iráku, je společným projektem českých institucí (Národní památkový ústav v Praze, Západočeská univerzita v Plzni, ČVUT Praha, INSET s.r.o., FAMU Praha) a iráckých pracovišť (Salahaddínova univerzita a Nejvyšší ředitelství památek v Arbílu). Jeho iniciátorem a hlavním organizátorem je společnost Gema Art Group, a.s. Praha, která působí od roku 2004 v Iráku při obnově památek a kulturního dědictví. Od roku 2006 jsou archeologické a konzervační projekty v Arbílu podporovány Vládou ČR, na financování první sezóny archeologického výzkumu se spolupodílela také Západočeská univerzita v Plzni. Dosavadním vyvrcholením české aktivity v Arbílu byla obnova historického domu Fatah Čalabi, který má sloužit jako české archeologické dokumentační centrum citadely.

Citadela v Arbílu je situována na 25–32 m vysokém tellu, který skrývá pozůstatky minimálně sedm tisíciletí dlouhého kontinuálního osídlení. Celek patří k nejvýznamnějším památkám severní Mezopotámie a současně tvoří přirozené urbanistické centrum explozivně se rozvíjející regionální metropole. Nejstarší písemné

[12] From the known tell sites is Qalinj Agha the nearest to the citadel tell, located 1.5 km to south (*fig. 36*). Its settlement now appears to be limited to Gawra period (Late Chalcolithic 1 and 2, ca. 4200–3800 BC) on the basis of preliminary results of the Iraqi smallish sondages in 1966–1971 (*Gut 1995*, 241–242). For comprehensive structural comparison of the Mesopotamian and especially Assyrian towns see *Novák 1999* and *2004*. The citadel of Halab with the newly unearthed temple of the weather god also seems to be very close analogy to Arbil in many ways (*Gonella – Khayyata – Kohlmeyer 2005*, 87–111).

[13] cf. *note 11*, further details and considerations in *Nováček 2007*.

zprávy o Arbílu (Urbilum, Arba ilu) pocházejí z doby krále Šulgiho (cca 2095–2048 před Kr.). Největšího významu město dosáhlo za vlády posledních asyrských králů v 8.–7. stol. př. Kr., hlavně v souvislosti s rostoucí oblibou kultu bohyně Ištary Arbelské, jejíž chrám spolu s významnou věštírnou, astronomickou observatoří a královským palácem s určitostí zanechal své pozůstatky v tělese tellu. Funkci centra provincie Arbíl plnil i po zániku Asýrie, v parthském a sásánovském období. V této etapě se stal také jedním z klíčových ohnisek křesťanství v povodí Tigridu. Po dobytí města muslimy roku 642 význam Arbílu zřejmě poklesl; oživení spojené s přestavbou pevnosti a stavebním rozvojem dolního města nastalo ve 12.–13. století.

Zatímco významem srovnatelným urbánním celkům v Aššuru či Ninive byla věnována soustavná badatelská pozornost již od poloviny 19. století, arbílský tell zůstával kvůli živé zástavbě na jeho temeni stranou archeologického zájmu. Disponujeme pouze zprávami o některých náhodných nálezech učiněných při stavebních pracích ve 2. polovině 20. století. Příprava rekonstrukce těžce poničeného památkového celku přinesla také potřebu jeho archeologické evaluace, která by posloužila jako východisko k navržení vhodné strategie archeologického výzkumu a jako základ pro vybudování archeologického informačního systému. Tato evaluace byla hlavním cílem první sezóny výzkumu, která proběhla v září a říjnu 2006. Expedice však současně plnila i pedagogický program, v jehož rámci byl zorganizován přednáškový a terénní kurz archeologie pro studenty a pracovníky památkové péče. Snaze o efektivní získání základních dokumentačních podkladů a rámcových dat o vývoji a chronologii tellu i citadely byla podřízena metodika terénního výzkumu: hlavní důraz byl kladen na pořízení nového zaměření areálu a na archeologický průzkum nedestruktivními metodami (geofyzikální průzkum, povrchové sběry). Sondáž měla v této fázi jen doplňkový poznávací význam a význam didaktický.

Geodetické zaměření citadely vzniklo na základě satelitních snímků systému QuickBird, jejichž polohopisný obsah byl vektorizován a konfrontován jednak s geodeticky zaměřeným bodovým polem v areálu citadely, jednak s fotogrammetricky transformovanými sériemi šikmých snímků, pořízených ze země a z nízko letící helikoptéry. Výsledkem je jednak vůbec první plán citadely s uspokojivou přesností, jednak digitální 3D model, tvořící základ postupně vznikající archeologicko-architektonické databáze citadely.

Geofyzikální průzkum přinesl i ve velmi složitém prostředí přelidněné citadely s množstvím rušivých vlivů některé zcela zásadní informace o struktuře a stratigrafii tellu. Kombinací tří metod – mikrogravimetrie, mělké refrakční seismiky a elektroodporového profilování – byly na několika místech v severní polovině areálu indikovány velké nehomogenity v hloubkách 9–21 m, které by měly strukturou odpovídat až 5 m mocným polohám destruovaných velkých kamenných bloků. Tyto destrukční vrstvy jsou zřejmě pozůstatkem zaniklé monumentální architektury, s velkou pravděpodobností z novoasyrského období.

Povrchovým sběrem na západním svahu citadely byl získán soubor bezmála 7 000 keramických zlomků, kamenná industrie a další nálezy. Analýza keramického souboru poskytla první poznatky o technologické a chronologické variabilitě lokálního hrnčířského zboží a umožnila také některé předběžné úvahy o meziregionálních kontaktech. Odhlédneme-li od hypotetické identifikace nejstarší neolitické keramiky kultury Hassuna, pak nejstarší spolehlivě prokázaná keramika pochází z mladších fází ubajdské kultury a zejména z pozdně chalkolitického období (ca. 4500–3200 BC). Početnými nálezy je zastoupeno také novoasyrské období, z něhož pochází i doklady jemné keramiky. Sporadicky se podařilo doložit keramiku ze sklonku 3. tisíciletí před Kr., dále nálezy ze středně asyrského období, helénistické a sásánovské. Islámské keramické nálezy potvrzují svým množstvím, kvalitou i variabilitou představu o dočasném vzrůstu významu a intenzity osídlení arbílské pevnosti ve 12.–13. století. Byly však získány i přesvědčivé doklady výskytu luxusní keramiky tzv. sámarrského horizontu (9. století), jejímž hlavním (možná jediným) výrobním centrem byla raně abbásovská Basra. V nevelkém souboru kamenné industrie (69 ks) má výrazné zastoupení surovinově pestrá industrie středopaleolitická (cca 110 000–40 000 před n. l.). Je zřejmé, že okruh do vzdálenosti cca 50 km kolem Arbílu, odkud byla industrie spolu se stavebním materiálem na tell transportována, má značný potenciál pro budoucí výzkum paleolitického osídlení.

Exkavační program expedice se omezil na tři drobné archeologické sondy. Dvě vznikly začištěním starších výkopů do akumulačních souvrství na úpatí svahu citadely (řez 1/06 a 2/06), jedna (sonda 3/06) byla otevřena uvnitř areálu na ploše recentně zaniklého domu a ukázala jeho stavební proměnu v průběhu 20. století, dobře korespondující s etnickými a kulturními změnami v osídlení citadely, a potvrdila rychlý nárůst terénu veřejného prostranství během posledních desetiletí 20. století.

První seznámení se sídelně historickým kontextem arbílského tellu a srovnání s lépe prozkoumanými mezopotámskými centry jasně ukazuje, že tell musel být jádrem rozsáhlejšího městského útvaru, jehož hranice a struktura se pochopitelně měnila v závislosti na změnách významu a funkce centra, demografických trendech, politických událostech a dalších faktorech. Možnosti archeologického ověření suburbiálního osídlení jsou bohužel zásadně omezeny hustou městskou zástavbou, nehledě na radikální ničení dosud intaktních ploch investiční činností v poslední době. Určitá vodítka o podobě městského útvaru nabízejí až písemné prameny islámského období, z nichž vyplývá, že znamenitě opevněné administrativní městské jádro na tellu tvořilo součást přilehlého, samostatně opevněného města v rovině. V úvahách o historických kořenech této urbanistické struktury hraje zřejmě důležitou úlohu nedostatečně poznaný komplex tzv. al-Muzaffarovy kongregační mešity, vzdálený cca 900 m západně od jižní brány citadely, z níž se nadzemně dochovalo jen torzo minaretu datovaného do doby kolem roku 1190. S tímto datováním není v rozporu nevelký keramický soubor, získaný sběrem v okolí minaretu v roce 2006. Vznik mešity však lze údajně datovat (podle nepublikovaného výzkumu z 60. let 20. století) už do pozdně umájjovského až raně abbásovského období, což poskytuje možnost hypoteticky uvažovat o existenci městské lokace z doby muslimské expanze v 7. století (*misr*), připojené k okraji staršího, sásánovského centra, s nímž byla posléze integrována do jednoho urbanistického celku.

Další fáze archeologického výzkumu tellu by se měla zaměřit na mapování starověkých sídelních horizontů pomocí nedestruktivních metod, zejména systematické geofyzikální prospekce. Z exkavačních postupů je nutno preferovat spíše menší preventivní výzkumy a sondáže, vyvolané postupující rekonstrukcí staveb a inženýrských sítí, které budou přinášet poznatky především o mladších etapách vývoje citadely. V nejbližším časovém horizontu bude dobudován archeologický informační systém pro citadelu, mezi výzkumné priority rovněž patří průzkum a dokumentace pozůstatků historické zástavby citadely, která je vážně ohrožena rychle postupující destrukcí.

References

Abid, S. A. 2004:
Methods of ancient monument protection and its future applications in Erbil citadel. In: 1st Scientific Conference for Renovation and Reconstruction of Arbil Citadel, Erbil, 10–13.

Banks, E. J. 1898:
Eight Oracular Responses to Esarhaddon, The American Journal of Semitic Languages and Literatures 14, 267–277.

Baram, U. 2000:
Entangled Objects from the Palestinian Past: Archaeological Perspectives for the Ottoman Period, 1500–1900. In: Baram, U. – Caroll, L. (Eds.): A Historical Archaeology of the Ottoman Empire: Breaking New Ground. Illinois, 137–159.

Bartl, K. 1994: Bartl 1995
Frühislamische Besiedlung im Balīh-Tal/Nordsyrien. Berlin.

Barton, G. A. 1893:
The Semitic Ištar Kult I, Hebraica 9, 131–165.

Ben-Tor, A. – Avissar, M. – Portugali, Y. 1996:

Yoqne'am I. The Late Periods. Qedem Reports 3. Jerusalem.

Delougaz, P. 1952:
Pottery from the Diyala Region. Chicago.

Dorna-Metzger, F. 1996:
Hellenistic and Parthian-Roman pottery from the upper Khabur survey: A preliminary study. In: Bartl, K. – Hauser, S. R. (Eds): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period, Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 363–375.

Falkner, R. 1987:
Surface pottery. In: The 1986 Survey Season at Sāmarrā, Iraq 49, 160–173.

Falkner, R. 1990:
Excavations, in: Survey and Excavations at Sāmarrā' 1989, Iraq 52, 134–147.

Fedorov-Davydov, G. A. – Bulatov, H. M. 1989:
Keramičeskaja mastĕrskaja Selitrennogo gorodišča. In: Smirnov, K. A. (Ed.): Sokrovišča sarmatskich voždĕj i drevnije goroda Povoľžja. Moskva, 133–248.

Fiey, J. M. 1965:
Assyrie chrétienne. Contribution à l´étude de l´histoire et de la géographie ecclésiastiques et monastiques du nord de l´Iraq, vol. 1. Beyrouth.

Gerber, Ch. 1996:
Die Umgebung des Lidar Höyük von hellenistischer bis frühislamischer Zeit. Interpretation der Ergebnisse einer Geländebegehung. In: Bartl, K. – Hauser, S. R. (Eds.): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period. Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 303–332.

Gibson, McG. – Armstrong, J. A. – McMahon, A. 1898:
The city walls of Nippur and an Islamic site betone: Oriental Institute excavations, 17th season, 1987, Iraq 60, 1–44.

Godbey, A. H. 1917:
The Rab-Šiṭirtê, The American Journal of Semitic Languages and Literatures 34, 13–20.

Gonella, J. 1999:
Reliefkeramik. In: Miglus, P. A.: Die frühislamische Keramik von Tall Aswad. Mainz a. R., 55–75.

Gonella, J. – Khayyata, W. – Kohlmeyer, K. 2005:
Die Zitadelle von Aleppo und der Tempel des Wettergottes, Neue Forschungen und Entdeckungen. Münster.

Grabar, O. et al. 1978:
Grabar, O. – Holod, R. – Knustad, J. – Trousdale, W.:
City in the Desert. Qasr al-Hayr East. Cambridge, Mass.

Guérin, A. 1996:
L´occupation abbasside de Nasibin, Typologie et chronologie préliminaires de la céramique prospectée en surface. In: Bartl, K. – Hauser, S. R. (Eds.): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period. Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 377–400.

Gut, R. V. 1995:
Das prähistorische Ninive. Zur relativen Chronologie der frühen Perioden Nordmesopotamiens. Baghdader Forschungen 19. Mainz.

Hallett, J. 1999:
Trade and Innovation: The Rise of a Pottery Industry in Abbasid Basra, PhD thesis. Oxford.

Hannestadt, L. 1983: v Islamic Period nad 6.1.3.4 Hannestad The Hellenistic Pottery from Failaka. Jutland Archaeological Society Publications 16.2. Aarhus.

Hauser, S. R. 1996:
The Production of Pottery in Arsacid Ashur. In: Bartl, K. – Hauser, S. R. (Eds.): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period. Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 55–86.

Hayerová, A. 2002:
The Eastern Sigillata „A" Pottery. In: Bouzek, J. (Ed.): Czech Excavations in Beirut, Martyrs´ Square (Bey 069, Sondage A). Part I: General Survey. Pottery and Other Small Finds of Hellenistic, Early Roman and Medieval Periods. Glass and Metal Objects, Eirene XXXVIII, 44–52.

Hayes, J. W. 1985:
Sigillate Orientali. In: Enciclopedia dell'Arte Antica, Classica ed Orientale, Atlante delle forme ceramiche II. Roma, 1–96.

Hayes, J. W. 1992:
Excavations at Saraçhane in Istanbul, Vol. 2: The Pottery. Princeton – Washington.

Hayes, J. W. 1997:
Handbook of Mediterranean Roman Pottery. London.

Heidemann, S. 1996:
Al-'Aqr, das islamische Assur, Ein Beitrag zur historischen Topographie in Nordmesopotamien. In: Bartl, K. – Hauser, S. R. (Eds): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period, Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 259–285.

Holland, T. A. 2006:
Archeology of the Bronze Age, Hellenistic and Roman Remains at an Ancient Town on the Euphrates River. Oriental Institute Publications Vol. 125. Chicago.

Horton, M. 1996:
Shanga. The archaeology of a Muslim trading community on the coast of East Africa. London.

Ismail, Z. B. 1998:
Erbil. Erbil.

Jabri, M. A. 2004:
Erbil Citadel – Historical and Aesthetic Importace. In: 1st Scientific Conference for Renovation and Reconstruction of Arbil Citadel. Erbil, 22–24.

Joffe, A. H. 2000:
Egypt and Syro-Mesopotamia in the 4th Millenium: Implications of the New Chronology, Current Anthropology 41, 113–123.

Kareem, J. M. H. 2000:
The Settlement Patterns in the Jordan Valley in the Mid- to Late Islamic Period. BAR Int. Ser. 877. Oxford.

Kennet, D. 2004:
Sasanic and Islamic Pottery from Ras al-Khaimah. Classification, chronology and analysis of trade in the Western Indian Ocean. BAR Int. Ser. 1248. Oxford.

Killick, R. 1988:
Pottery from the Neo-Assyrian to Early Sasanian Periods. In: Excavations at 'Āna, Qal'a Island. Warminster, 54–75.

Kenyon, K. M. 1957:
Pottery: Hellenistic and Later. In: Crowfoot, J. W. – Crowfoot, G. M – Kenyon, K. M.: The objects from Samaria, Samaria-Sebaste 3, Palestine Exploration Fund. London, 217–357.

Kleiss, W. 1997:
Bauten und Siedlungsplätze in der Umgebung von Soltaniyeh, Archäologische Mitteilungen aus Iran und Turan 29, 341–391.

Lane, A. 1937:
Medieval Finds at Al Mina in North Syria, Archaeologia 87, 19–78.

Larsen, C. 1983:
Life and Land use on the Bahrain Islands. The Geoarchaeology of an Ancient Society. Chicago.

Mason, R. forthcoming:
Shine Like Sun: Lustre-painted and Associated Pottery from the Medieval Middle East (manuscript kindly provided by author).

Miglus, P. A. et al. 1999:
Die frühislamische Keramik von Tall Aswad. Mainz a. R.

Nevling Porter, B. 2004:
Ishtar of Nineveh and her collaborator, Ishtar of Arbela, in the reign of Assurbanipal, Iraq 66, 41–44.

Nováček, K. 2007:
Arbíl – konstanty a proměnné ve vývoji mezopotámského městského centra. In: Pecha, L. (Ed.): Orientalia Antiqua Nova 7. Sborník z konference v Plzni 2007, 135–145.

Nováček, K. forthcoming:
Architektura citadely v Arbílu (Předběžná zpráva o druhé sezóně výzkumu citadely v roce 2007) — The architecture of Arbil citadel (A preliminary report on the 2nd season of the citadel survey in 2007). In: Pecha, L. (Ed.): Orientalia Antiqua Nova, Sborník z konference v Plzni 2008, v tisku.

Nováček, K. et al. 2007:
Nováček, K. – Chabr, T. – Filipský, D. – Janíček, L. – Pavelka, K. – Šída, P. – Trefný, M. – Vařeka, P.:
Research of the Citadel at Arbil, Kurdish Autonomous Region, Iraq – First Season (Joint Archaeological Training Program, Arbil 2006). Manuscript of the final report. Plzeň.

Novák, M. 1999:
Herrschaftsform und Stadtbaukunst – Programmatik im mesopotamischen Residenzstadtbau von Agade bis Surra man ra'a. Schriften zur Vorderasiatischen Archäologie 7. Saarbrücken.

Novák, M. 2004:
From Ashur to Nineveh: The Assyrian town-planning programme, Iraq 66, 177–185.

Oates, D. – Oates, J. 1958:
Nimrud 1957: The Hellenistic settlement, Iraq 20, 114–157.

Parker, B. J. 2003:
Archaeological Manifestation of Empire: Assyria´s Imprint in Southeastern Anatolia, American Journal of Archaeology 107, No. 4, 525–558.

Postgate, C. – Oates, D. – Oates, J. 1997:
The Excavation at Tell al Rimah: The Pottery. Warminster.

Reade, J. E. 2002:
The Ziggurat and Temples of Nimrud, Iraq 64, 135–216.

Redford, S. 1998:
The Archaeology of the Frontier in the Medieval Near East: Excavations at Gritille, Turkey. Philadelphia.

Rich, C. J. 1836:
Narrative of a Residence in Koordistan and on the Site of Ancient Nineveh; with Journal of a Voyage Down the Tigris to Bagdad and an Account of a Visit to Shirauz and Persepolis II. London.

Roaf, M. 1984:
Excavations at Tell Mohammed Arab in the Eski Mosul Dam Salvage Project, Iraq 46, 141–156.

Römer, Ch. 1996:
A First Glimpse at Glazed Pottery from Tell Šēh Hamad. In: Bartl, K. – Hauser, S. R. (Eds): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period, Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 13–21.

Rothman, M. S. – Kozbe, G. 1997:
Muṣ in the Early Bronze Age, Anatolian Studies 47, 105–126.

Sachau, E. 1915:
Die Chronik von Arbela. Ein Beitrag zur Kenntnis der ältesten Christentums im Orient. Berlin.

Sarre, F. – Herzfeld, E. 1920:
Archäologische Reise im Euphrat- und Tigris-Gebiet II. Berlin.

Scanlon, G. 1984:
Mamluk Pottery: More Evidence from Fustat, Muqarnas 2, 115–126.

Simpson, J. 1996:
From Tekrit to the Jaghjagh: Sasanian Sites, Settlement Patterns and Material Culture in Northern Mesopotamia. In: Bartl, K. – Hauser, S. R. (Eds.): Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period, Berliner Beiträge zum Vorderen Orient Bd. 17. Berlin, 87–126.

Sourdel, D. 1990:
Irbil. In: van Donzel, E. – Lewis, B. – Pellat, Ch. (Eds.): Encyclopaedia of Islam, New Edition, Vol. IV. Leiden, 76–77.

Tampoe, M. 1989:
Maritime Trade between China and the West. An Archaeological Study of the Ceramics from Siraf (Persian Gulf), 8th to 15th centuries AD. BAR Int. Ser. 555. Oxford.

Tonghini, C. 1998:
Qal'at Ja'bar Pottery. A Study of a Syrian Fortified Site of the Late 11th–14th Centuries. Oxford.

Unger, E. 1928:
Arbaïlu. In: Reallexikon der Assyriologie und vorderasiatischen Archäologie Bd. 1/3. Berlin, 141–142.

Valz, E. 1984:
Pottery from Seleucia on the Tigris. In: Boucharlat, R. – Salles, J. F. (Eds.): Arabie Orientale, Mésopotamie et Iran méridional de l´Âge du Fer au début de la période Islamique, C.N.R.S. 37. Paris, 41–48.

Villard, P. 2001:
Arbèles. In: Joannès, F. – Michel, C. (Eds.): Dictionnaire de la civilisation mésopotamienne. Paris, 68–69.

Waagé, F. O. 1948:
Antioch-on-the-Orontes IV. Ceramics and Islamic Coins. Princeton.

Ward, Ch. 2000:
The Sadana Island Shipwreck: A Mideighteenth-Century Treasure Trove. In: Baram, U. – Caroll, L. (Eds.): A Historical Archaeology of the Ottoman Empire: Breaking New Ground. Illinois, 185–202.

Watson, O. 1999:
Report on the Glazed Ceramics. In: Miglus, P. A.: Die frühislamische Keramik von Tall Aswad. Mainz a. R., 81–87.

Watson, O. 2004:
Ceramics from Islamic Lands. London.

Wheatley, P. 2001:
The Places Where the Men Pray Together: Cities in Islamic Lands, Seventh through the Tenth Centuries Chicago.

Whitcomb, D. 1978:
The archaeology of al-Hasa' oasis in the Islamic period, Atlal 2, 95–113.

Whitcomb, D. 2004:
Khirbet Dhiman (SS 11) and Khirbet al-Hamrah (SS 7) (Sweyhat Survey Period XIV). In: Wilkinson, T. J. et al.: On the Margin of the Eufrates, Settlement and Land Use at Tell es-Sweyhat and in the Upper Lake Assad Area, Syria. Chicago, 98–132.

Wilkinson, T. J. 2004:
On the Margin of the Eufrates. Settlement and Land Use at Tell es-Sweyhat and in the Upper Lake Assad Area, Syria. Oriental Institute Publications Vol.124. Chicago.

Wilkinson, T. J. – Tucker, D. J. 1995:
Settlement Development in the North Jazira, Iraq. A Study of the Archaeological Landscape. Iraq Archaeological Reports 3. Baghdad – Warminster.

Woods, J. E. 1977:
A Note on the Mongol Capture of Isfahan, Journal of Near Eastern Studies 36, 49–51.

Yener, K. A. (Ed.) 2005:
The Amuq Valley Regional Projects, Vol. 1: Surveys in the Plain of Antioch and Orontes Delta, Turkey, 1995–2002. Oriental Institute Publications No. 131. Chicago.

Mgr. Tomáš Chabr, INSET s. r. o., Novákových 6, CZ 180 00 Praha 8, chabr.tomas@inset.com

Mgr. David Filipský, INSET s. r. o., Novákových 6, CZ 180 00 Praha 8, filipsky.david@inset.com

Mgr. Libor Janíček, Katedra archeologie, Filozofická fakulta, Západočeská univerzita v Plzni, Sedláčkova 15, CZ 306 14 Plzeň, janicek@kar.zcu.cz

Mgr. Karel Nováček, PhD, Katedra archeologie, Filozofická fakulta, Západočeská univerzita v Plzni, Sedláčkova 15, CZ 306 14 Plzeň, knovacek@kar.zcu.cz

Doc. Dr. Ing. Karel Pavelka, Katedra mapování a kartografie, laboratoř fotogrammetrie, Fakulta stavební ČVUT, Thákurova 7, CZ 166 29 Praha 6, pavelka@fsv.cvut.cz

Mgr. Petr Šída, PhD, Katedra archeologie, oddělení výzkumných projektů, Filozofická fakulta, Západočeská univerzita v Plzni, Sedláčkova 15, CZ 306 14 Plzeň, petrsida@yahoo.co.uk

Mgr. Martin Trefný, PhD., Katedra archeologie, oddělení výzkumných projektů, Filozofická fakulta, Západočeská univerzita v Plzni, Sedláčkova 15, CZ 306 14 Plzeň, TrefnyMartin@seznam.cz

Doc. PhDr. Pavel Vařeka, PhD., Katedra archeologie, Filozofická fakulta, Západočeská univerzita v Plzni, Sedláčkova 15, CZ 306 14 Plzeň, vareka@kar.zcu.cz