

Anna Endrődi—Ferenc Gyulai

SOROKSÁR – VÁRHEGY

A FORTIFIED BRONZE AGE SETTLEMENT IN THE OUTSKIRTS OF
BUDAPESTPLANT CULTIVATION OF MIDDLE BRONZE AGE FORTIFIED
SETTLEMENTS

The construction of a section of the motorway M0 (around Budapest) across Péteri major (Péteri farm) in the XXth district of Budapest was preceded in 1987 by rescue excavations (Fig. 1.). Along the track of the way beehive-shaped refuse pits and hearths of Vatia culture came to light sporadically and mostly disturbed by Medieval features and by the houses, ovens and ditches of Early Medieval (11–13th century) village Kerekegyháza.¹ (MELIS 1992, 71–175.) When in 1975 an air-photo of the region was made we took note of an area at about a 100 m s distance from the 27 km section of the motorway. It is bordered by the Gyáli brook from the north, by the M0 motorway from the east and by a transmission line from the west. The site is situated on an oval ridge of a hill, slightly emerged above its surroundings in

a once damp, swampy area at a 3 km s distance from the Soroksár Danube branch (Fig. 5).

As for the *geomorphological conditions* of the area, it is on late Pleistocene (II/a–II/b) gravel terrace. II/a terrace was formed at the end of the Wurm when several beds of one-time Danube had been cut off and filled up. Some of them, however, had not become dried even after the formation of the Soroksár Danube bend in the post-glacial period but remained a flood-plain during certain periods of the Holocene as well-though it was inundated usually only by the highest floods.

The surface of lower alluvial flats which can be regarded as representing II/a terrace was raised by a usually 1–1,5 m thick sequence of extremely fine-grained sediments, that is by calcareous mud of high floods.

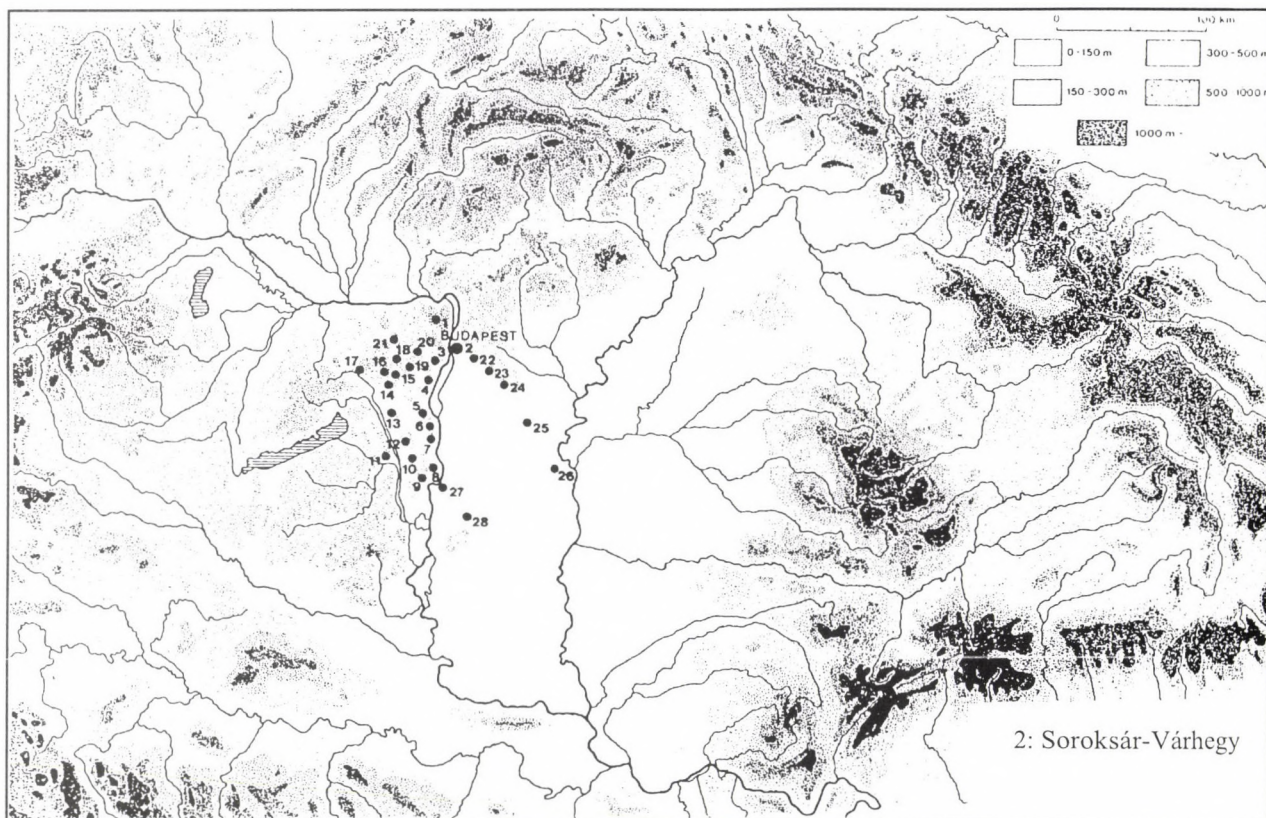


Fig. 1. Fortified settlements of Vatia culture (after T. Kovács 1969, fig. 5)

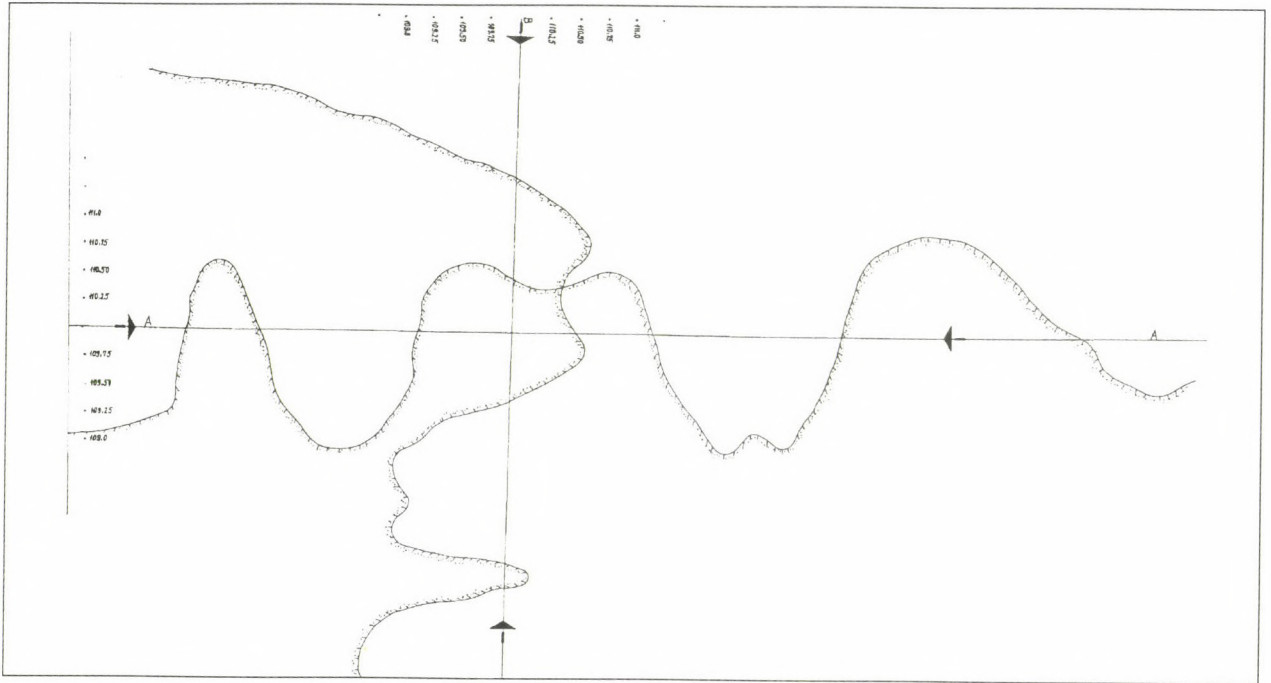


Fig. 2. Distorted relief segment of the site



Fig. 3. Airphoto - computer-made image with filtered colouring

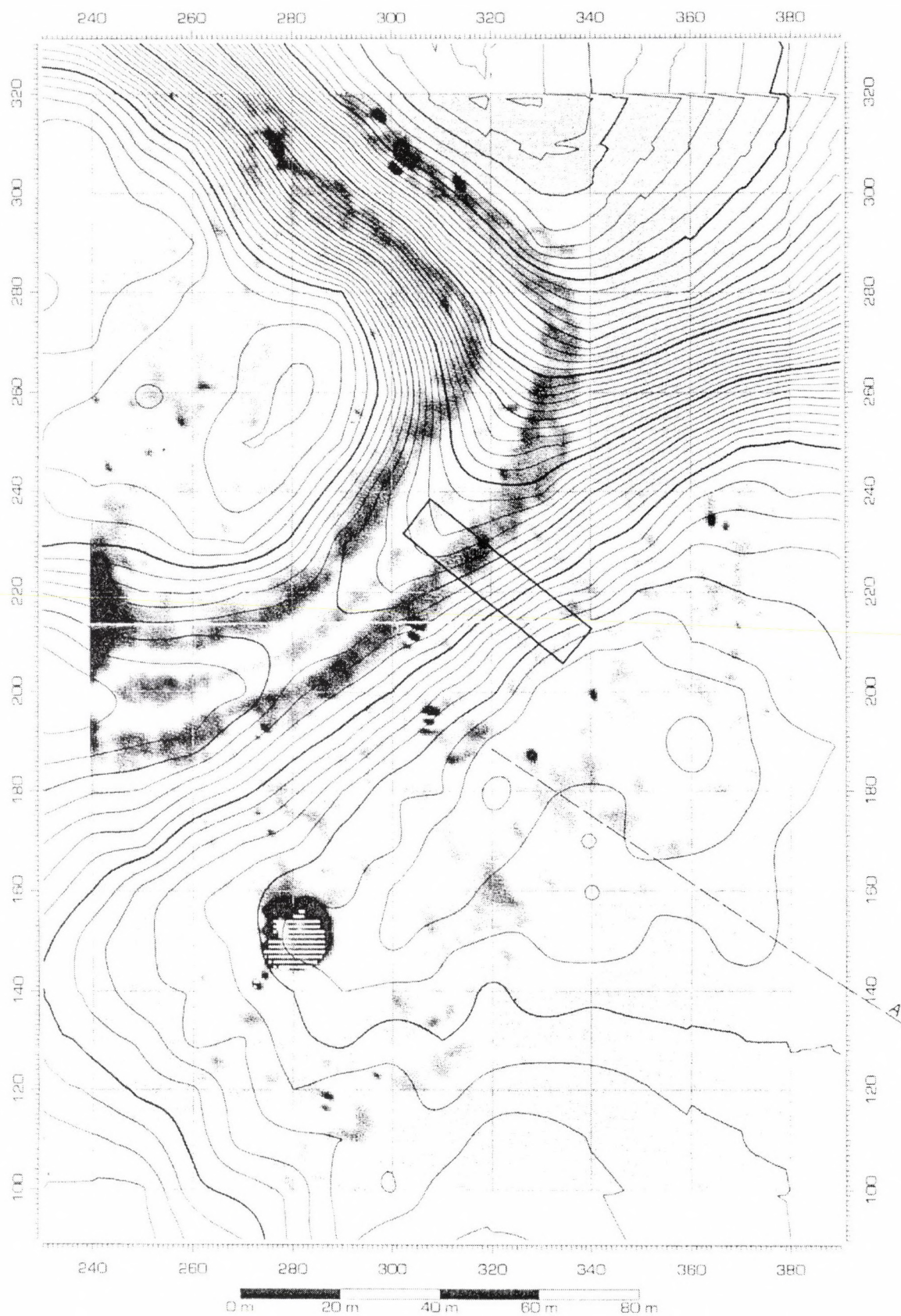


Fig. 4. Geophysical-magnetic-contour map with discovered area (Made by S.Puszta)

During the Holocene the SE part of the Pest plain was still covered by swampy spots and the Soroksár Danube branch had extended till that what is today the Soroksári út (Soroksári road), at about a 2,5–3 km s distance from our site.² (PÉCSI 1958, 248, 281, 297–298, 425–426, 473.)

lowing features were excavated below a humus layer with an average thickness of 60 cm (Fig. 6):

An NW-SE direction ditch with „V”-shaped cross section. Its greatest width below the 40 cm thick humus is 3,60 m. Its depth is 1,67 m. Its infilling is dark brown with humus, its bottom is greyish brown, clay and gritty. Along its northern and

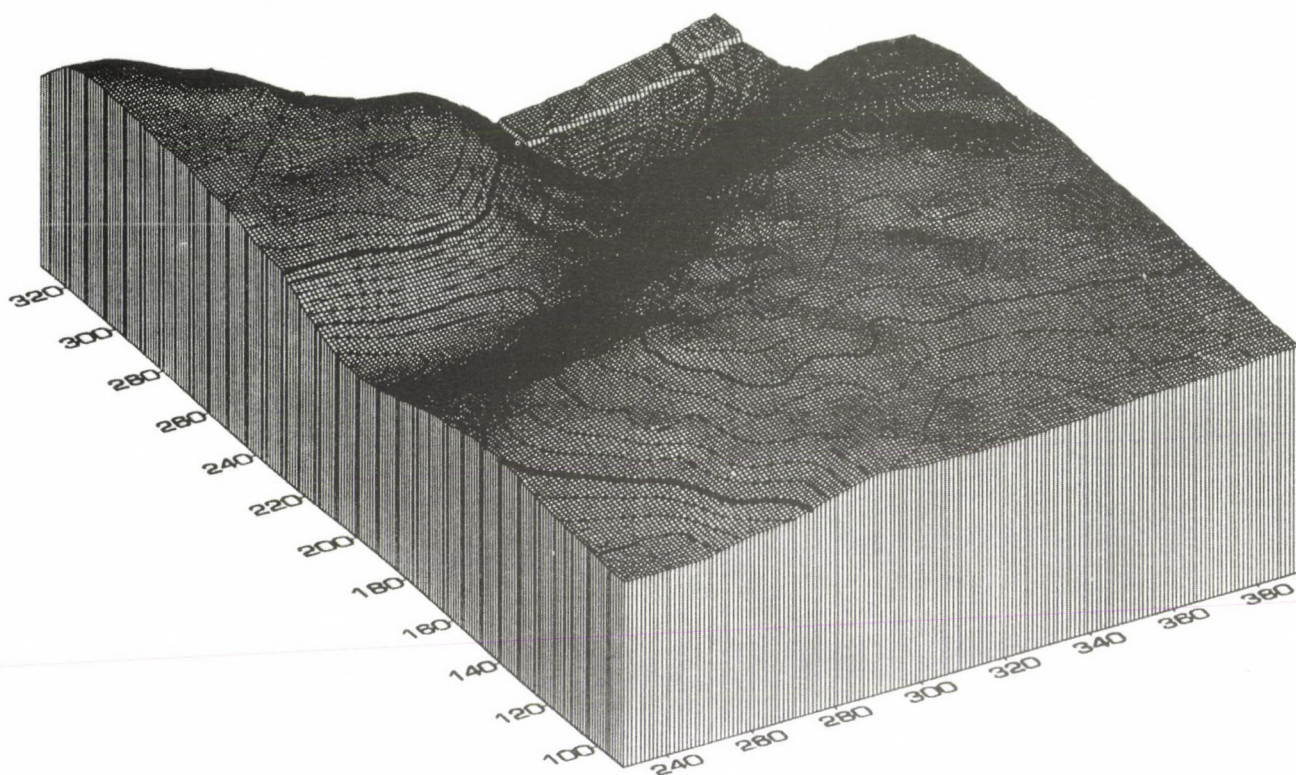


Fig. 5. Axonometric map about examined area

On the airphoto made about the environment of the site a semicircular discoloration was visible. The computer-made image with filtered colouring revealed also further details (Fig. 3. the photo was made by Ferenc Gyulai). In this area being continuously cultivated differences in level are only scarcely obvious for the naked eye, except a slope towards the bed of the Gyáli brook, bordering the region from the N. The bend of the Gyáli brook, a brook trained in the last century, has step walls. To the SE from the area observed on the photo at an about 150 m s distance, beside the motorway there is a hill on a somewhat higher level. The two areas are connected with each other by a slope (Fig. 5). On this hill a trench dug during the 2nd World War and the establishment of a point needed for the geodetic measurements of the motorway had destroyed the lowermost stone rows of the walls of an Arpadian Age church (MELIS 1992, 71).

In the large trench of 10 x 30 m with an NW-SE axis opened in the SE part of the fortified settlement the fol-

southern edges there is a 20–50 cm thick greyish-brown mixed layer over the yellow subsoil which can be identified as spread out soil extracted from the ditch. In the infilling of the ditch (at a depth of 72 cm) lay an incomplete skeleton of a cattle. Within the infilling and beside the animal bones the potsherds of Vátya culture were found (Fig. 13, 4).

There were two post-holes beside the eastern edge of the section, with depths of –60 and –40 cms. To the W of the post-holes an oval *hearth* with a shelf came to light: its southern shelf was imprinted. (Just like at Alpár-Várhegy, here too, two types of hearths were found: a „cameo-shaped” with plastered up shelf and a „circular-oval” cauldron-shaped one. BÓNA-NOVÁKI 1982, 33.)

The diameter of this hearth is 1,46 x 1,10 m (Fig. 6; fig. 7,1). Below the hearth and to the S of it damaged remains of a plastered up *house floor* were found. It was smeared twice and since it was observable also in the profile of the hearth with shelf, the hearth was most probably built within the house (Fig. 6). The two postholes belonged supposedly to the superstructure of the house.

Pit No.1. Between the W wall of the trench and the house floor. It slightly narrowed downwards, its bottom is flat, with a

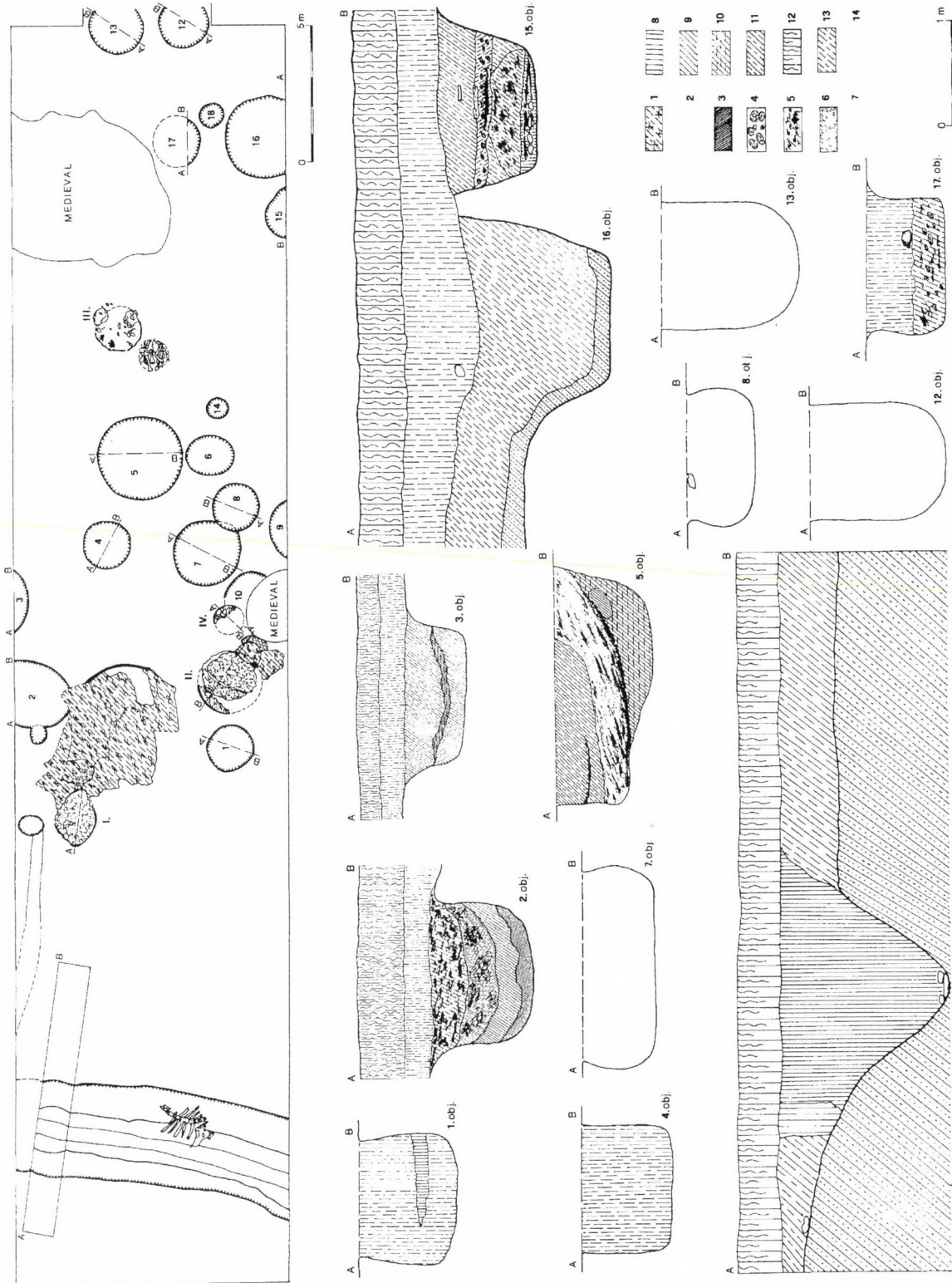


Fig. 6. Objects of the Bronze age settlement

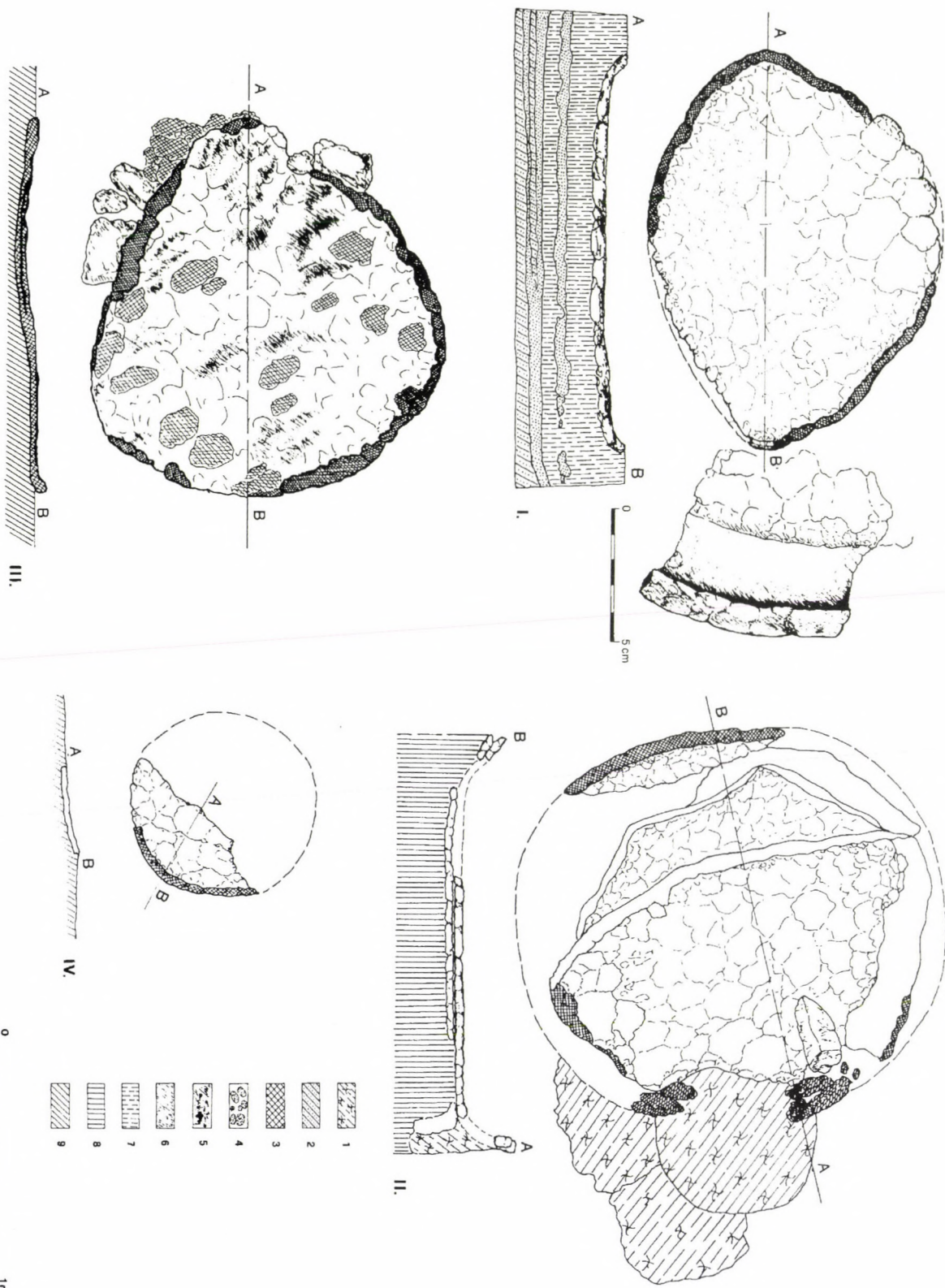


Fig. 7. Plastered up hearths and ovens

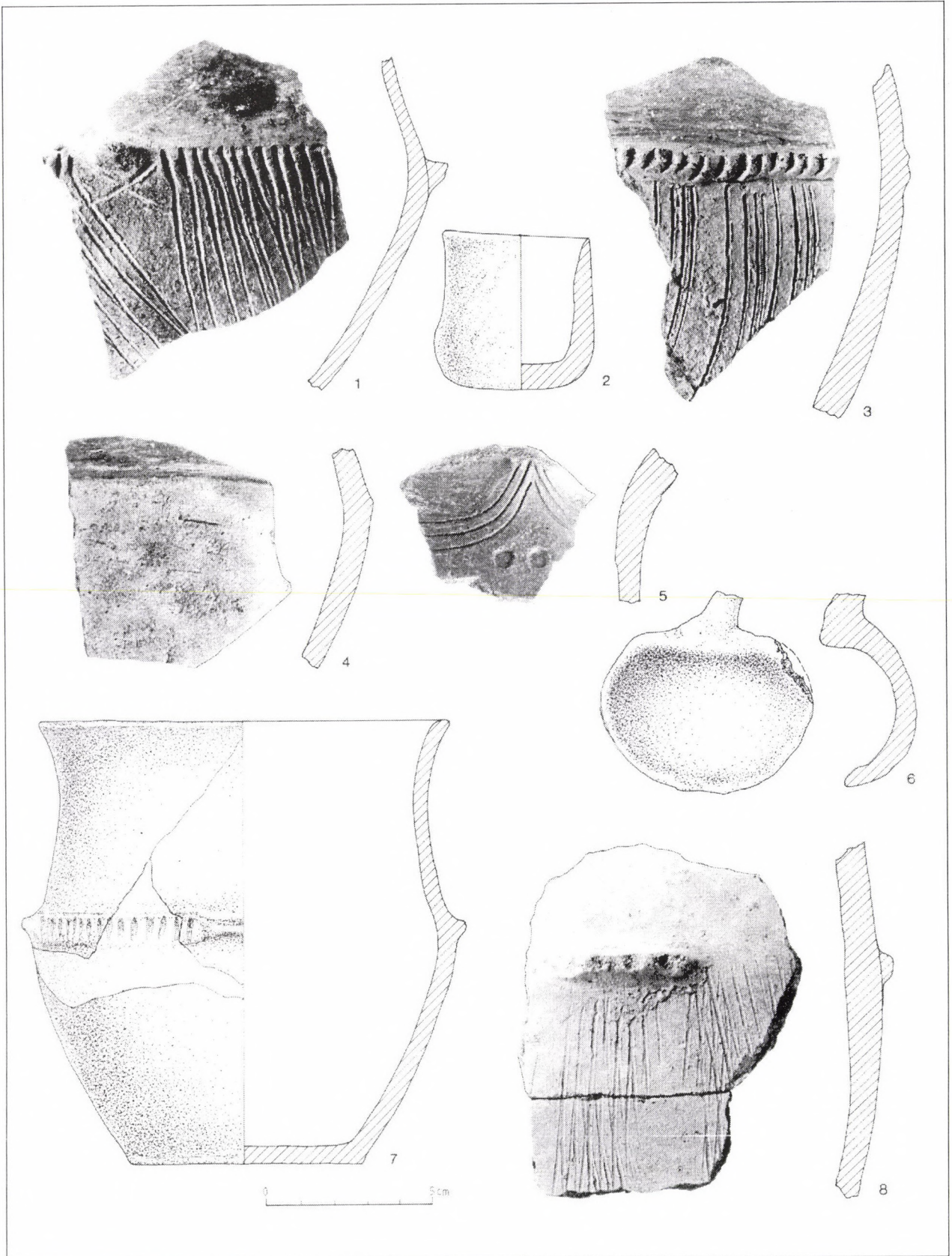


Fig. 8. Finds from pits 7, 1, 2, 12, 6, 9.

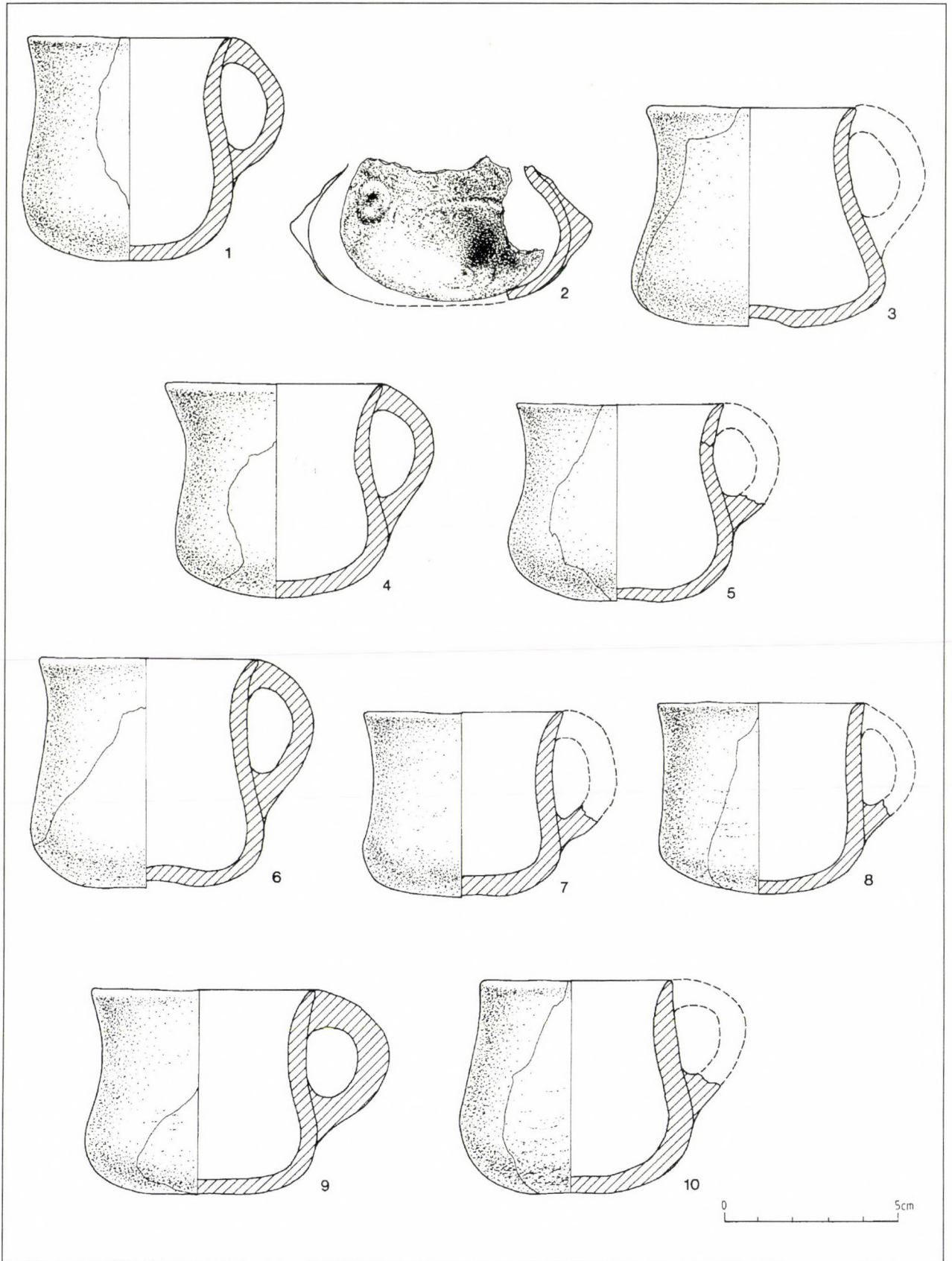


Fig. 9. Pots from pits 1, 3, 7.

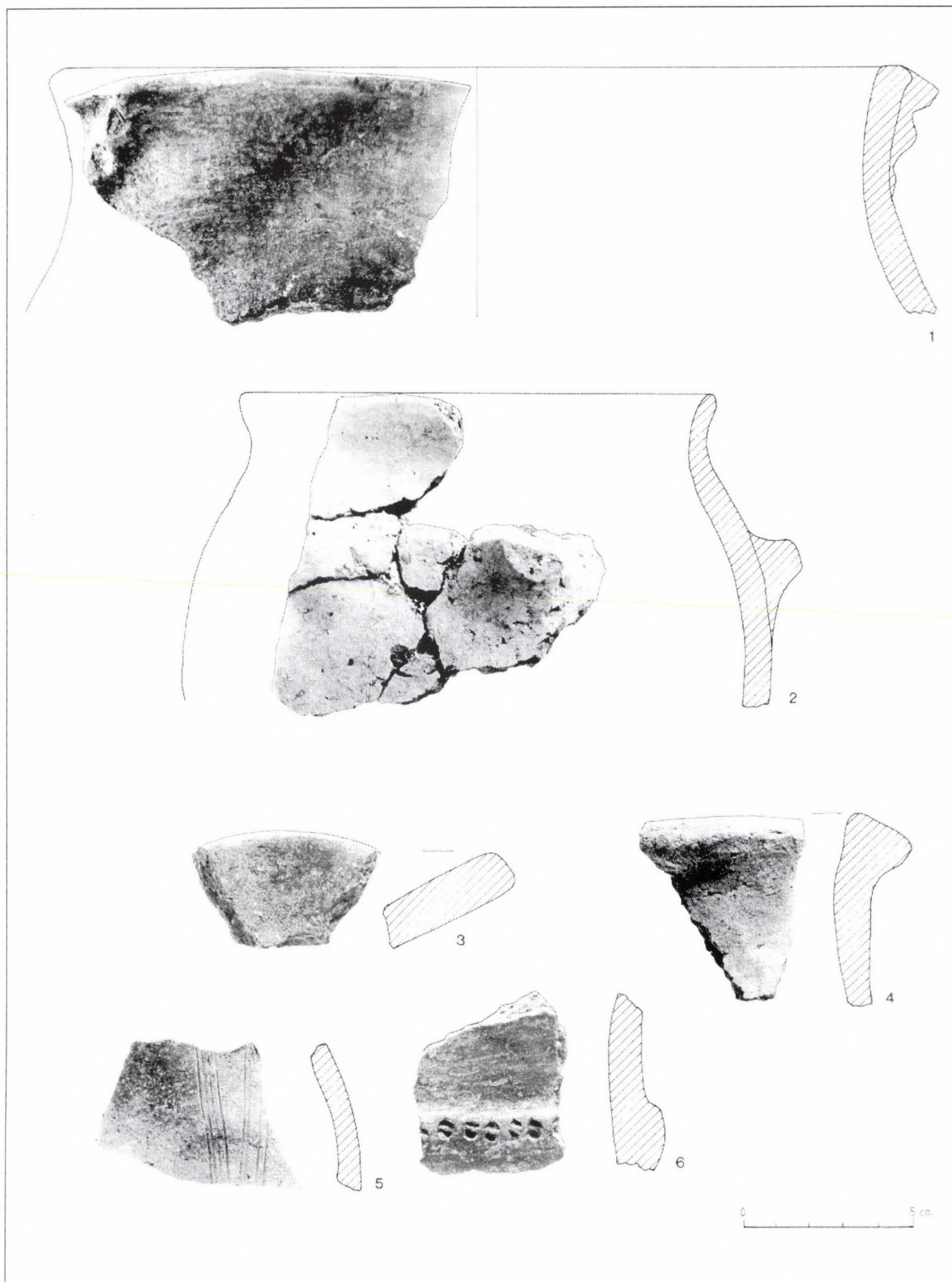


Fig. 10. Finds above the house floor

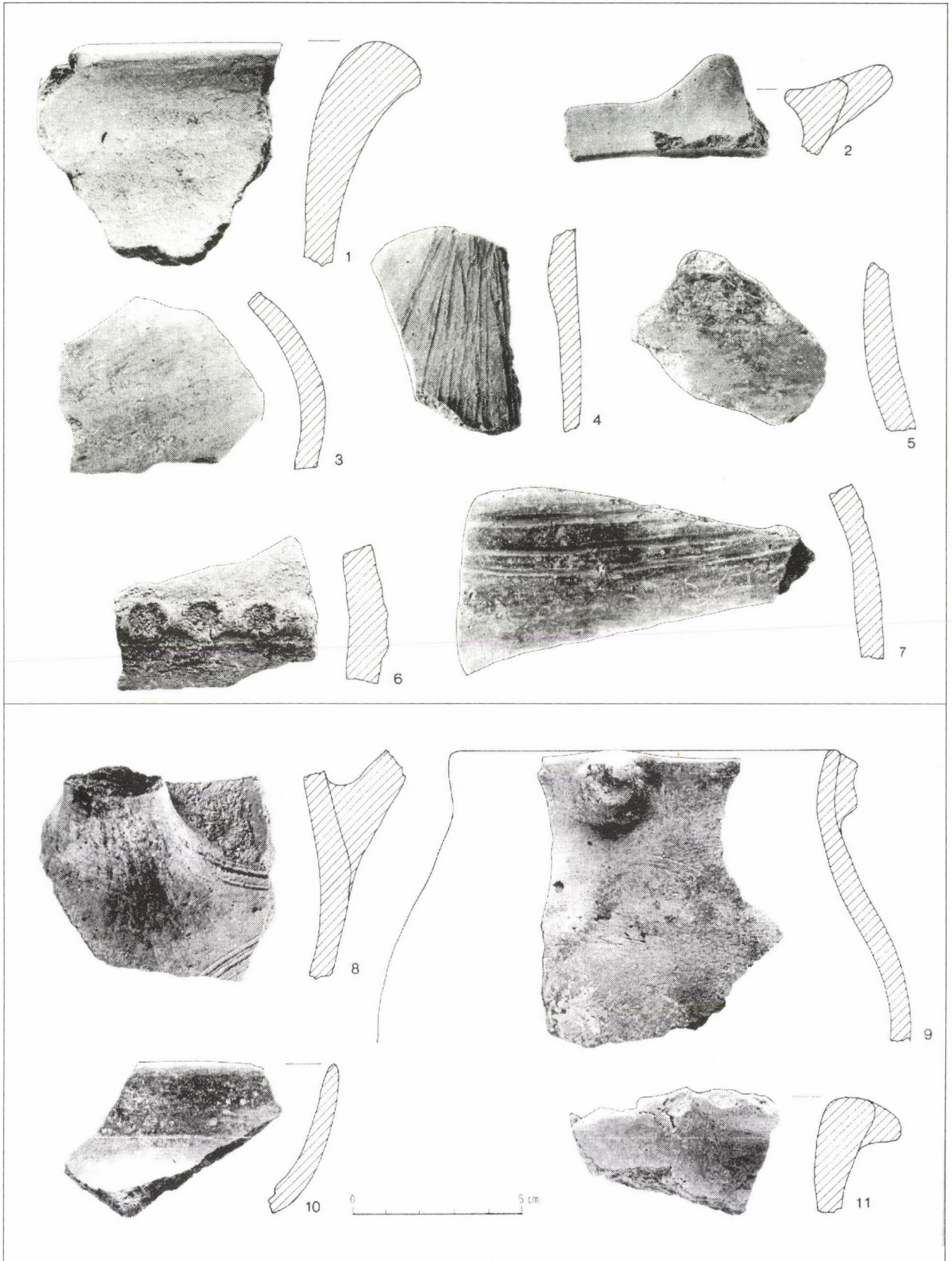


Fig. 11. 1–7: finds above the house floor, 8–11: finds from pit 1., and from oven

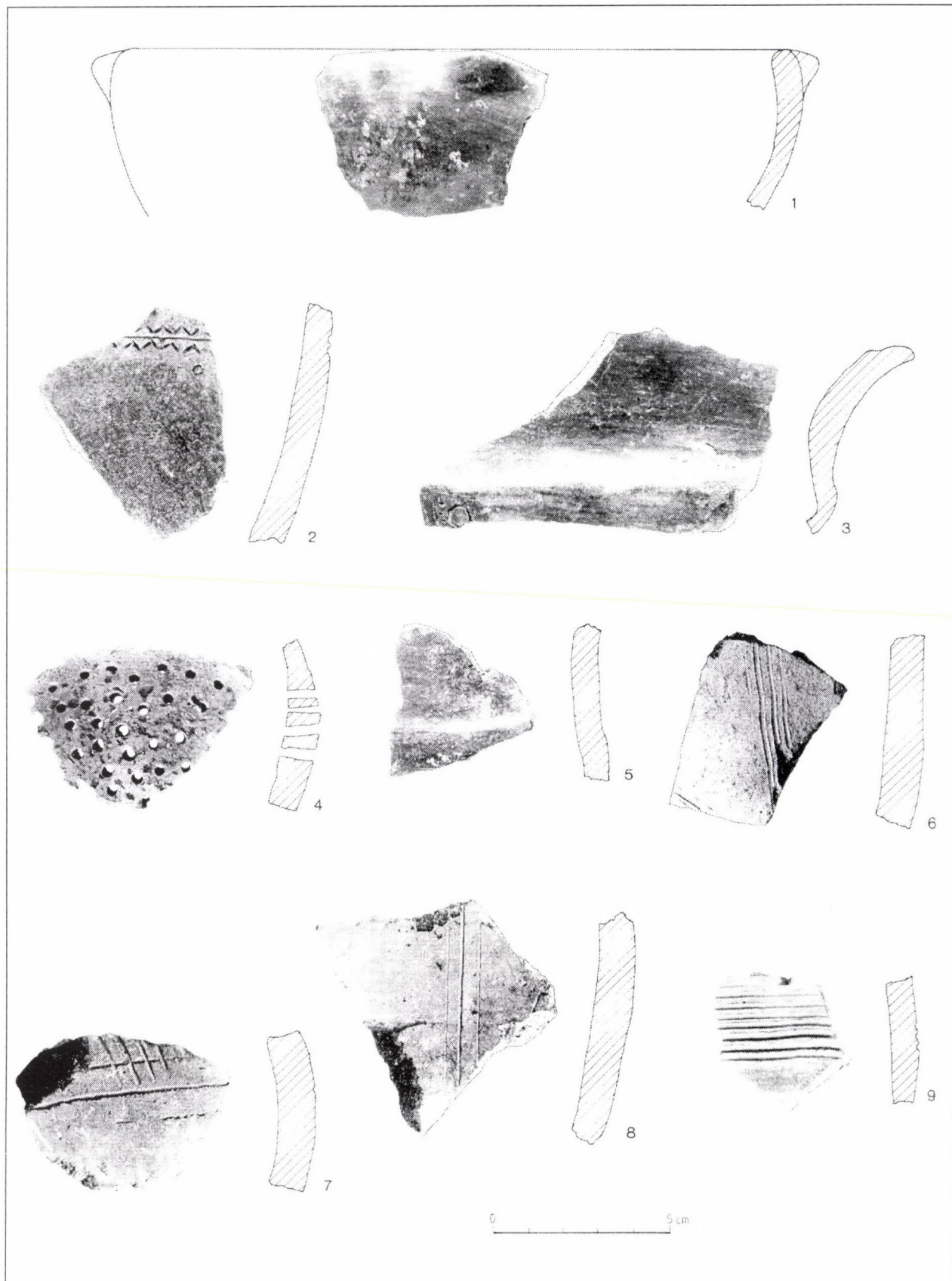


Fig. 12. Finds from pits 2, 3.

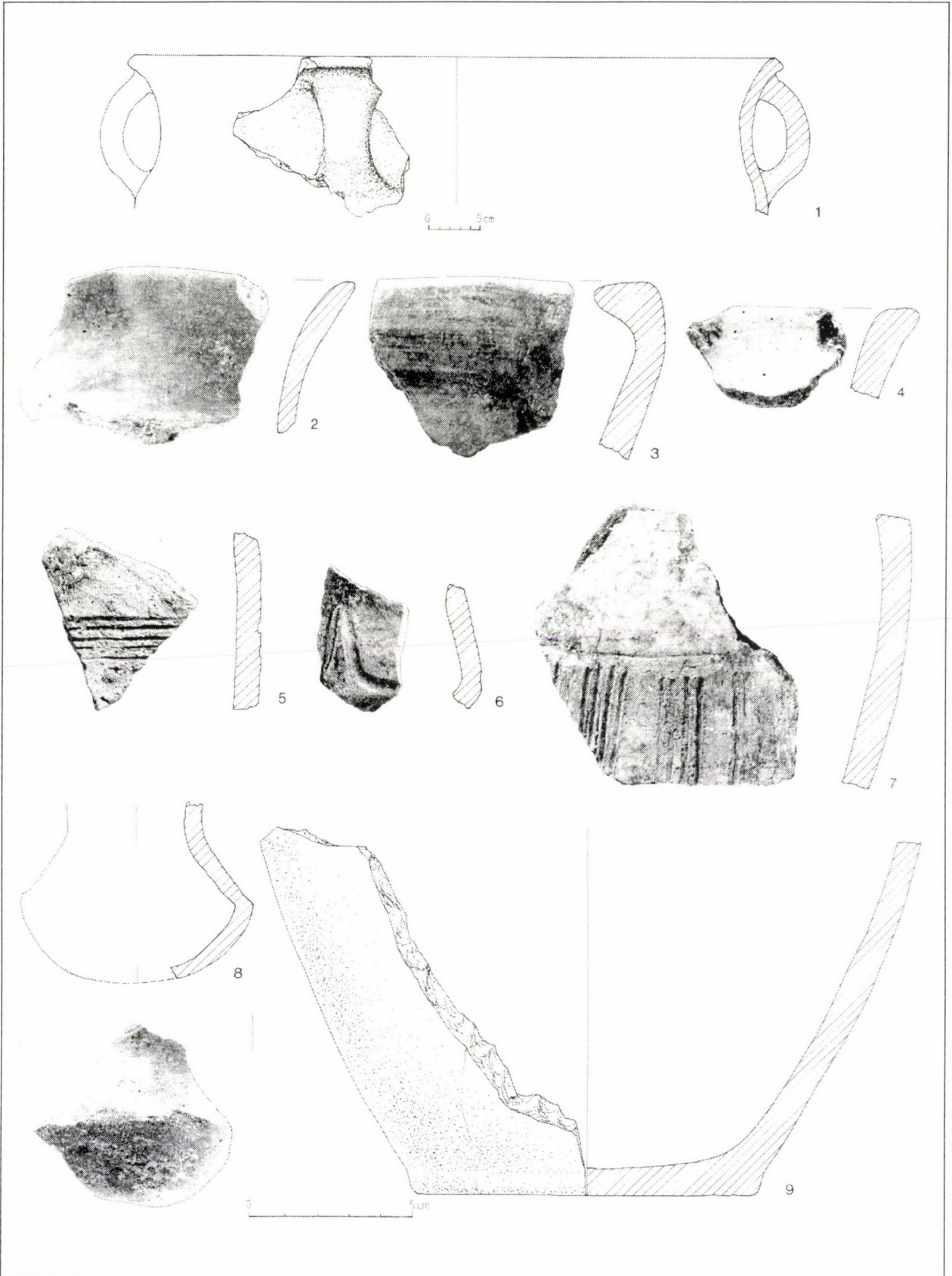


Fig. 13. 1: from pit 10., 2-4, 7-9: finds from the infilling oven No 3, 5-6: finds from the ditch

few Bronze Age ceramics and animal bones in its infilling (Fig. 8.2; fig. 8.7.; fig. 10.1; fig. 14.1–5).

About one-third of *pit No. 2.* between the E wall of the trench and the floor, is situated below the floor. It has an infilling consisting of several layers, its uppermost layer is burnt, containing soil mixed with ashes. Most probably it was abandoned when the house was built. Among the ceramic fragments found in its infilling a decorated side-fragment and a clay spoon are noteworthy. (Fig. 8.3, 6).

To the SW of the floor of the house there was a twice renovated *oven* with a diameter of 1.52 m. Its heating space opened to the south. The reconstructed diameter of the remains of a plastered up *hearth* beside the oven is cca 80 cm (Fig. 7. II, IV).

Near the central part of the trench 9 other Bronze Age *pits* were unearthed, among which No. 3. is a pit extending below the E wall of the trench. It is narrowing downwards and has a flat bottom. In the middle of its infilling there was a clayey layer from which the fragments of a strainer dish and of a small cup came to light (Fig. 12.4; fig. 9.4). Pit No. 4. has cylindrical walls, flat bottom and contains a few ceramic fragments and animal bones in its infilling. Refuse pit No.5. has also cylindrical walls, its bottom deepened eastwards, in the middle of it infilling there is a sooty layer with charcoal. From the finds of this pit a small cup, an „ansa lunata” type handle-fragment and a pointed rim fragment are noteworthy. In the infilling of pit No. 6. a rim fragment of a jug and a bone implement were found (Fig. 17.1). Pit No. 7. was beehive shaped with a flat bottom and it was intersected by the beehive shaped pit No. 8. (Fig. 14.6–9). Half of pit No. 9. had extended below the W wall of the trench while in its unearthed half there was an infilling with ashes. Pit No. 10. was intersected by a Medieval digging. Pit No. 14. was most probably a post-hole with a plastered up bottom.

Pit No. 11. Was found without discoloration. In a small group within it cattle bones were found. Beside it *oven* No. III. was unearthed with a 30 cm thick layer of ruins. The entrance in the southern wall of the oven was strengthened by stone (Fig. 7. III).

Half of pit No. 15. Had extended below the W trench wall, its diameter is 1.70 m, its dept below the 1 m thick humus is -90 cm. The bottom of this pit is flat, its walls narrowing downwards. Its infilling had several layers. Its upper one-third is grey, mixed, where a fragment of a two-sided mould made of sandstone was found (Fig. 18.6). The bottom of the pit was strongly burnt, and sooty with ashes.

In the beehive shaped *pit No. 16.*-its diameter is 2 m, its depth is 2.80 m- there were several animal bones together with a few potsherds.

At the SE end of the trench we found an open *fireplace of Arpadian Age.* In its neighbourhood were refuse pits No. 17., 12., and 13., all are cylindrical shaped with flat bottom. They contain only a few finds e.g. fragments of large-size pots (Fig. 8.4–5). Here another post-hole was unearthed.

Ceramic finds from Soroksár-Várhegy excavated in 1987. (Fig. 8–16)

The scarcity of finds does not make possible a detailed typological analysis. At the same time we are able to present some characteristics which help us to determine the chronological position of these finds within the Vaty culture.

The forms of ceramic finds unearthed at Soroksár-Várhegy originated dominantly from the late phase of Vaty culture.

Funnel-necked „urn”-pots.

Rim and bottom fragments (Fig. 16.1; fig. 13.9). Their analogies can be found at the sites Solymár-Várhegy (ENDRŐDI 1980, fig. 17, 18), Cegléd-Öreghegy, Lovasberény-Jánoshegy (BÓNA 1975, fig. 46, 2.4; fig. 49, 4; fig. 52, 6.7), Áporka (BÓNA 1975, fig. 38, 1.14) and Alpár (BÓNA-NOVÁKI 1982, fig. LI,1). The more frequent occurrences of those varieties of this type which are decorated by knobs, incised lath-decoration and incisions suggest Vaty-Koszider tendencies. These we find first of all among decorated side and handle fragments (Fig. 8.1, 3; fig. 13.7; fig. 14.2; fig. 15.11; fig. 11.8.). Their analogies are present also at Solymár and Alpár. (ENDRŐDI 1980, fig. 6,1–5; BÓNA-NOVÁKI 1982, fig. XLI,5).

Pots

An incomplete piece which can be reconstructed as an oval pot with outwardly arching rim was found in pit No. 6. On its belly the incised rib-ornament is dissected by horizontal knobs (Fig. 8.7). Its undecorated varieties can be interpreted as antecedents of Vaty III., known from the sites Cegléd-Öreghegy (BÓNA 1975, fig. 42, 6), Solymár (ENDRŐDI 1980, fig. 16) and Alpár (BÓNA-NOVÁKI 1982, fig. XII,10; fig. XLII,2).

A Vaty-Koszider variety of this type is a pot with knobs on its rim, the fragments of which were found at our site, too (Fig. 11.2, 9, 11). In spite of the fact that Koszider-type hoards were hidden is similar vessels (Dunaújváros II., Ócsa) the type was generally widespread in the late phase of Vaty culture, though it occurs also at the sites of Bodrogszerdahely group (ENDRŐDI 1980, 273; BÓNA-NOVÁKI 1982, 69; KEMENCZEI 1963, fig. 3, 15–16).

On pots of similar shape but of larger size there is also an imprinted rib ornament starting slantwise from the rim (Fig. 10.1). Several specimens of this variety were found at Alpár. István Bóna claims this pot to be a Vaty-Koszider type and published numerous analogies of it from the Vaty-Koszider finds found at Dunaújváros-Kosziderpadlás, Pákozd-Várhegy and Solymár (BÓNA-NOVÁKI 1982, fig. VI,4; fig. XI.1.5–6, 70; ENDRŐDI 1984, fig. 4.5).

Cup with Handle

A widespread type of late Vaty phase. It has outwardly arching rim from which a strap-handle starts and rest on the arch of the neck, quite often with knob decoration on it (Fig. 10.2). It is present at Dunaújváros, Alpár and Solymár too (BÓNA 1975, fig. 38.2; BÓNA-NOVÁKI 1982, fig. XXV. 1–2; ENDRŐDI 1984, 114).

Bowls

Rim fragments of bowls with outwardly arching rims (Fig. 13.2; fig. 15.7–8; fig. 16.3) which are the antecedents of certain similar type bowls of late Vaty phase as regards their form.

Fragments of bowls with rims arching inwards with knob decoration (Fig. 12.1; fig. 13.3). They are characteristic specimens of Vaty III. phase, though an analogy of them with an incised decoration was found also at Solymár (BÓNA 1975, fig. 38. 8–9; ENDRŐDI 1984, fig. 3.3).

Truncated cone-shaped bowl with arched rim and 2–4 handles

Our settlement yielded a rim-handle fragment of this type, decorated with a row of stamped points in the arch of the neck (Fig. 14.6). According to I. Bóna this type is a heritage from the Nagyrev culture, and the enumerated its numerous analogies

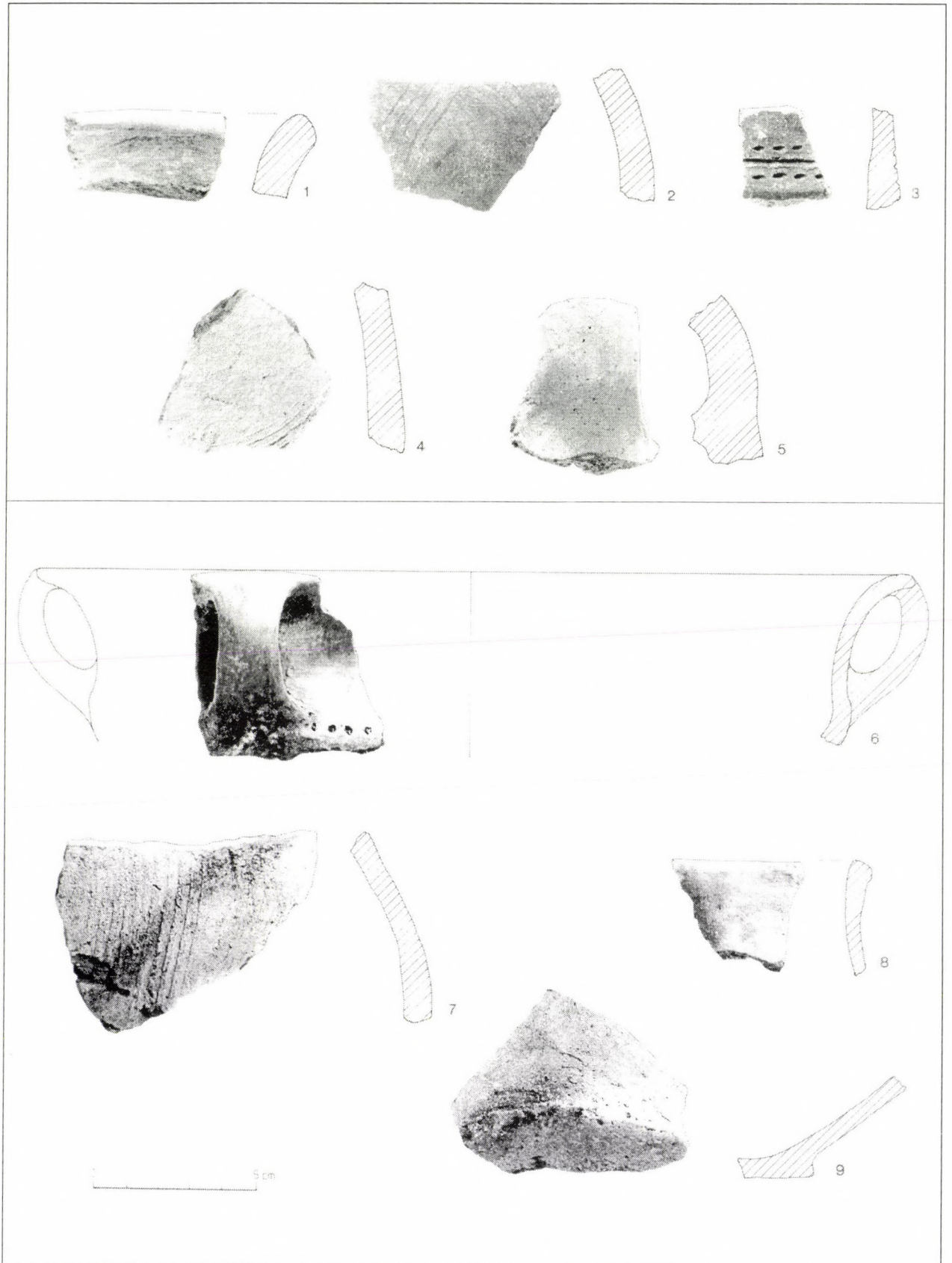


Fig. 14. 1–5: finds from pit 1., 6–9: finds from pit 8.

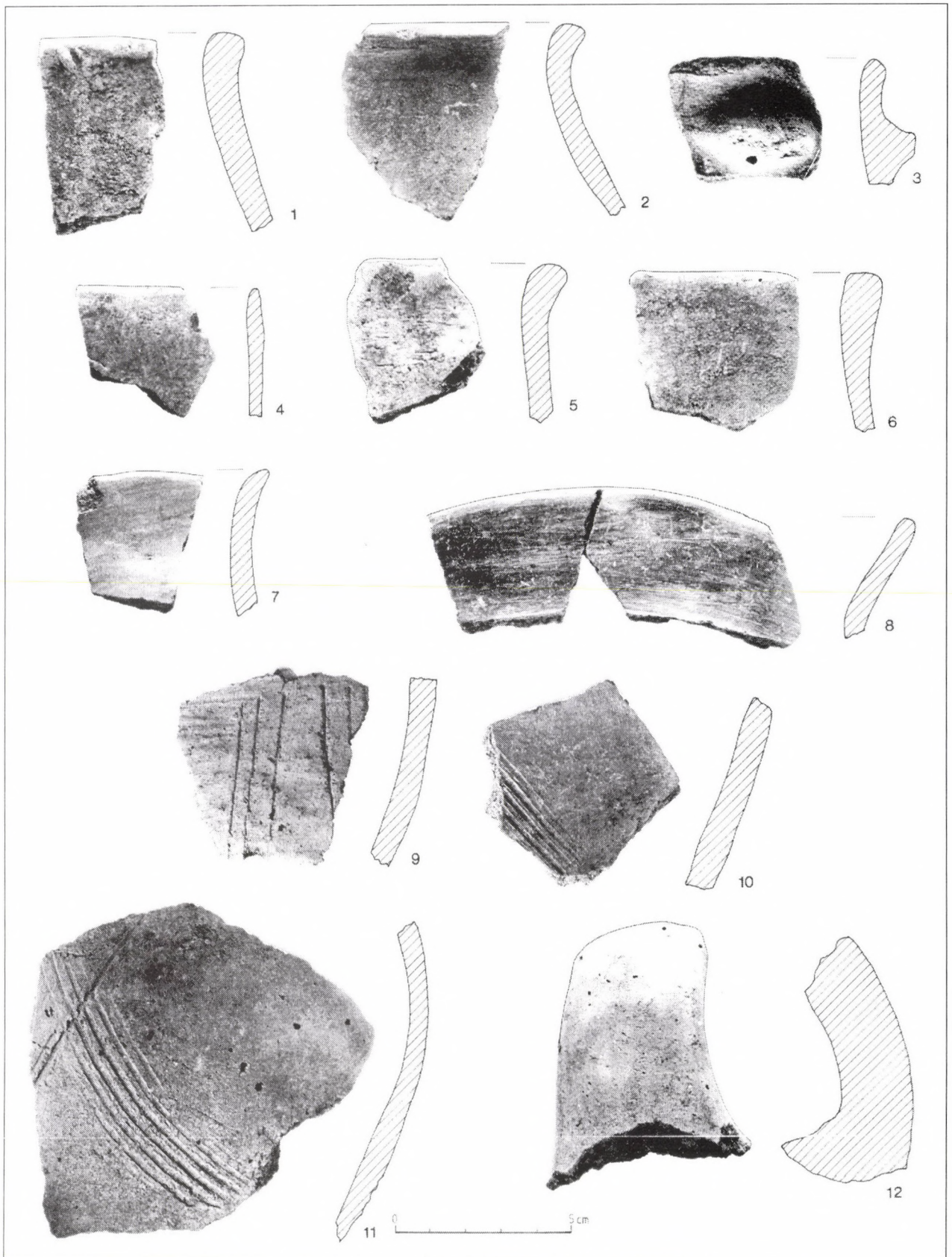


Fig. 15. Stray-finds from the excavation

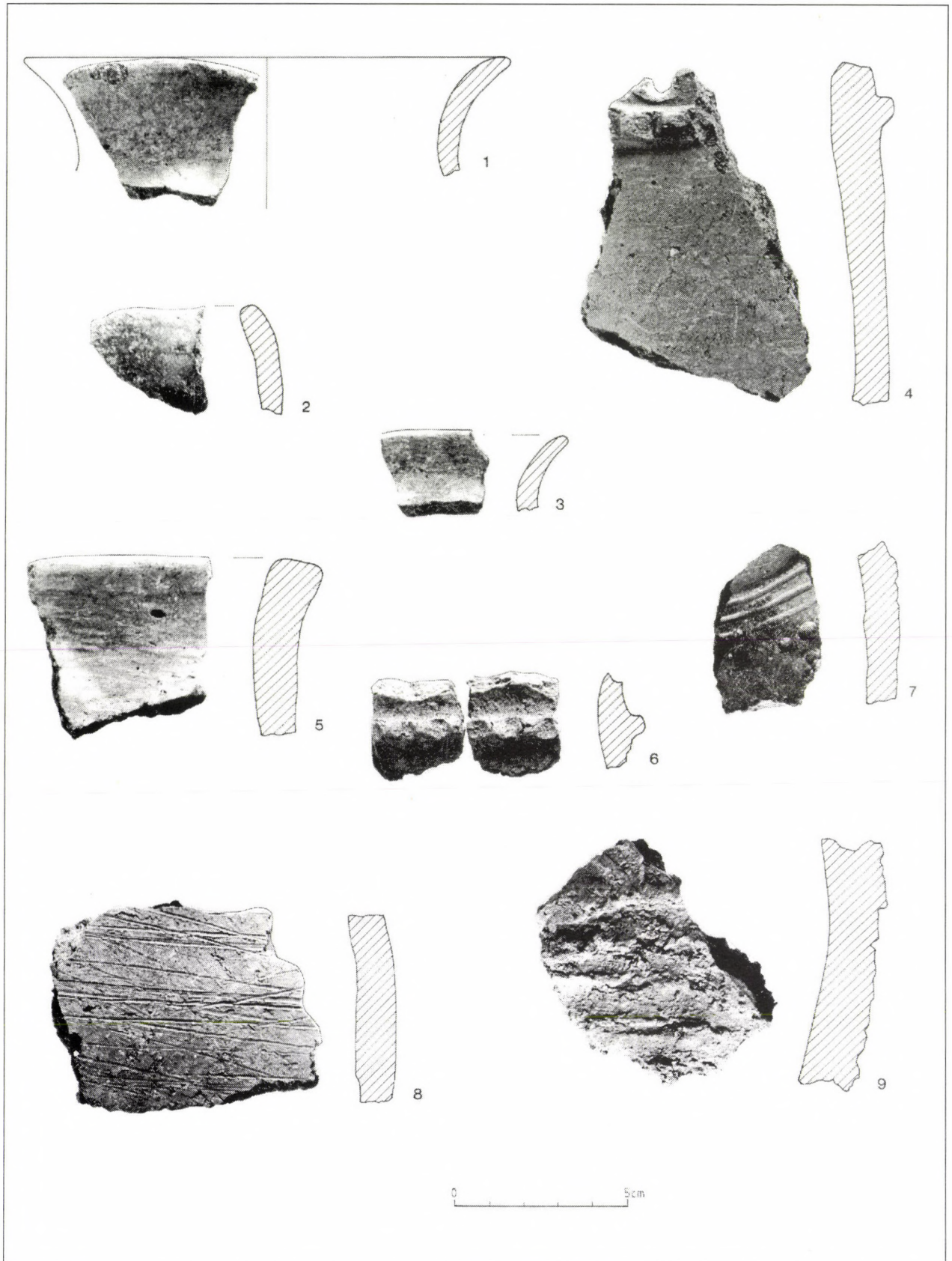


Fig. 16. Stray-finds from the excavation

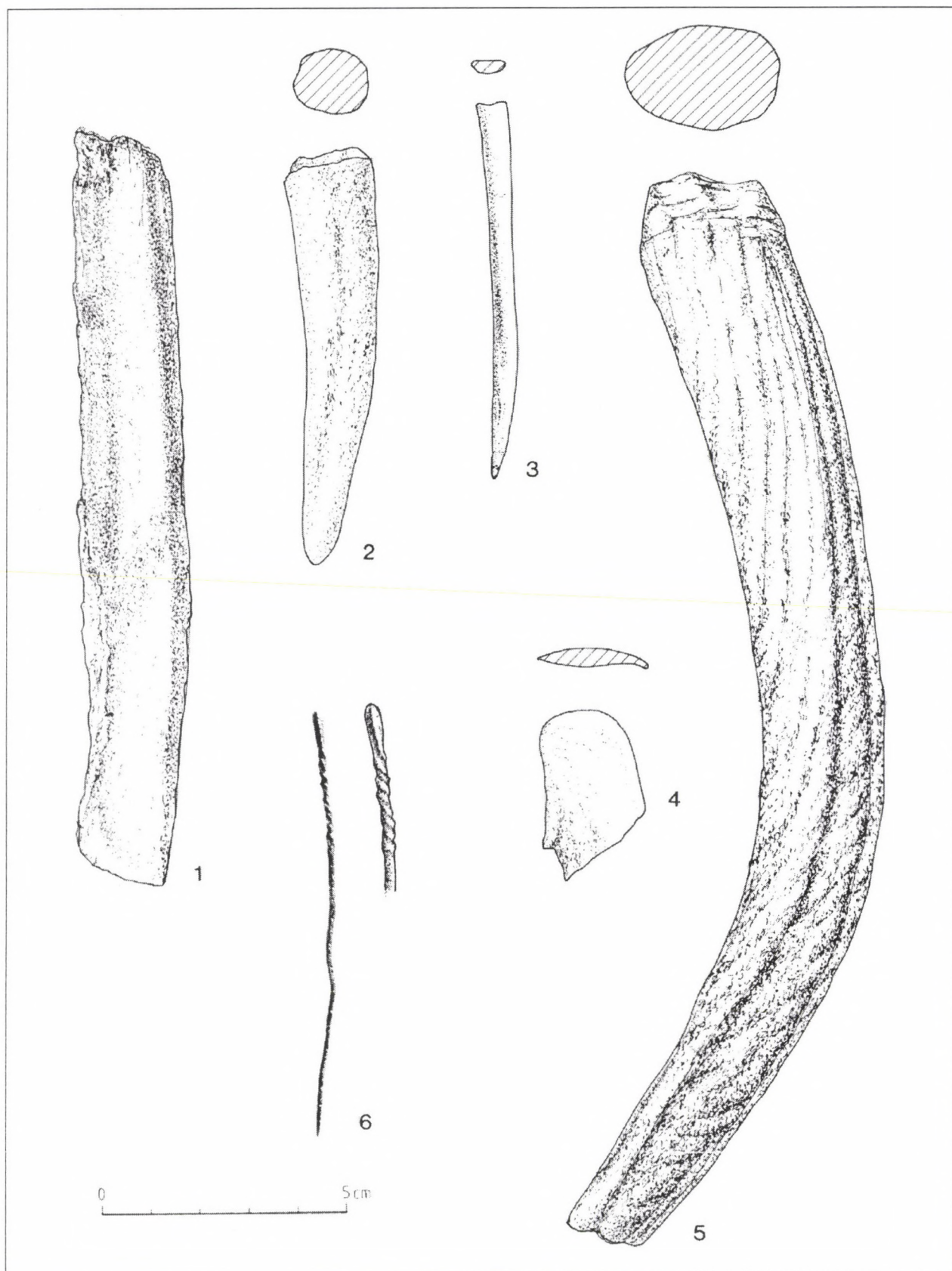


Fig. 17. 1–5: worked bones, 6: a bronze needle

from Alpár (BÓNA-NOVÁKI 1982, 64), though these types of form and decoration can be found in the Magyarád culture as well (Nitriánsky-Hradok, Dolný Peter, TOČIK 1964, fig. 15.12; DUŠEK 1960, fig. 8. 5).

Jug

On the basis of an analogous jug which came to light from Solymár-Várhegy (ENDRŐDI 1984, fig. 10.1). The side fragment decorated with garland and stamped points pattern found at our site is the fragment of a bellied jug with arched neck (Fig. 8.5). On the basis of the urn from Pákozdvár and of the fragments found at the Mende settlement and considering also Tibor Kovács' s observations their decoration seems to be the adoption of the decoration of Koszider type hoards, but especially of those punched patterns which used to appear on pins with conical head (KOVÁCS 1975, 40., fig. 9; MAROSI 1930, fig. 69). This motif occurs also on the pots of the Bodrogszerdahely culture (KEMENCZEI 1963, fig. 4. 9).

Cups

Spherical shaped cups with handle (Fig. 8.2; fig. 9.3–10) are characteristic vessels of Vatyá culture.

The fragment as a small cup came to light from the track of the motorway at about 200 m's distance from our excavated area. It is decorated with a plain knob in the lower part of its belly and a bit over it on the belly with a channelled knob (Fig. 9.2). The similar small cups found at Alpár were published by I. Bóna among the Koszider-type material (BÓNA-NOVÁKI 1982, 77. b6 type), but they appear also at the site Lovasberény-Mihályvár (BANDI-PETRES 1969, fig. 7.8).

The fragments of a *clay spoon* (Fig. 8.6) of a *strainer dish* (Fig. 12.4) and of a *bowl for „frying fish”* (Fig. 10.3; fig. 11.10) found at Soroksár are characteristic finds of the settlements of Vatyá culture.

The remains of alien, imported vessels are side fragments with incised pattern in two parallel lines (Fig. 10.6; fig. 14.3) and the fragment decorated with incised „zig-zag” motif (Fig. 12.2). Analogies are present both in the Szeremle and in the Magyarád culture (BANDI-KOVÁCS 1969–1970, fig. XII.6; TOČIK 1964, fig. 39. 6). Fragments with three-dimensional rib-decoration are known both from our site (Fig. 13.6) and from Alpár (BÓNA-NOVÁKI 1982, fig. XXXVI. 2). Their analogies can be found among the ornamental motifs of the Magyarád culture (TOČIK 1964, fig. 20. 1–2).

Bone implements (Fig. 17)

From the features of Soroksár-Várhegy some worked antler implements (Fig. 17.2, 4), a bone *awl* (Fig. 17.3) and bone *scrapers* (Fig. 17.1, 4) came to light. They are usual and typical finds of Vatyá culture. Fish- and bird-bones (CHOYKE 1984, 33. table 3) so characteristic of fortified settlements near the Danube (Százhalombatta-Téglagyár, Pákozd-Vár, Lovasberény-Mihályvár) and which can be connected with fishing and hunting have not found so far at Soroksár. It can be explained by the relatively small extension of the excavated area.

Stone implements (Fig. 18)

They were determined by Katalin T. Bíró as a rejuvenated *axe* (maul) with shaft-hole, made of andesite (10,5 x 5,5 cm. Inv. No. 90.1.10.) (Fig. 18.1/a–b)

a fragment of a small *axe* with shaft-hole made of basalt (4,5 x 3,2 cm. Inv. No. 90.1.13) (Fig. 18.3/a–b).

a perforated *plug of mould* made of sandstone (4 x 1,8 cm. Inv. No. 90.1.14) (Fig. 18. 5/a–b).

a two-sided *mould* made of sandstone. (77 x 6 cm, Inv. No. 90.1.3). A secondary use of this broken, damaged mould is probable (for casting pin). (Fig. 18. 6/a–b).

Bronze find

A bronze with pin straight cut, spiral head (its length is 9 cm, Inv. No. 90.1.4) (Fig. 17. 6) originated from a pit excavated on the track of the motorway, at a cca. 200 m's distance from our excavated trench.

Neither finds of the period preceding Vatyá culture, nor those of the Tumulus culture, following Vatyá culture were found in the excavated trench. At the same time, as sporadic finds, cannot be connected to features a few fragments with aggrafite and channelled decoration of the Hal age Velatice (Early Urnfield) culture and some sherds belonging to the Arpadian Age were found³.

In 1996 *archeological-geophysical measurements* led by Sándor Pusztá were carried out on the spot⁴ (Fig. 6).

The dimensions of the 20 x 20 m grid map representing magnetic measurements is 220 m in N-S direction and 140 m in E-W direction. The aim of the presentation was to detect the existence and character of subsurface archeological features by using magnetic field intensity data measured by a protonprocess magnetometer in the plane over the surface of the soil. Maximum field intensity data (dark grey-black on photo)⁵. Indicate a cca 3–5 m wide ditch in the area, with its N end heavily eroded (Fig. 6). (Greatest intensities are resulted by an iron pylon of transmission line at 205–226; 240 coordinate and by an iron irrigation plant at 280; 150 coordinate). In the area within the roundel there are several spots with maximum anomaly. These are most probably for deeper pits or hearths, perhaps containing metals or finds in greater quantity. A NW-SE direction stripe outside of the ditch at 320; 180 coordinate is noteworthy as well as several NEE-SWW direction linear phenomena in the eastern part of the area; supposedly ditches or roads. At a 150 m's distance on the track of the motorway M0 were excavated the houses and ditches of the 11–13 th village Kerekegyháza, among which there were several ones of the same direction (MELIS 1992, 4. fig. 14). At the same time magnetic anomalies appeared to the S of the ditch may originated from Bronze Age features as well, since along the track of the motorway also beehive-shaped pits containing Vatyá III type ceramics came to light. Represented by a lower intensity we could observe another ditch (most probably a shallower and narrower one) which runs parallel to the main ditch.

The 3,60 m wide, 1,67 m deep ditch with „V”-like cross section appeared in the NW end of our 10 x 30 m' s extension trench opened in 1987 across the area with 210; 280 central point coordinate, corresponds to the roundel appeared on the map as maximum magnetic anomaly (Fig. 6).

On the basis of the contour map and axonometric map made of the site Soroksár-Várhegy (Fig. 5) we suppose that here the Bronze Age population had settled on a ridge of a hill only slightly emerging from the surface around. The diameter of the settlement defended by fortification is 120 m, it was bordered from the N by Gyáli brook. Its entrance was presumably on the SE side. On

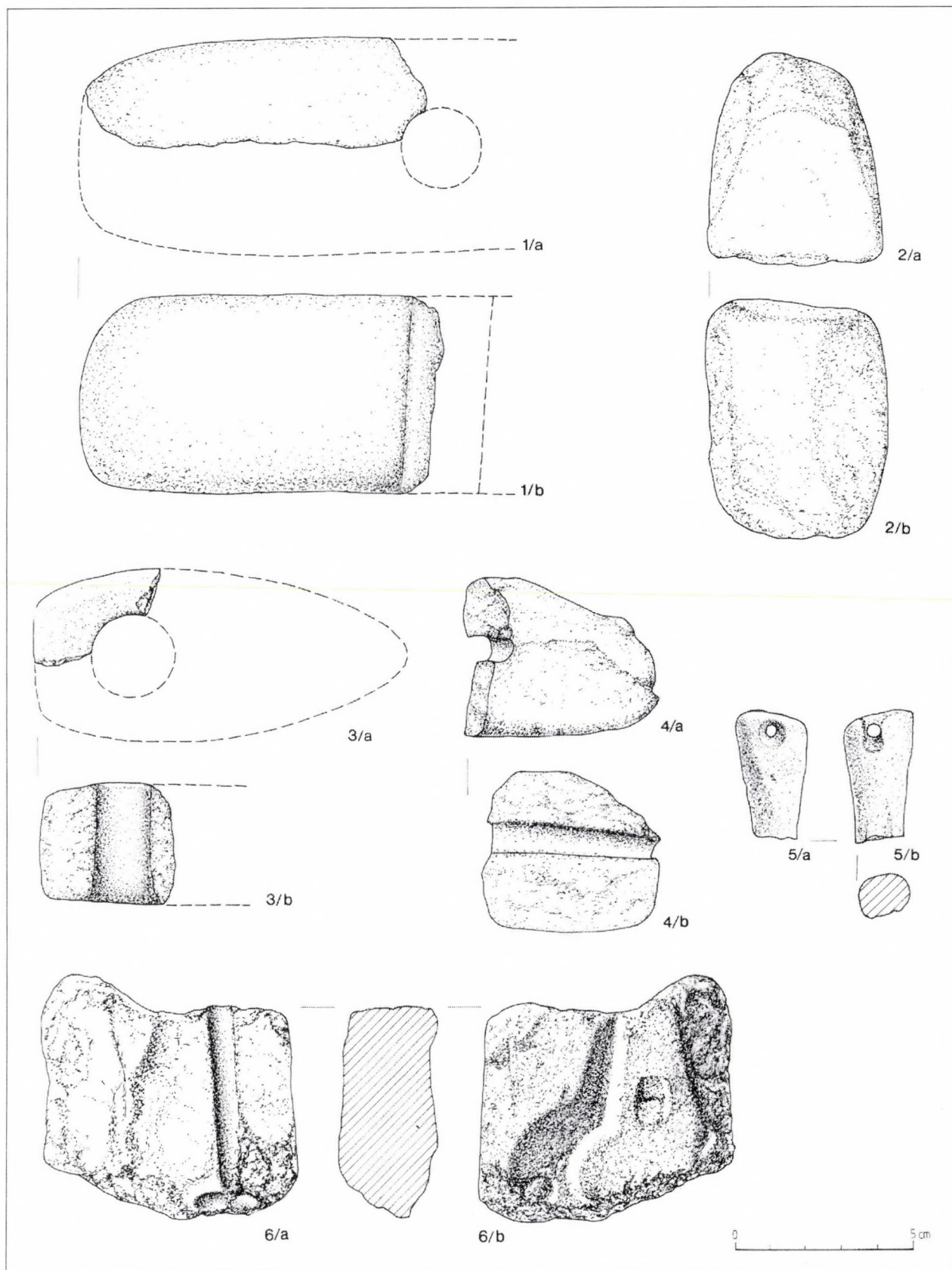


Fig. 18. 1–3, 5: stone tools; 6: fragment of the mould; 4: fragment of the clay plummet

the basis of contour maps we suppose that the hill of similar extension which is situated at a 150 m's distance to the SE from the settlement protected by ditch belonged also to the settlement. On the other hill, however, the analysis of airphotos did not reveal traces of fortification. Nowhere on the surface we found earthwork remains, though further excavations are needed to clear up this question. At the same time a distorted topography section made earlier seems to confirm the existence of earthworks (Fig. 2. section „B”).

As for its structure the fortified settlement at Soroksár-Várhegy is similar to the other settlements of this type of the Vátya culture in the Gödöllő hill county (Gomba-Várhegy, Mende-Leányvár, Nagykőrös-Földvár, MIKLÓS 1982, 29. 31–32). In this region the position of fortified settlements was always very favourable from the viewpoint of defence. They were situated always on the highest point as compared to their surroundings. Talking advantage of terrain conditions in most cases a ditch encircled the occupation area from those sides which were exposed to a possible attack. In case of favourable natural conditions no other fortifications were built. The occupation areas were defended by ditches from three sides or all round (At Gomba-Várhegy also traces of earthwork were observed). A common characteristic of the fortified settlements in the Gödöllő hill county is their position at the edges of large-size settlements on hilltops (MIKLÓS 1982, 61–62).

At Soroksár-Várhegy a smaller part of the loess plateau was encircled by a ditch (in this case by a kind of fortification, because without making further researches we cannot speak of an earthwork), thus establishing a defence line from the less defended – and as the excavations prove, inhabited – settlement. Just as at Alpár and

Hajós the outer settlement remained unprotected (BÓNA–NOVÁKI 1982, 64–65).

All this raise the question of contacts between fortified settlements and contemporaneous open settlements forming a group around the fortified ones on a lower terrain. The fortification system tells of the defensive function of the settlements, as well as their location in strategically important places suggest their function as centres of administration, manufacture, trade and cult (FURMANEK–VELIAČIK–VLADAR 1991, 364). This view may be corroborated by the metal workshop excavated at Lovasberény-Mihályvár and the mould of Soroksár also proves the existence of bronze casting at this site. To clear up these question, however, further researches are needed and over a more extensive area both within the fortifications and outside them.

The finds unearthed at the fortified settlement of Soroksár-Várhegy belong to the population lived there during the Late Vátya-Koszider period. There are no traces of human occupation on the Soroksár plateau before the arrival of the people of Vátya culture.

The central area of Vátya culture (the NE part of Transdanubia, the N part of the Danube-Tisza Interfluvium area, Mezőföld) are bordered by fortified settlements on the western margin of the Mezőföld till the mouth of the river Sió, and on the right bank of the Danube from Százhalombatta till Dunakömlőd (BÓNA 1958 228., BÁNDI–PETRES 1969, 171–172). Considering the material culture and structure of settlements Soroksár-Várhegy fits into this system of fortified sites filling a gap at the NE between Solymár-Várhegy and Mende-Leányvár, strengthening the defense line of the valley leading towards Esztergom (Fig. 1.).⁶

Notes

- 1 The excavation of the Medieval village was made by Katalin Írásné-Melis.
- 2 The most significant spring of the Pest bank is between Soroksár and Dunaharaszti, on the site of the one time Danube at the boundary of the impermeable clay layer and of the Holocene terrace gravel.
- 3 Within the frames of this study we do not want to deal with the expansion of the Tumulus culture. Detailed Publications on this topic are: BÓNA 1982, KEMENCZEI 1963, KOVÁCS 1969, 1992.
- 4 Archeological-geophysical-magnetic researches were carried out by Fractal Btr led by Sándor Pusztai in 1996, Geophysical Faculty of ELTE. Pusztai Sándor: Jelentés a Soroksár-várhegy/1996 jelű területen végzett régészeti-geofizikai mágneses kutatási tevékenységről. 1996. Budapest.
- 5 The magnetic effect of objects depends on the quality and quantity of their raw material. The width of magnetic anomaly caused by objects is increasing in direct proportion to the

depth of the objects, thus in this case the phenomenon can be used also to estimate depth (Sándor Pusztai 1996).

- 6 Following KOVÁCS 1969. Fig. 5., the catalogue of the fortified settlements of the Vátya culture published by him are completed by the sites Solymár-Várhegy and Soroksár-Várhegy. 1. Solymár-Várhegy, 2. Soroksár-Várhegy, 3. Százhalombatta-Téglagyár, 4. Ercsi-Bolondvár, 5. Adony-Bolondvár, 6. Dunaújváros-Koszider, 7. Baracs-Bottyánsánc, 8. Bölske-Vörösgyár, 9. Dunakömlőd-Bottyánsánc, 10. Alsószentiván-Kazalhegy, 11. Igar-Vámpusztai, 12. Sárbogárd-Cifrabolondvár, 13. Aba-Belsőbáránd-Bolondvár, 14. Pákozdi-Vár, 15. Lovasberény-Szöszvár, 16. Lovasberény-Mihályvár, 17. Fehérvárcsurgó-Várhegy, 18. Vál-Pogányvár, 19. Kajászó-Várdomb, 20. Sósút-Kálváriahegy, 21. Alcsutdoboz-Pogányvár, 22. Mende-Leányvár, 23. Gomba-Várhegy, 24. Káva, 25. Nagykőrös-Várhegy, 26. Alpár-Várhegy, 27. Dunapataj-Alsószentkirály-Várhegy, 28. Hajós-Hild.

Ferenc Gyulai

CONCLUSIONS ON PLANT CULTIVATION OF MIDDLE BRONZE AGE FORTIFIED SETTLEMENTS DRAWN FROM THE EVIDENCE OF PLANT REMAINS

1. Introduction

The people of the Bronze Age preferred elevations with natural protection, loess plateaus protected by the double terrace system of the Danube banks for their settlements. The fortified Bronze Age settlements along the Danube are known already since the 19 th century.

The significance of botanic material found at Middle Bronze Age (Vatya culture) fortified settlements is only increased by the fact that from the Middle Bronze Age we have relatively few archeobotanic finds, although these finds would help archeologists considerably to get a better knowledge on the plant cultivation and natural environment of cultures with tell settlements.

The overwhelming part of the archeobotanical analyses of botanical remains originated from Middle Bronze Age to be discussed below was made by Borbála Hartyányi and Gyula Nováki and it was completed by the author's analyses during the past years. These results are an important contribution to our picture drawn so far on the plant cultivation of the Middle Bronze Age (GYULAI 1993).

2. Middle Bronze Age fortified settlements studied from botanical point of view (Fig. 19., 20., Table 1.)

Baracs-Bottyán sánc (Fejér county-I. Bóna's excavation)

In 1962 a large quantity of carbonized seeds came to light at the floor level of houses at this fortified settlement (BÓNA 1963, 6). The botanical material is analyzed (HARTYÁNYI, NOVÁKI-PATAY 1967-68, 5-85). The material is in the Museum of Agriculture, Budapest.

Bölcske-Vörösgyir (Tolna county - Gy. Nováki's excavation)

In 1965-67 a settlement belonging to the Nagyrév and Vatya cultures was excavated there. For a botanical analysis soil samples were taken from the features of the about 6,5 m thick sequence of layers. The samples were floated on the spot. The samples taken for archeobotanical analysis originate mostly from houses and from areas between the houses, first of all from pits. This study comprises the material of only those 142 samples which belong to the Vatya culture (Gyulai-Berzsenyi, unpub-

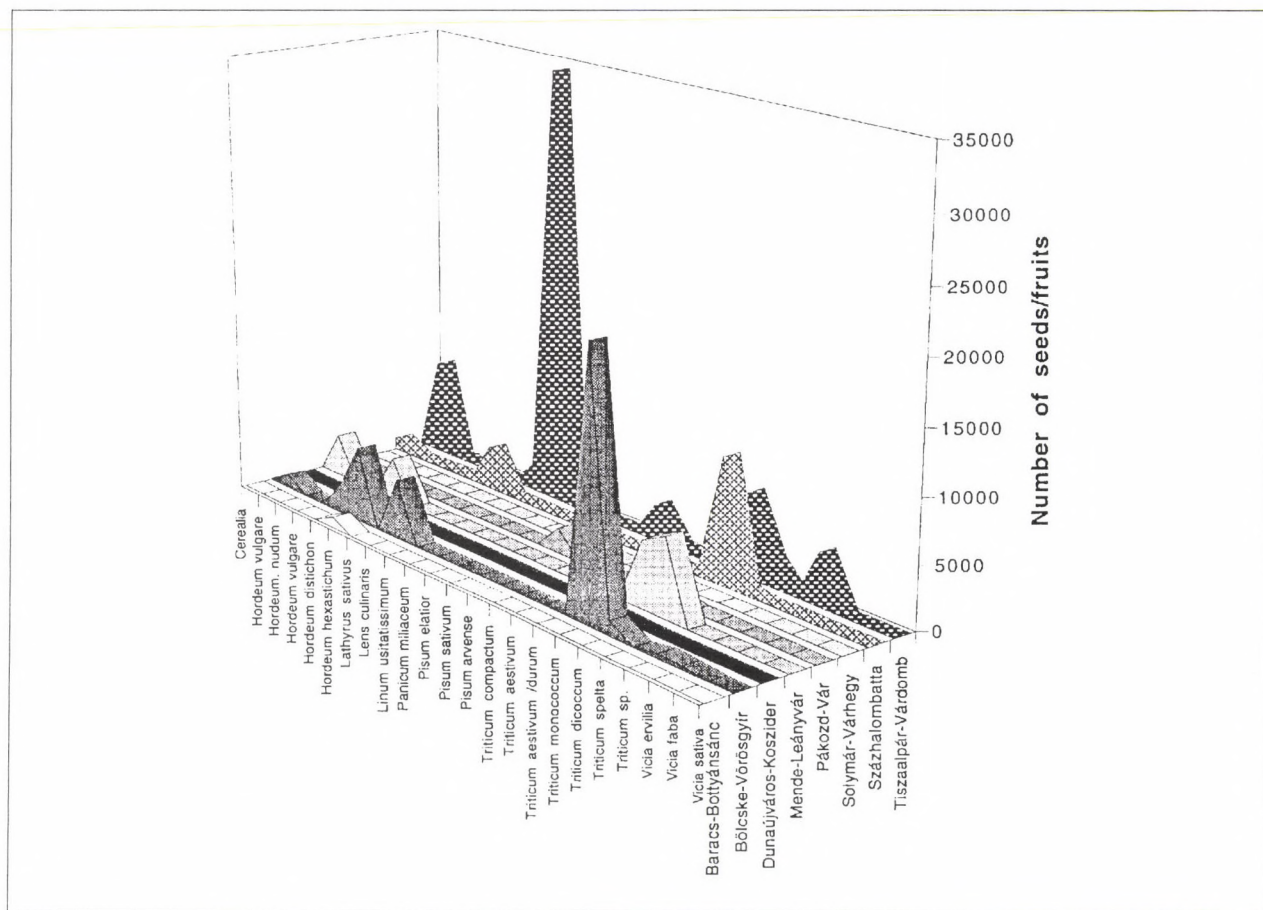


Fig. 19. Plant cultivation of Middle Bronze age fortified settlements

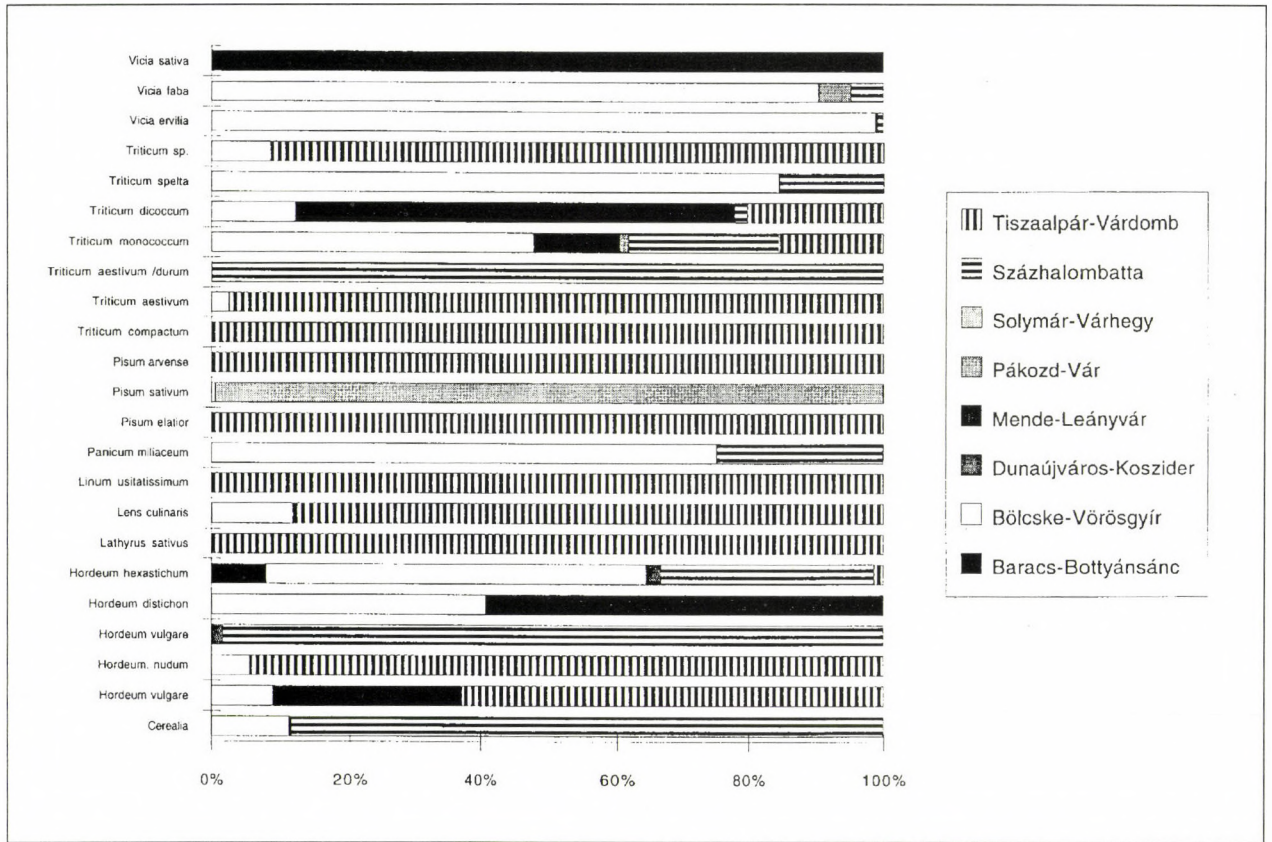


Fig. 20. Plant cultivation of Middle Bronze age fortified settlements

lished). The finds are in the Archeological Institute of Hungarian Academy of Sciences, Budapest).

Dunaújváros (Dunapentele)-Kosziderpadlás (Fejér county – A. Mozsolics's excavation)

During the 1950 excavation in the fortified settlement belonging to Nagyrév and Vatyá cultures seed remains were found (BÓNA 1959). The excavated material was only partly studied, it is impossible to separate the seed remains according to cultures (TEMPÍR 1964). The finds are in the Museum of Agriculture, Budapest.

Mende-Leányvár (Pest county – T. Kovács's excavation)

In 1966 a single layer settlement of a fortified site of late Vatyá culture seeds were found in four pits (HARTYÁNYI-NOVÁKI-PATAY 1967/68). The finds are in the Museum of Agriculture, Budapest.

Pákozd-Vár (Fejér county – A. Marosi's excavation)

In 1925 during the excavation made by in Nagyvár area cca. 10 litre carbonized seeds were found in a pit (MAROSI 1930). On the basis of the archeological material the settlement was inhabited by the peoples of Vatyá, of Northern Pannonian and of Southern Pannonian Incrusted Ceramic Cultures, the seeds may belong to them. The material is analyzed and published, it is in the István

Király Museum, Székesfehérvár. (HARTYÁNYI-NOVÁKI-PATAY 1967/68).

Solymár-Várhegy (Pest county – A. Valkó, A. Endrődi, I. Feld's excavation)

In 1929–32 below the layers of the Medieval fortress scarce remains of a Bronze Age settlement were excavated (VALKÓ 1932/33). The few finds may belong to the Vatyá culture (PATAY 1958). Around one of the hearths a small quantity of carbonized barley was found (HARTYÁNYI-NOVÁKI-PATAY 1967/68). The finds are in the Museum of Agriculture, Budapest.

Százhalombatta (Pest county – T. Kovács, I. Poroszlai's excavation)

In 1963 at the site Százhalombatta-Téglagyár (Brickyard) a fortified settlement of Vatyá culture was excavated (KOVÁCS 1964, 11). During the excavation in four vessels and around them on the ground carbonized seeds were found (HARTYÁNYI-NOVÁKI-PATAY 1967/68). The finds are in the Museum of Agriculture, Budapest.

During a systematic excavation made in 1991 in the Middle Bronze Age (Vatyá culture) tell settlement at Százhalombatta-Földvár carbonized seed and fruit remains well visible even to the naked eye were found in

the profile. A large quantity of soil samples was collected from the Bronze Age layers and was floated. The identified botanical material of the 101 samples which can be regarded as representative is in the Archeological Institute of Hungarian Academy of Science, Budapest (GYU-LAI 1996, 16–24).

Tiszaalpár-Várdomb (Bács-Kiskun county – S. Farkas, Gy. Szalay, P. Patay, I. Bóna, Gy. Nováki's excavation)

Excavations had been started at this site at the right bank of the river Tisza more than a hundred years ago in 1889. Seed remains at the site were observed for the first time in the twenties of this century and in 1949 some of them were collected (The finds are in the Kiskunfélegyháza Museum). In 1974–75 and in 1977 systematic sampling was made. Finally from the four different excavations the archeobotanical material of altogether 42 samples were studied (HARTYÁNYI 1982).

3. Conclusions can be drawn from the botanical material

The majority of the botanical material from the fortified settlements of Vátya culture came to light as sporadic finds, Baracs-Bottyánsánc, Dunaújváros (Dunapentele)-Kosziderpadlás, Mende-Leányvár, Pákozdt-Vár, Solymár-Várhegy, Százhalombatta-Téglagyár. They originate mostly from the neighbourhood of hearths, pits and vessels, therefore they by no means can be regarded as representative. Though systematic sampling was carried out only at three excavations, at the sites Bölske-Vörösgyír, Százhalombatta-Földvár and Tiszaalpár-Várdomb, it is instructive to compare with each other the cultivated plant species originated from all the eight sites.

The majority of seeds and fruits found at these sites belongs to cereals, followed by leguminose remains. Furthermore numerous weeds, wild fruits and other species from the onetime natural environment can be found in the material.

3.1. Cultivated plants

On the basis of the finds the inhabitants of the fortified settlements had a flourishing agriculture. They did not specialize themselves on the cultivation of a single cereal but cultivated several ones to ensure food supply. The important role of cultivated plants in the life of the inhabitants of the settlements and their large-scale cultivation are clearly testified by those „stores”, consisting of a large quantity of cereal grains, which can be found at every site, especially near the hearths, in vessels and in storage pits. They most important cereals were sixrowed barley, einkorn and emmer. This is clear even from sporadic botanical samples. Barley is present in every material, even in materials collected as sporadic finds. E.g. at Solymár-Várhegy it was only barley which was found and at Baracs-Bottyánsánc the ratio of barley was of 98 per cent. Barley was first of all the sixrowed type, though the tworowed variety was also present (Mende-Leányvár).

Among chaffed varieties einkorn and emmer had a decisive role. Among cereals usually einkorn is represented in the largest quantity suggesting that this chaffed species with high protein content was the main „breadgrain” of the inhabitants of the fortified settlements. At Bölske-Vörösgyír nearly three-quarters of the cereal remains belongs to einkorn, while at Százhalombatta-Földvár and Mende-Leányvár twice as much emmer than einkorn were found. Both at Bölske-Vörösgyír and Százhalombatta-Földvár the third chaffed variety of wheats, that is spelt, too, was present, though only in a small quantity, in 1–3 per cent. The same concerns common wheat (Bölske-Vörösgyír, Tiszaalpár-Várdomb, Százhalombatta-Földvár) and dwarf wheat (Tiszaalpár-Várdomb). Therefore they cannot be considered to be widespread, that is they were cultivated only on a small scale. Truemillet was found only at two sites, at Bölske-Vörösgyír and Százhalombatta-Földvár, though rather as sporadic finds. This is the period, that is Middle Bronze Age, when truemillet cultivation was becoming to be widespread.

The store finds of cereals were obviously intended for human consumption, for preparing meals. This is testified also by those six fragments of food remains (bread/pulp) which were found during the study of samples from Százhalombatta-Földvár (Gyulai, unpublished datum).

Leguminose plants found at the fortified settlements were lentils, pea, bitter vetch, horsebean, and some other vetch species. Similarly to cereals several species of leguminoses were cultivated, that is in this case, too, the inhabitants of the settlements tried to ensure their food supply by not insisting on the cultivation of a single species. All this is the evidence of a high level of agricultural knowledge. It is not mere chance since such an exquisite vegetable gardening could have been developed only based on a highly developed plant cultivation. Among leguminoses the seeds of lentils were found in largest quantity, sometimes even fifty per cent of all the seed remains consists of this species (Bölske-Vörösgyír, Tiszaalpár-Várdomb). It is followed by peas (wild peas and field peas). Pea cultivation was very widespread since besides Bölske-Vörösgyír, Százhalombatta-Földvár, Tiszaalpár-Várdomb it was found also among the botanical remains of Pákozdt-Vár. It is noteworthy that at those sites where there were numerous barley crops also the seeds of field peas were found in a larger quantity (e.g. Tiszaalpár-Várdomb). It is not impossible that the origin of sowing barley with pea over it, a tradition survived in rural economy even up to present can be recognized in this phenomenon. Bitter vetch, this leguminose poisonous when uncooked was generally widespread in the Middle Bronze Age, though after the Bronze Age it was dropped out from the group of cultivated plants. Its seeds are found at Bölske-Vörösgyír (there in a very large quantity), at Pákozdt-Vár and Százhalombatta. At these sites also the seeds of horsebean are present. Some other vetch species, being also poisonous when uncooked occurs at Baracs-Bottyánsánc.

Flax seeds were found only at Tiszaalpár-Várdomb (HARTYÁNYI 1982). From the seeds only unfortunately we cannot decide whether at this site flax was cultivated as a fibre crop or as an oil crop.

At Bölcske-Vörösgyőr we were able to arrange the samples into a chronological order. Thus for the first time an opportunity arose for us to distinct certain phases within a single prehistoric culture from the viewpoint of plant cultivation as well (Gyulai-Berzsenyi, unpublished).

There were seven species of cereals cultivated in the oldest phase of Vatyá culture (Vatyá I.), namely two-rowed and six-rowed barley, naked barley, common wheat, emmer, einkorn and spelt. In that period emmer was the main crop, einkorn had only a minor role. In samples taken from Vatyá II period the specific composition of cereals had changed, that is while six-rowed barley and naked barley are still present, two-rowed barley is already absent. As for wheats all the chaffed varieties that is einkorn, emmer and spelt are present and also naked common wheat. It is a unique phenomenon of the Vatyá I-II periods the occurrence of a botanical peculiarity, that is of emmer-like einkorn, or two seeds einkorn. The most cereal species are found in the younger (Vatyá III) phase of the culture where every species mentioned as occurring in Vatyá II culture appears as well, completed by two-rowed barley and truemillet.

From the Vatyá II period onwards the number of cereals was increasing, the quantity of crops was becoming more and more. Regarding the number of crops the most important breadgrain both in Vatyá II and Vatyá III periods was einkorn, surpassing emmer. The third chaffed variety, that is spelt, was also present though only in a few number. Common wheat occurred only sporadically, as a „concomitant” of chaffed varieties. In Vatyá III culture a new and important grain, truemillet, appears. Another difference is that while in Vatyá II culture only six-rowed barley was present, in Vatyá III period two-rowed barley, too was an important cereal in addition to the six-rowed one. All this suggest the existence of a sedentary population having an excellent knowledge of agriculture/plant cultivation. Their diversified cereal cultivation ensured to them safe food supply even in adverse periods.

We do not find leguminoses in the older (Vatyá I) phase. In Vatyá II phase, however, appears and remains also during the Vatyá III period the lentils and the pea and also bitter vetch, a species earlier unknown. Lentils seeds which are present in a surprisingly large number are identified as belonging to lentils (whit small seeds following present classification based on the dimensions of seeds).

At certain sites the number of the remains of chaffs of cereals (earspindle fragments-*furca bicornis*) and the number of seeds and fruits of weed species are unusually high (Bölcske-Vörösgyőr, Százhalombatta-Földvár), it is

possible that they had got into that place where they were found as remnants of threshing or rather of processing. Namely the spicas of these chaffed wheats used to disintegrate during threshing only to spiculums, in most chases chaffs used to remain on the grains. After threshing grains were most probably winnowed. During prehistoric times roasting was a widespread method to get nude grains. During roasting made in vessels the grains had been frequently burnt therefore they were thrown out. By all means this had happened in this case as well.

3.2. Weeds

Weeds also indicate the cultivation of cereals. Their number at those sites where systematic sampling was made (Bölcske-Vörösgyőr, Százhalombatta-Földvár) is very high. It is obvious that at these sites were found the remnants of threshing /cleansing as well. A major part of the cereals could have been winter grain cereal-crop weeds (*Secalitea*), namely field brome and rye brome and black bindweed. The identified weeds are of high growth consequently the cereals were harvested high. It was made most probably by sickle and stems were cut in their 2/3 height.

The remains of wild oat, doeny brome, green bristle-grass and fat-hen species are members of the root-crop weed association (*Polygeno-Chenopodietalia*). They could have been the weeds of summer grain (barley), truemillet and of leguminoses (lentil, pea, horsebean, bitter vetch). The seeds of weeds indicate loessy calciferous soil with high nutritive power, though not dunged.

We must mention here that fathen seeds and doeny brome grains found in the samples may originated from ruderal weed plant associations as well. We may find these ruderal weed associations (*chenopodietea*) in each areas exposed to anthropogenetical effects (along drainage ditches, roads, on the walls of banks, on wastes, in the neighbourhood of buildings) where the soil is rich in nitrogen or maybe dunged.

3.3. Remains of flora cover

At those sites where samples were taken also from the environment of archeological features (Százhalombatta-Földvár, Bölcske-Vörösgyőr) species composing the original flora of the region can be found in great quantity. The quantity of both the species themselves and of their seeds/fruits suggest that the analyzed botanical material of Vatyá culture is a typical paleo-ethno-biocoenosys, that is the major part of the material consists of the remains of cultivated plants together with the weed species belonging to them and in addition to them of the remains of some collected plants.

Though the number of contemporary vegetation elements found in the material is not enough to give an environmental reconstruction they are still suitable to draw from their presence some conclusions regarding Middle Bronze Age environment. These species had got into the material spontaneously, that is accidentally, though as for certain species, e.g. the black berry and crab apple found

at Százhalombatta, being tasteful wild fruits we may reckon with gathering as well.

All this suggests that the environment of the above-mentioned two fortified settlements was diversified. Though the number of contemporary vegetation elements found in the material is not enough to give an environmental reconstruction we may draw some conclusions as regards the environment of the fortified settlements. The presence of dewberry and wild apple at Százhalombatta may refer to the existence of a forest grove around the site. The presence of wall germander refers to a light mixed forest. The existence of meadows is testified by numerous species, medick, sheep's sorrel, meadow clary, meadow fescue, common sorrel, common birdsfoot-trefoil, bur medick, bulbous buttercup.

In the neighbourhood of the Bölcske settlement, too, was by all means a forest. The acorn of oak tree can be identified only on the generic level, is originated from a forest while the sloe and hawthorn originate from shady or dry skirts of the forest. The meadow which was situated near the settlement was most probably moderate/arid. Soft brome and black medick had got into the settlement material from here.

The fruits of several plant species are tasty, edible, therefore we are not mistaken supposing their consumption. The leaves of fat-hen can be prepared for a salad and the consumption of its seeds as a substitute for cereals was a widespread practice in the past regardless of place. The blackthorn, hawthorn, cornelian cherry found at Bölcske-Vörösgyőr were by all means well-known and collected wild fruits, appreciated because of their high vitamin content. They could have been consumed either as uncooked or as processed for jam/syrup. These species have a healing power as well. Naturally it

does not mean that they were used as actual medicinal plants, though we cannot exclude it either. E.g. according to an ethnographic evidence the acorn of oak was consumed after roasting called „acorn coffee” which is a roborant and in the past it was given rachitic children to drink. It cures also the intestinal catarrh elderly troubles of elderly people (RÁPÓTI-ROMVÁRY 1983).

Blackthorn, too, is known as a medical plant. The tea made of its blossom (*Pruni sponosae flos*) has a mild diuretic and laxative effect. The concoction made of its fruit (*Pruni spinosae fructus*) was used against intestinal catarrh. After its fruit had become frostbitten it was also frequently processed for jam which holds back excreta (RÁCZ-RÁCZ KOTILLA-LAZA 1984).

The blossom of hawthorn (*Crataegi flos*), its leaf (*Crataegi folium*), its sprout summit (*Crataegi summitas*) and its red but still hard fruit (*Crataegi fructus*) are used after a dehydration to make a tea of them. It is a sedative and helps the work of coronary artery system, increases the capacity of myocardium. (RÁCZ-RÁCZ KOTILLA-LAZA 1984).

Ruderal plant species are found at each areas exposed to anthropogenetic effects (along drainage ditches, roads, on walls of banks, on wastes, in the neighbourhood of buildings) where the soil is rich in nitrogen, perhaps dunged. The members of ruderal weed associations (*Chenopodietea*) found in the material of the above mentioned two fortified settlements, fat-hen, wild barley-grass, green bristle-grass, hairy edge, white campion, knotgrass, creeping buttercup, thyme-leaved sandwort, wild carrot, common mallow, and here's-foot clover, refer to an area exposed to considerable anthropogenetic effects, giving information on the extension of the settlement.

Table 1.

Table 1. The plantremains of the Bronze Age fortified settlements (No. of specimen, x=sporadic, xx=common)												
Plantspecies	Common name	Remains	Ecological group	Baracs-Bottyánsánc	Bölcske-Vörögyi	Dunaútváros-Köszider	Ménfő-Leányvár	Pákozdi-Vár	Solymás-Várhegy	Százhalombatta-Földvár	Százhalombatta-Téglagyár	Tiszaalpár-Várdomb
<i>Agrostemma githago</i> L.	corncockle	seed	9.3	5		2	4	2		13	132	11
<i>Ajuga chamaeepytis</i> (L.) Schreb.	ground-pine	seed	9.3							1		
<i>Amaranthus lividus</i> L.	green amaranth	seed	9.2							2		
<i>Arenaria serpyllifolia</i> L.	thyme-leaved sandwort	seed	10.3							3		
<i>Avena fatua</i> L.	wild oat	chaffed grain	9.2/9.3		35					15		
<i>Avena fatua</i> L.	wild oat	naked grain	9.2/9.3							40		
<i>Brassica nigra</i> (L.) Koch.	black mustard	seed	9.2/10.3									
<i>Bromus arvensis</i> L.	field brome	chaffed grain	9.3							9		
<i>Bromus arvensis</i> L.	field brome	naked grain	9.3		470		15				89	23
<i>Bromus erectus</i> Huds.	upright brome	chaffed grain	9.3							1		
<i>Bromus mollis</i> L. (syn. hordeaceus)	soft brome	chaffed grain	9.3/8.2		3					5		
<i>Bromus secalinus</i> L.	rye brome	naked grain	9.3		622	3				25		13
<i>Bromus sterilis</i> L.	barren brome	naked grain	9.3	3								
<i>Bromus tectorum</i> L.	doeny brome	chaffed grain	9.2/10.2		1							
<i>Bromus</i> sp.	brome grass species	chaffed grain	diverse	4				1		2	17	1
<i>Capsella bursa-pastoris</i> (L.) Medic.	shepherd's-purse	seed	9.3/8.2			1						
<i>Carex hirta</i> L.	hairy sedge	seed	10.2/8.1/2.2							1		
<i>Carex hordeistichos</i> Vill.	barley sedge	seed	10.2/8.1/2.2									
Caryophyllaceae	pink	seed fragment	diverse							4		
<i>Centaurea pannonica</i> (Heuff.) Simk.	knapweed	seed	8.3									
Cerealia	cerealia	grain	9.1		129	3				1001		
<i>Chenopodium album</i> agg.	white goosefoot	seed	9.2/10.2		3	5	15			60		14
<i>Chenopodium hybridum</i> L.	maple-leaved goosefoot	seed	9.2							2		
<i>Cirsium</i> sp.	thistle species	seed	diverse			1						
<i>Conringia orientalis</i> (L.) Andr.	hare's-ear mustard	seed	9.3	1								
<i>Convolvulus arvensis</i> L.	field bindweed	seed	9.3/9.2/8.3									5
<i>Cornus mas</i> L.	cornelian cherry	putamen	7.3		2							
<i>Crataegus monogyna</i> Jack.	hawthorn	putamen	7.2		1							
<i>Daucus</i> sp.	carrot	seed	diverse			1						
<i>Daucus carota</i> L.	wild carrot	seed	10.3/8.3/9.3							1		
<i>Fallopia convolvulus</i> (L.) A. Löve	black bindweed	seed	9.3	1	2		28			19		3
cf. <i>Festuca pratensis</i> Huds.	meadow fescue	chaffed grain	8.2							2		
<i>Galium aparine</i> L.	cleavers	seed	9.3/ 10.1/ 7.2							1		
<i>Galium spurium</i> L.	green goosegrass	seed	9.3	1			1					
<i>Glaucium corniculatum</i> (L.) Rudolph	common horned-poppy	seed	9.2/ 10.2	1								
<i>Hordeum murinum</i> L.	wild barley-grass	chaffed grain	9.2/ 10.2							5		
<i>Hordeum vulgare</i> L.	barley	chaffed grain	9.1		1095		3350	2	x		4	7552
<i>Hordeum vulgare</i> L. var. nudum	naked barley	naked grain	9.1		9							149
<i>Hordeum vulgare</i> L.	barley	furca bicornis	9.1			2				113		
<i>Hordeum vulgare</i> L. subsp. distichon Zoh.	two-rowed barley	chaffed grain	9.1		2314		3350					
<i>Hordeum vulgare</i> L. subsp. hexastichum Zoh.	six-rowed barley	chaffed grain	9.1	874	5911	231				3385		149
<i>Hordeum vulgare</i> L. subsp. hexastichum Zoh.	six-rowed barley	naked grain	9.1							21		
<i>Lathyrus sativus</i> L.	chickling vetch	seed	9.1									2146
<i>Lens culinaris</i> Medicus subsp. microsperma Baumg.	lentils	seed	9.1	13	4688		1			113		34389
<i>Linum usitatissimum</i> L.	flax	seed	9.1									14
<i>Lithospermum arvense</i> L.	field gromwell	seed	9.3/8.3							6		
<i>Lithospermum officinale</i> L.	common gromwell	seed	7.1/7.3							1		7
<i>Lotus corniculatus</i> L.	common birdsfoot-trefoil	seed	8.2/ 8.3							1		
<i>Malus silvestris</i> Miller	crab apple	seed	4.2							5		

Table 1. The plantremains of the Bronze Age fortified settlements (No. of specimen, x=sporadic, xx=common) 2.

Plantspecies	Common name	Remains	Ecological group	Baracs-Botyánsanc	Bölcse-Vörösgyir	Dunaújváros-Köszider	Mende-Leányvár	Pákozdi-Vár	Sólymar-Vármegy	Százhalombatta-Főcivár	Százhalombatta-Téglagyár	Tiszaújvári-Várdomb
Malus sp.	apple species	seed	diverse					1				
Malva silvestris L.	common mallow	seed	10.3							1		
Medicago lupulina L.	black medick	seed	8.3		1							
Medicago minima (L.) Desr.	bur medick	seed	8.3							2		
Medicago sp.	medick species	seed	8							1		
Melampyrum arvense L.	field cow-wheat	seed	9.3							1		
Melandrium cf. album (Mill.) Gar.	white campion	seed	10.2							1		
Panicum miliaceum L.	true millet	naked grain	9.1		6					2		
Papaver sp.	poppy species	seed	diverse			1						
Papilionaceae	leguminous	seed	diverse		1					2		
Pimpinella saxifraga L.	common burnet-saxifrage	seed	8.3/7.3				1					
Pisum cf. elatior Stev.	wild peas	seed	9.1									4
Pisum sativum L.	peas	seed	9.1		11			2000		18		
Pisum sativum L. var. arvense	field peas	seed	9.1									2950
Pisum sp.	peas	seed	9.1									5
Poaceae	grass	chaffed grain	diverse		7	2				1		
Poaceae	grass	nodus fragment	diverse		5					8		
Poaceae	grass	furca bicornis	diverse		24					52		
Polygonum aviculare agg.	common knotgrass	seed	10.2					45		2		8
Potentilla sp.	cinquefoil species	seed	diverse							3		
Prunus spinosa agg.	blackthorn	putamen	7.2		5							
Quercus sp.	oak species	seed	4.-6.		1							
Ranunculus bulbosus L.	bubous buttercup	seed	8.3							2		
Ranunculus repens L.	creeping buttercup	seed	10.2							1		
Ranunculus sp.	buttercup	seed	diverse							1		
Rubus caesius L.	blackberry	seed	4.1/4.2							1		
Rubus sp.	blackberry species	seed	diverse									
Rumex acetosa L.	common sorrel	seed	8.2							4		
Rumex acetosella L.	sheep's sorrel	seed	8							1		
Salvia pratensis	meadow clary	seed	8							1		
Scleranthus annuus	annual knawel	seed	9.3							3		
Setaria viridis (L.) PB./verticillata agg.	green/rough bristle-grass	chaffed grain	9.2/10.2		1					2		
Stachys annua L.	annual woundwort	seed	9.3							4		
Stellaria media agg.	common chickweed	seed	9.2/10.2							1		
Teucrium chamaedrys L.	wall germander	seed	5							14		
Trifolium arvense L.	hare's-foot clover	chaffed grain	9.3/ 8.3/10.3							2		
Trifolium sp.	clover species	seed	diverse	1								
Triticum aestivum L. ssp. compactum (Host)MacKey	dwarf wheat	naked grain	9.1									285
Triticum aestivum L. ssp. vulgare (Vill.)MacKey	common wheat	naked grain	9.1		5							184
Triticum aestivum L./durum Dest.	common/durum wheat	naked grain	9.1							7		
Triticum monococcum L.	eincorn	naked grain	9.1	x	20823		5200	500		133	8600	6680
Triticum monococcum L.	eincorn	furca bicornis	9.1		22	80	xx			810	x	
Triticum turgidum ssp. dicoccum (Schrank)Thell.	emmer	naked grain	9.1	4	1158	10	6200	10		420	32	1961
Triticum turgidum ssp. dicoccum (Schrank)Thell.	emmer	furca bicornis	9.1		43		xx			56		
Triticum aestivum L. subsp. spelta (L.) Thell.	spelt	naked grain	9.1		33					7		
Triticum aestivum L. subsp. spelta (L.) Thell.	spelt	furca bicornis	9.1							4		
Triticum sp.	wheat species	grain	9.1		415					101		4228
Vicia angustifolia L.	narrow-leaved vetch	seed	9.3							2		
Vicia ervilia (L.) Willd.	bitter vetch	seed	9.1		325			1		8	1	
Vicia faba L.	horsebean	seed	9.1		19			1		2		
Vicia sativa L.	common vetch	seed	9.1									
Vicia sp.	vetch species	seed	diverse	4	1					1		
Food remains	gruel/bread fragment									50		
Tilenchus tritici Bauer	black rust	sporodochium										7

Table 1. continue