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The northern periphery of the Early Neolithic Starčevo culture in south-western Hungary: a case study of an excavation at Lake Balaton

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ABSTRACT – *Vörs-Máriaasszonysziget is one of the northernmost lying sites of the Starčevo culture discovered in Hungary recently, which allowed the authors to reconstruct important steps in the neolithisation of the Carpathian Basin. The Northern distribution limit of the Starčevo-Körös-Criş complex forms not only the periphery of the earliest Neolithic communities, but represents also a frontier zone between the earliest farmers and the local hunter-gatherers at the turn of the 7/6 millennium BC. The appearance of new features in pottery production that turned to be main characteristics of the Oldest Linearband Pottery culture and the raw materials distribution are discussed in context of farmer-forager interactions on the agricultural frontier zone.*

POVZETEK – *Vörs-Máriaasszonysziget je eno najsevernejših najdišč kulture Starčevo, ki so ga nedavno odkrili na Madžarskem. Avtorji članka so lahko na osnovi tega najdišča rekonstruirali pomembne korake neolitizacije Karpatske kotline. Severna meja razširjenosti kompleksa Starčevo-Körös-Criş predstavlja obrobje zgodnjeneolitskih skupnosti in hkrati tudi mejni pas med zgodnjimi kmetovalci in lokalnimi lovci-nabiralci na prehodu iz 7. v 6. tisočletje BC. V članku obravnavamo pojav novih značilnosti pri izdelovanju keramike, ki so postale glavna lastnost najstarejše kulture Linearnotrakaste keramike, ter razširjenost surovin in sicer v luči medsebojnih vplivov med kmetovalci in lovci-nabiralci na kmetovalski meji.*

The Starčevo culture constitute the westernmost unit of the large Early Neolithic archaeological complex, comprising, towards the east the Körös culture and further east, Criş, a culture representing the first food-producing communities in the region. It is connected with more loose ties to the Bug-Dniestr culture, lying further to the east, the formation of which, however, was also influenced by other factors (*Маркевич 1974; Larina 1994, Fig. 1*). As has been noted several times, the complex of Starčevo-Körös-Criş cultures form the northernmost territory, i.e., the periphery of the vast area where the Early Neolithic archaeological heritage is intensively influenced by Balkan-Aegean traditions. The lively discussion of recent years has only concentrated on unfolding the nature and extent of this southern, south-eastern influence, as seen from this peripheral "frontier" position[1].

The limits of the aforementioned periphery start at the foreland of the Alps and run across the southern parts of Transdanubia in a west-east direction along Lake Balaton, turning north in the Tisza region of the Alföld up to the great bend of the Tisza. From here, the limits terminate, across Transylvania and the Northern part of Rumanian Moldavia to the river Dniestr in the central part of the Moldavian Republic (Fig. 1) (*Larina 1994, Fig. 1*). The archaeological

1 It is most exciting that the last four volumes of "Poročilo" edited by M. Budja (*Vols. 21, 1993; 22, 1994 (1995); 23, 1996; 24, 1997*) were devoted to the question of European Neolithisation, giving a forum and space to sometimes conflicting views. Further works on this issue: *Barker 1975*; *van Andel, Runnels 1995*; *Bogucki, Grygel 1993*; *Velušček 1995*; *Budja 1996b*, etc.

heritage is bound by many indisputable threads to southerly regions. The great problems are how to interpret historically the attestable archaeological contacts with the Balkano-Aegean region, and how to explain the northern limit of distribution. The three cultural units (Starčevo, Körös, Criş) of this large northern Early Neolithic complex can be well considered as three independent cultures. Distinguishing features can be spotted within the great unit in several characteristics of settlement features, and in the quality and quantity of material and spiritual cultural heritage; taken together these features offer adequate grounds for separating the individual cultures (*Raczky 1976; Kalicz 1980; 1983; 1990; 1993*).

Among the three cultural units, the Körös culture occupies the smallest territory. Its density of sites and richness of the material culture, however, is exceptional in this period, and far surpasses that of the other two cultures. The explanation for this unexpected abundance can be found in differences in ecological relations. Only the territory of the Körös culture is fairly homogeneous, fertile flatland, where differences in altitude are negligible and soil quality is also fairly even. At the same time, this central part of the Alföld (Great Hungarian Plain) densely criss-crossed by living waters and periodically inundated land, the most extensive area of the Carpathian Basin, offered an especially favourable micro-climate for the first farming communities occupying the region. The forest groves and grass-lands, steppes, and "Pusztas" offered favourable conditions for both domestic animals and game, and the abundance of the latter provided conditions for easy hunting. It must be said, however, that hunting was less important in the life of Early Neolithic communities than, for example, in the Late Neolithic (*Bökönyi 1992. 197–201, 233–239*). At the earliest settlements, the people of the Körös culture basically consumed the meat of domestic animals and the ratio of hunted animals, apart from some local exceptions, was negligible in the food supply. The protein sources included, apart from meat, an almost inexhaustible stock of fish, freshwater mussels, and other resources, obtained from the rivers and the flood plains. The immediate surroundings of the settlements was also suitable for the cultivation of plants, i.e., corn. Favourable natural endowments are indirectly reflected in the density of settlements and the wealth of archaeological finds, animal bones, fish and shell remains. In our opinion, no other places in Europe offered, in the scale of the whole culture, comparably favourable conditions, with the exception of small ecological niches. The factors permitting and facilitating the existence and flourishing of Körös culture are so different from an average Early Neolithic footing that, in spite of its peripheral position, it can be considered a special, evolved case among south-east European cultures.

The Starčevo and Criş cultures, in a way, surrounded the Körös habitation area in a large semicircle (Fig. 1). The ecological relations of the Starčevo and Criş cultures were essentially different from that of the Körös culture. Smaller and larger flatlands, basins, river and stream valleys, as well as hills and Alpine-type mountain ranges can be found in the habitation area. With the exception of the wide, swampy valley of some great rivers (e.g. the confluence of the Danube and the Sava), the living water environment was as important here as on the Alföld. The strategy for acquiring food was more variable compared to Körös subsistence strategies, as a result of the more variable local natural endowments.

The population belonging to these cultures (Starčevo, Criş) also intruded into the high mountain ranges and adapted successfully to a variable local environment without essential modification to the material culture so far unearthed. This feature allows us to hypothese, among others, the existence of permanent communication networks.

As a special case we can mention the settlements in the Iron Gate region where the subsistence strategy was based on the Danube and girdled with high mountains (*Srejović 1969; 1972; 1981; Jovanović 1969; 1972; 1975; Comşa 1974 with all earlier references; Stalio 1986; Vasić 1986; Stanković 1986*). We can also mention Bosnia, the complete territory of which has yielded only four sites (*Leković 1995. 36*), two of which, however, Tuzla and Obre seem especially important with tell settlements proving the existence of long-term permanent occupation (*Čović 1960/61; Benac 1973*). In the case of Obre, communication routes running along the valleys of the Neretva and Bosna rivers and passing Obre are especially important (*Gimbutas 1974.11–13*). The range of the Dinarian Alps running along the western part of Bosnia probably forestalled the population of the Dalmatian coast by Starčevo people. It is well known that the narrow zone of the Adriatic coast was inhabited by different Early Neolithic cultures (Impresso ceramics) (*Müller 1994*) that were essentially different from the appearance of the Starčevo and Criş cultures, never reaching the coast all along their vast areas of distribution. The territory of the Starčevo culture is following the N–S direc-

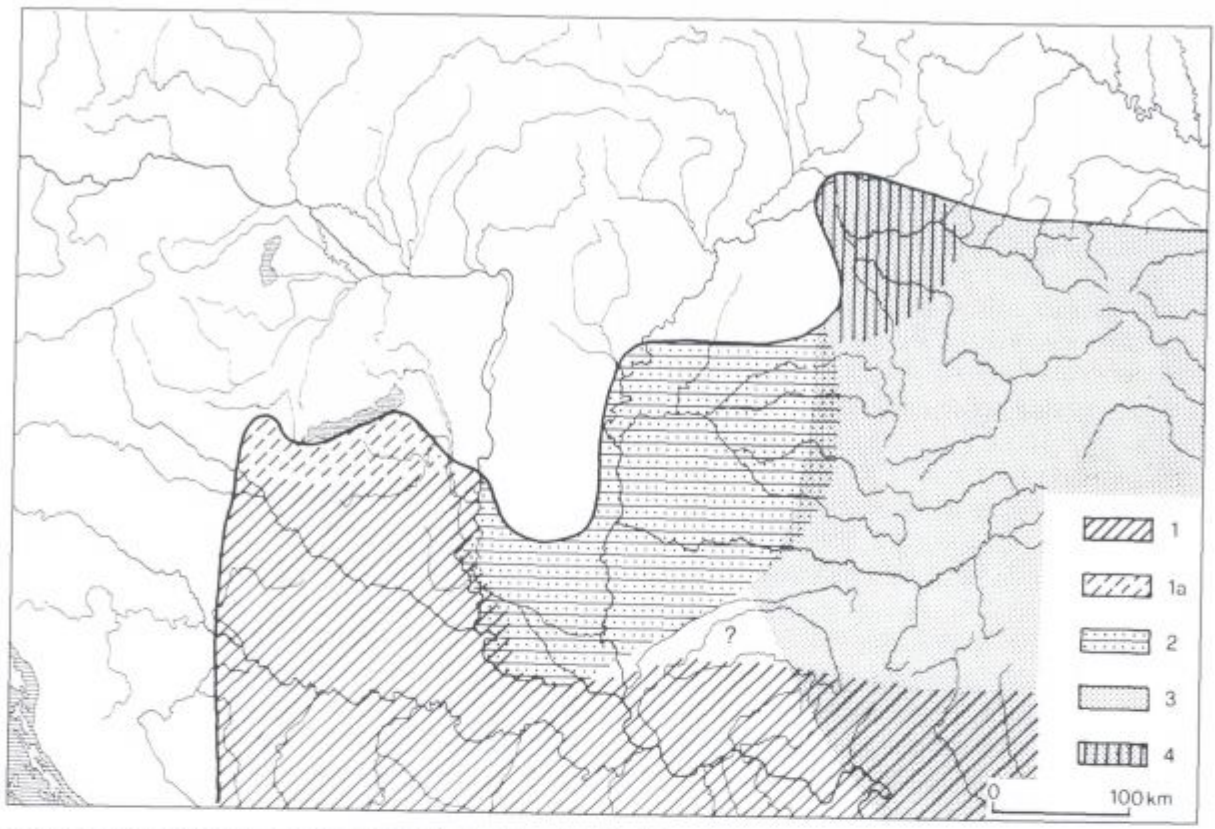

Fig. 1. Early Neolithic cultures in the Carpathian Basin. Key: 1. Starčevo culture, 1a. Periphery of the Starčevo culture, 2. Körös culture, 3. Criş culture 4. Méhtelek facies of the Körös culture.

Fig. 2. Sites of the Starčevo culture in Southern Transdanubia (Hungary), Croatia and Syrmium. Key: Vörs-Máriaasszonysziget.

tion axis of the Vardar and Morava rivers from Macedonia to the mouth of the River Sava, and following the valleys of the Danube-Sava and Drava, the main area of distribution widens in an E–W direction (*Arandelović-Garašanin D. 1954; Garašanin M. 1958; 1979; 1982; Dimitrijević 1966; 1969a; 1969b; 1974; 1979*). In my opinion, the wide strip of land starting from the central Balkans can be still considered as a possible route for neolithisation for large parts of the Carpathian Basin. The other communication route also reaching the Carpathian Basin and running similarly in a S–N direction is the Struma valley with northward running course connected to this towards the Danube. The lower reach of the Danube, currently lying between Bulgaria and Romania, transferred the early Neolithic achievements towards the North (Transylvania) and the North-west (Tisza Valley). The two routes of southern origin could possibly meet in the Sava and Drava Valleys. The Criş culture was formed along the Oltenian rivers and passes in Transylvania (*Lazarovici 1969; 1979; 1984*) and round the Eastern Carpathes, in Moldavia (*Ursulescu 1984*). The formation of the Körös culture took place along the river Tisza (*Kutzián 1944; 1947*), while the Southern parts of Transdanubia were taken over by the Starčevo culture following the rivers Danube-Sava-Drava, to the East, along the Sihievements towards the North (Transylvania) and the North-west (Tisza Valley). The two routes of southern or Zala flowing into the Balaton and, to the West, the Alpine forelands (Fig. 2) (*Kalicz 1978; 1990; 1993; H. Simon 1996*).

As pointed out earlier, at the beginning of the Early Neolithic period these three cultures were fairly uniform (which is probably why the complex was separate within Early Neolithic units: *Kalicz 1983; 1990; 1993*). The separation of the individual cultures started only later, not at the very beginning. Observing the phenomenon from Yugoslavia, almost the entire territory of which was occupied by the Starčevo culture, D. Srejović termed this earliest Neolithic unit "ProtoStarčevo" (*Srejović 1971.14–15; 1981.176–180*) which is, however, rather unfortunate, as the same phase of development can equally be seen in the territory of both the Körös and Criş cultures. Thus the same phenomenon could equally be termed "Donja Branjevina", "Gura Baciului", the "Szarvas 23" phase, "ProtoKörös", or "ProtoCriş", as did J. Paul (*1995*).

Our current level of understanding suggests that by the time the Early Neolithic communities reached Transdanubia, the separation of the three regional versions of the great complex was complete, as only the classical and late phases of the Starčevo culture are known throughout the territory (*Kalicz 1978; 1980; 1983; 1990; H. Simon 1996*). However, we must be very careful with such exclusive statements. For example, after the discovery of the first Neolithic communities established in Northern parts of Transdanubia, the Central European type Oldest Linear Band Pottery Culture, the evidence for distribution was concentrated for two decades at sites lying further west of the Danube. The classical phase of LBC was known far to the east of Budapest as well, with a site density great enough to indicate a seemingly reliable border region. Only the investigations of the most recent years have shown the distribution of the oldest phase of this culture to east of the Danube, in the same region where the classical phase of the LBC has long been known (*Kalicz, Kalicz-Schreiber 1999*). In other words, the Central European LBC took hold of the same territories from the beginning where the classical LBC with its numerous sites had spread. Similarly, we cannot finally exclude the possibility of finding the oldest phase of Starčevo ("ProtoStarčevo") culture within Transdanubia. Allowing for this, we can suppose that the distribution of Early Neolithic cultures in Western Hungary would be similar as in the classical and late phases of the Starčevo culture.

The settlement lying closest to the Danube with the oldest phase of habitation is Donja Branjevina, which is opposite the mouth of the Drava on the Eastern bank of the Danube, already on the Alföld side. This site had a strategic location at the crossroads of natural communication routes, as well as being an important point of contact between the Starčevo and Körös cultures, taking a different turn of regional development in times to come (*Karmanski 1968; 1975; 1979; Trbuhović-Karmanski 1993*). Farther away from the Transdanubian region, the Dobanovci site, opposite the mouth of the Sava, is a site of similar strategic importance, but unfortunately it was less intensively investigated (*Todorović 1968; Dimitrijević 1974.100, Pl. 1, 1–7*). The sites at the Iron Gate can be classified here, constituting surprisingly the most dense network of occupation of the early period (as above).

A similar importance can be attributed to sites of the Eastern parts of the Carpathian Basin along the rivers in Oltenia (most important among them, Cîrcea and Grădinile: *Nica 1976; 1977; 1981*)) and sites of similar age in the valley of rivers running through the Carpathians (e.g., Ocna Sibiului: *Paul*

1995). In the heart of Transylvania, the site Gura Baciului has attained general fame (*Vlassa 1972; Lazarovici-Maxim 1995*). In Eastern parts of Hungary, this period seems to be represented by some units of the Szarvas 23 site, finds from which have yet to be published in their entirety (*Makkay 1981; 1996*). We can neglect here more the southerly, exposed Central Balkan sites, mentioning only that the character of the early Neolithic sites in the Serbian parts of the area agree well with the most ancient finds of the Carpathian Basin. On all these sites so-called "monochrome pottery" is mentioned as the earliest phase of the first pottery periods, which is rather difficult to interpret due to the scarcity of data.[2] According to our current knowledge, the presence of the common type of the earliest Neolithic can be traced from Central Serbia to the West-Eastern midline of the Carpathian Basin. There are no significant differences in the finds, just as there are no essential chronological differences.

The study of the Transdanubian settlements of the Starčevo culture has raised several important questions, most of which cannot be answered yet. On the 18000 km^2 of territory, currently known as the Transdanubian distribution area, there are still only 18 known sites. It is highly probable that the number will grow, as has happened lately in Croatia. According to K. Minichreiter, the number of sites known between the Drava and the Sava rivers is about 60, increasing in density towards the east (*Minichreiter 1997*). According to V. Leković, in the much smaller Syrmium region, straddled by the Drava, Sava and Danube, the number of sites is already 56 (*Leković 1995*). The geographical conditions bordered by the rivers are basically similar to the natural endowments of southern parts of Transdanubia, therefore we are confident that the number of settlements will also grow considerably in Hungary. The settlements of Croatian and Syrmian territories are especially mentioned because, apart from the geographical conditions, the similarity of finds also connects them closely to Southern Transdanubia. The territories lying to the south and north of the river Drava can be considered as belonging to the same cultural entity, and this entity is also supported by environmental conditions.

The neolithisation of Southern Transdanubia probably started during the frequently quoted "monochrome" phase which is, however, not adequately defined for northern territories. It is beyond doubt that the process of neolithisation proceeded from the south towards the north (*Ammerman, Cavalli-Sforza 1971; 1973; Chapman, Müller 1990; Chapman 1994*). In respect of Transdanubia, the lines of communication which facilitated this were the valleys of the Danube and the Drava. The earliest settlers were attracted farther along the Danube by the waterways of the Sió-Sárvíz, while along the Drava, parallel stream valleys running north to south are typical of the whole Hungarian reach of the river as far as Lake Balaton and the large northern bend of the River Zala mentioned above (Fig. 1,2).

Several questions arise concerning the first Neolithic settlers. One of most important is the character of ecological conditions at the beginning of the Neolithic in the southern parts of Transdanubia. Palinological analyses would be a good tool for environmental reconstruction. These are, however, not very abundant, we can still build our knowledge mainly on the drilling probes of B. Zólyomi (*1980*).

In trying to collate the data of pollen chronology and calibrated ^{14}C dates, we find that neolithisation of the southern part of the Carpathian Basin, and also in Transdanubian territory, had already begun at the beginning of the Atlantic climate zone. The beginning of the Atlantic period is generally dated to 5500 BC (although some favour 6000 BC: *Borsy 1985*), while the earliest Neolithic cultures are dated to the first half of the 6th millennium, and some data indicate the middle third of the 6th millennium BC Unfortunately, we have no relevant data from southern Transdanubia as yet. We have a seemingly young radiocarbon date from a Late Starčevo settlement, Becsehely (6425 bp, that is, 5550–5290 BC (*Kalicz 1990.92*)). Thus we can only consider the data of the nearest and neighbouring settlements which can be tentatively applied to the start of neolithisation in Transdanubia (*McPherron et al. 1988.379–381*: Divostin: 5945–5685 BC; Grivac: 5985 BC; Banja 5810 BC; *Gimbutas 1974.15–21*: Obre IA 6250–5750 BC; *Ehrich 1977*; *Gläser 1991*: Starčevo 5800–5290 BC). The Hungarian Körös dates are, according to Hertelendi et al. (*1995; 1998*) are 5950–5400 BC for the earliest period, and 5770–5230 BC for the later phase. In the first half of the Atlantic climate phase, that is, during the Early Neolithic period, the pollen of mixed deciduous vegetation (oak, lime, elm and beech) can be found. Conifers and hazelnut

2 *Srejović 1971; 1973; 1981; Jovanović 1969; 1972 1975; Dimitrijević 1974; Makkay 1982*; Remarks on the "monochrom" pottery: *Kalicz 1990.89*.

were still present in a significant ratio around Lake Balaton. These features indicate considerable woodlands which are, however, less dense than later. At the same time, non-arboreal plants are also represented, indicating grasslands probably in valley bottoms. It should be mentioned as a positive fact that occasionally the pollen of cerealia and weed plants can also be found in small quantities, which is not statistically relevant, but very important for our subject (*Zólyomi 1980; Járai-Komlódi 1987; Füzes 1989.142–145, 203; Willis et al. 1997; 1998; Szathmáry 1983; 1988; 1991*). The vegetation of the Alföld was essentially different, with much looser arboreal vegetation and the presence of more non-arboreal plants. Recently, P. Sümegi and R. Kertész examined the Early Neolithic environment in a fundamental paper (*Sümegi, Kertész 1998*) attesting, partly, to trends similar to that of our era, and observing a mosaic-like character in the Carpathian Basin due to the movement of flora and fauna caused by rhythmic changes in climate since the Late Pleistocene.

Closed forests are still characteristic of the southern Transdanubian region, and general in almost the entire Holocene period. This feature can explain the less dense habitation compared to the Alföld in the Early Neolithic, and the lower supporting capacity. Auroch, which had been one of the key elements of the economy in steppe-like regions since the beginning of the Neolithic, had a much smaller territory. It is also probable that a considerable degree of deforestation was needed for the establishment of settlements, and perhaps also for areas selected for cultivation. So far, we do not have enough direct evidence of cereal cultivation during the Early Neolithic in Southern Transdanubia, but the little direct and much more abundant indirect evidence certainly prove its existence. Among the rare direct evidence there is an altar fragment found at Kéthely, undoubtedly representing Starčevo culture, in which burnt cereal remains were found in the eye sockets of a sculpted human head (*Füzes 1989.161–162*). At the same time, pieces of burnt clay (daub) found at several localities contain abundant corn chaff prints, and the same can be said of pottery. These remains were found in large numbers at Lánycsók (Baranya County) at one of the settlements of Starčevo culture (*Kalicz 1990. Pl. 9*). On the fragments of vessels and (daub) of the Körös culture, the chaff prints can in most cases be observed with the naked eye; several pieces of corn fragments were obtained from these prints. The chaff fragments were generally used for tempering all types of Körös and Starčevo pottery, most of them being from cereals (*P. Hartyányi, Nováki 1971/2; Füzes 1989.155–157*). In the (Proto)-Starčevo cultural layers of Divostin and Grivac, palinological studies have confirmed the presence of cerealia, and burnt corn grains were also found at the settlement (*Grüger-Beug 1988*). The so far deficient, but potentially increasing evidence proves the wide distribution of agriculture and cereal cultivation during the Early Neolithic not only on the Balkans, but also in the Carpathian Basin.

The above incidental data indicate that during the Early Neolithic, favourable conditions were formed wihtin the Carpathian Basin, with some regional variations similar to the Balkans (*p.e. Kordos 1978a; 1978b*).

The known settlements of the Starčevo culture are usually distributed at considerable distances from each other. Communication between these settlements is shown by the presence of non-local objects such as stone artefacts made of raw materials coming from more distant territories. Radiolarite from the Bakony mountains and other raw materials are found on some sites as we shall see below. The obsidian of the Tokaj-Zemplén mountains are not known yet from the Early Neolithic Starčevo finds of Southern Transdanubia. This must be accidental, as obsidian has been found in the Eastern Slavonia and Sirmium Early Neolithic sites (Vinkovci: *Chapman 1981.302–304*; Golokut-Vizić: *Kaczanowska-Kozłowski 1984–85.27–31*) and even on the eponym site (*Fewkes et al. 1933.47*). On the Obre site, mentioned formerly as lying along important communication routes, obsidian has also been found (*Benac 1973.365; Sterud & Sterud 1974*). The exact provenance of the Obre obsidian is not known yet; it could equally be of both Carpathian and Melian origin (Lipari obsidian should be also considered), but undoubtedly it was brought to the site as a result of very distant relations (*Willms 1983.342–346*). Similarly, obsidian is known from the contemporary layers of Tuzla as well as more southerly, exposed sites in the Morava valley (Grivac, Drenovac, *Chapman 1981.302–304*). From the Early Neolithic of the Trieste Karst the presence of Carpathian obsidian is, specially mentioned (*Biagi et al. 1993.58*). Obsidian is also known from the earliest Neolithic sites of Transylvania and Oltenia. Their quantity is not great, but this is not surprising considering their great distance from the source region (*Vlassa 1972.178; Lazarovici, Maxim 1995.390; Nica 1977, fig. 6, 7–8*). It can also be concluded from their scarcity that they were not items of daily necessity. The site at Lepen-

ski Vir is especially interesting in this respect because, in the Early Neolithic layers, Tokaj obsidian from the north occurs with Aegean Spondylus shell (*Srejović 1969.173; 1972; 1981.173*). All these features show that at the beginning of the Neolithic, long-distance connections were already established, probably being based on Mesolithic antecedents.

The identity of the carriers of the neolithisation of Transdanubia, as well as questions of "when" and "how", are the focus of intensive discussion. Unfortunately, the scarcity of evidence precludes a reassuring answer. The subjective judgement of students of the period interfere considerably in deciding on migration, diffusion models or the formation of a local autochthonous Neolithic culture. Like archaeology, physical anthropology still does not provide enough evidence on this matter. Zs. K. Zoffmann and J. Nemeskéri emphasised the heterogeneity in the anthropological remains within the material of the two cultures (Starčevo and Körös). She attributed this to differences in origin, i.e., the variations in the anthropological evidence were traced back to the mixture of local population and southern immigrants (*K. Zoffmann 1977–78.157–162; 1988.447–454; Nemeskéri 1972.201–202; 1981.268*). A similar mixture of anthropological types was observed in the Iron Gates materials excavated later (*Radosavljević, Krunić 1986.51–56*).

The contributions of palaeozoological and palaeobotanical evidence are heavily debated, as some scientists postulate the existence of the wild forms of all domestic animals and cultivated plants in the Balkans, and even the Carpathian Basin during the late Mesolithic (*Whittle 1985.11–12, 65; Budja 1993; 1996*)[3]. It is not aimed here that authors should recite the known contradictory theories on migration, diffusion and local development with all their variants. Lacking decisive new evidence, the formerly expressed opinion is maintained: i.e., neolithisation in the Carpathian Basin took place as a result of the interaction of an autochthonous, so far hypothetical, local, Mesolithic population and an infiltrating(?), immigrating(?), smaller, southern groups conducting already a "Neolithic" way of life. Recently, in a micro-region in the northern parts of the Alföld, the Jászság area, several sites of the formerly hypothetical Mesolithic population have been found in several chronological phases (*Kertész 1991; 1996, with all earlier references*). According to R. Kertész, the youngest Mesolithic finds can be dated to the early phase of the Atlantic period. This period is partly contemporary with the existence of the Early Neolithic Körös and Starčevo cultures as well (*Kertész et al. 1994; Kertész 1996.23*). This Northern region of the Alföld was never populated by these two cultures, which means that the earliest food-producing groups in the Carpathian Basin did not occupy this region, i.e., the Early Neolithic Körös culture was not formed here. According to P. Sümegi and R. Kertész, the Late Mesolithic population was ready to adapt itself to Neolithic achievements (*Sümegi, Kertész 1998*) which had taken place probably by the end of the Körös and Starčevo cultures. It should be stressed that his investigations proved the existence of a Mesolithic population similar to that in neighbouring regions of Hungary. The high level of Mesolithic culture was best presented by the excavations at the Iron Gates. At the same time this population was not acquiring notions of a productive economy by itself, together with the technical and cultural achievements characteristic of the productive way of life. Certain ethnic impetus from the south transferring Neolithic ideas, characteristic material and spiritual culture, all domestic animals and cultivated plant species were needed for the neolithisation of the local population.

It should be stressed that we think of no large-scale direct migration from the far south, but of smaller immigrant groups from the northern Balkans where the Proto-Starčevo phase was formed earlier. Although we cannot fully agree with the theory of Ammerman-Cavalli-Sforza on the mechanical explanation of northern distribution, it is clear that the known absolute dates of the Early Neolithic tend to be younger proceeding from south to the north. This feature shows the direction of neolithisation clearly (*Ammerman, Cavalli-Sforza 1971; 1973; Chapman-Müller 1990*). The content of the process, however, always simultaneously influenced a larger area. This means that the model of distribution is more staged, than ramp-like. All this happened in the southern part of the Carpathian Basin, thus in southern Transdanubia, at the turn of the 7/6th millennium BC, or the beginning of the 6th millennium BC. The process of neolithisation stopped here for a time.

The borders of the northern periphery of the Starčevo culture, observed and drawn during the last two

3 The representation of wild goat in the Carpathian Basin and Bulgaria (*Makkay 1996; Budja 1996a*) is at least questionable, given that with the investigation of several ten of thousands of animal bones, no wild-goat remains were found.

decades, can be considered more or less stable. The question can be raised, why this frontier zone existed in the same time. Ecological condition do not necessarily imply a barrier here. Although only a few specialists have ventured to give an explanation, opinions vary considerably. One of the strongest points is that hypothetical northern Mesolithic populations did not immediately conform to neolithisation, and blocked the distribution of Starčevo and Körös cultures farther to the North (*Kalicz 1965.33–35; 1983.108–109; Kalicz, Makkay 1972.78; 1977.18; Makkay 1982.21–22; 1996.40–42*). According to another explanation, climatic factors prevented the further northern distribution of the first Neolithic farmers, because the natural endowments as a system were already not found there (*Pavúk 1980.171–173; 1996.30, 33*). The most tenable current view is the acceptance of a "Central-European-Balkan agro-ecological barrier" as proposed by P. Sümegi and R. Kertész in their excellent paper (*Sümegi, Kertész 1998*). Their convincing reasoning is quoted here, almost word for word. The environment formed as a function of different climatic, soil geographical, hydrological factors "...the communities with Mediterranean cultural and economic traditions, reaching the periphery of Balkan environmental and climatic endowments were, in a way trapped by the more northerly exposed ecological conditions. Their distribution slowed down, then completely stopped along the Central-European-Balkan agro-ecological barrier". According to the authors, the Mesolithic hunters living north of the barrier came close to the vicinity of Early Neolithic groups and were allowed time to adapt to Neolithic technical and economic novelties without integrating culturally and demographically with Neolithic communities of Balkan origin. Our earlier opinion agrees well with the conclusions of the author, according to which "...the Mesolithic communities living south of the barrier assimilated into the Mediterranean type neolithisation process, culturally and demographically, with the exception of certain places of isolation (e.g., Iron Gates). It seems that the "Central-European-Balkan agro-ecological barrier" played a decisive role in the formation of a different character of local Neolithic to the north of the barrier, adapting to local environmental conditions (*Sümegi, Kertész 1998.156–157*). On the basis of our present state of knowledge, we can fully agree with the statements of the cited authors. In our former studies, this barrier was understood as the meeting zone of the Balkan-Aegean region and the Central European region. Smaller scale migrations were postulated as reaching the northern periphery of the Balkan-Aegean region. Further migrations were, however, not postulated, but rather an exchange of ideas, a transfer of Neolithic achievements (*Kalicz 1980, 1983, 1993, 1995; Makkay 1982.23; 1987; 1996.42–43*). The same opinion is maintained today. Our conception can be brought into accordance with "agricultural frontier" model of R. W. Dennel and M. Zvelebil (*Dennel 1985; Zvelebil 1986; 1995*).

CASE STUDY – VÖRS-MÁRIAASSZONY-SZIGET

Evidence concerning the settlement area of the Starčevo culture has undergone considerable change since the beginning of the 'seventies. The pioneering study of S. Dimitrijević proposed, at that time, the northern distribution limit of the culture at the line of the Drava river (*Dimitrijević 1966; 1969a; 1969b; 1974; 1979*). Sites of the Starčevo culture were discovered by Hungarian research in the southern parts of Transdanubia (*Kalicz 1978; 1980; 1983*). These sites clearly indicated that the northern distribution of the culture went beyond the River Drava. The investigations of the 'eighties and 'nineties has proved the existence of the Starčevo culture up to the line of Lake Balaton (*Kalicz 1990; 1993; Füzes 1989.142–145*). Even further north, west of Lake Balaton, in the northern bend of the River Zala, an independent Starčevo site was found (Gellénháza, in the vicinity of Zalaegerszeg: *H. Simon 1996*). According to our present knowledge, this is the northernmost distribution limit of the Starčevo culture. Probably, this northern distribution limit can be considered stable (Fig. 1. 1).

One of the northerly settlements was found in 1990 at Vörs, Máriaasszony-sziget, Somogy County, which proved for the first time that Starčevo people reached the line of Lake Balaton, proceeding along the north-south oriented tributaries of the Drava river (*M. Virág 1996; M. Virág, Kalicz 1999*). These communities proceeded further to the north along the River Zala.

The Máriaasszony-sziget (island) is located in wetlands connected to the SW corner of Lake Balaton. Before the regulation of the marshy area, rescue excavations were performed there (Fig. 3). The excavations were connected with the investigation of a small medieval church, during which four smaller sondage sections were opened to the south of the church. On the area investigated (some 500 m^2), traces of intensive occupation by Early Neolithic, Starčevo people were found. The units and details of

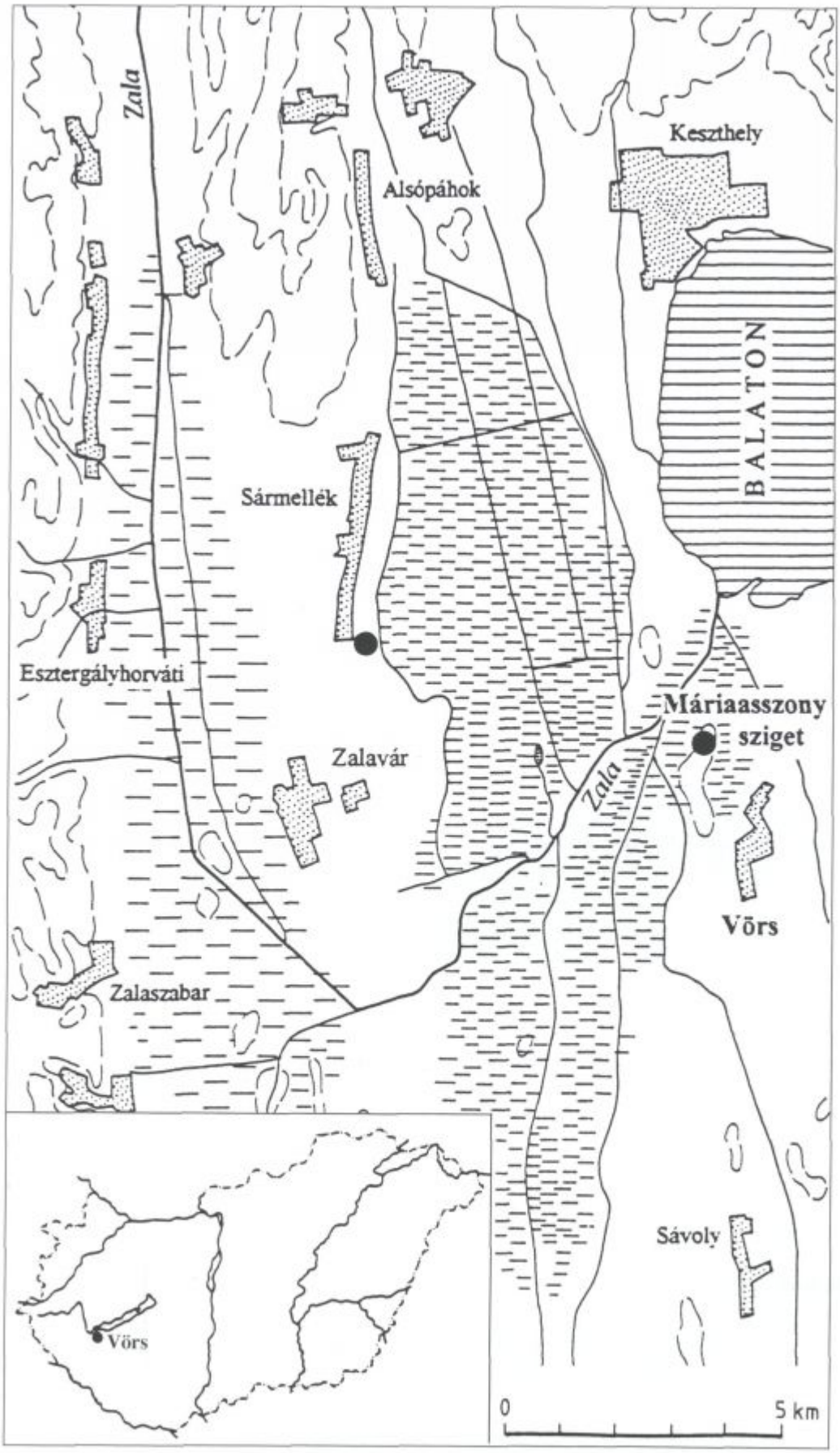

Fig. 3. Natural environment of the Vörs-Máriaasszonysziget settlement.

units (Fig. 4. hatched surface)[4] were irregular clay-pits and pit complexes more or less linked to each other. Probably belonging to a Neolithic settlement, an inhumation burial in the contracted position, without grave goods, and two ovens were found[5]. The extent of the settlement cannot be judged on the basis of the relatively small excavation area, but the range of sections lying 75 m in length from north to south indicate traces of very intensive occupation. Unfortunately, we have no data on the character of the settlement pattern, but we can be almost certain that there was once a small, Early Neolithic village there.

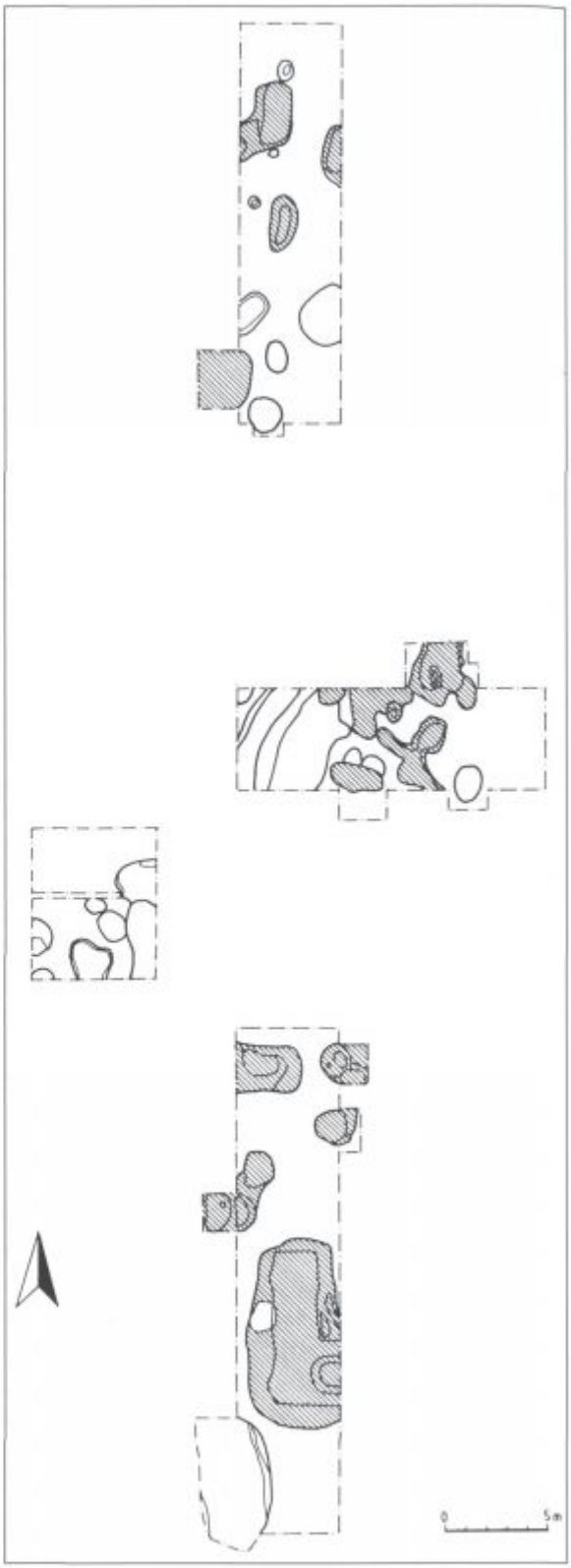

Fig. 4. Vörs-Máriaasszonysziget, general map of the excavations. Hatched area: units of the Starčevo culture.

GENERAL CHARACTERISATION OF THE POTTERY

Pottery technique

The pottery of the find assemblage can be uniformly characterised by the application of organic matter, probably chaff for tempering, sometimes with variable quantities of sand. This is characteristic of both smaller and larger vessels; "fine" and "coarse" pottery can only be differentiated on the basis of surface finish and size. The surface of larger vessels is typically made "rough" by the application of special techniques (Schlickwurf, barbotine), but specimens with smoothed surfaces are also common. "Fine" pottery is made up of smaller vessels which typically have a carefully smoothed or polished surface. In all types we can observe a careful smoothing of the interiors of the vessels, sometimes polishing. Occasionally we can observe the application of a thin, clay varnish (slip) on the surface of smaller vessels. The colour of the pottery is generally reddish or yellowish, light brown, often with greyish, dark brown patches. A characteristic feature connected to the firing of the vessels is the layered structure observable on the fractures of sherds: the colour of the exterior and interior wall surfaces is typically identical, while inside we can observe in most cases a dark, typically grey-brown stripe.

Pottery forms

Fine pottery

Pedestal goblets

Rimmed side fragments of small vessels belong to this type. The diameter of the mouth of the vessel is

4 Units unmarked on Fig. 3. belong to more recent periods (Early Bronze Age, Medieval period).

5 The excavation of the Early Neolithic settlement remains were performed by Cs. Móga-Aradi in 1990 (RF 44(1992) 26–27. We should like to express our thanks for the possibility of publishing the material to her.

typically less than 10 cm., but some specimens have a larger mouth, around 15 cm. The surface is carefully smoothed, sometimes polished from both inside and out. Three variants could be separated in the Vörs material; all variants probably stood on a low, hollow foot. They are generally ornamented with small knobs along the fraction lines.

Variants:

(1) Biconical goblets, with a slightly (Fig. 5a. 1) or considerably (Fig. 5b. 3) inwardly curved upper part.

(2) The biconical type also occurs with slightly arched rim (Fig. 5a. 2,4).

(3) Less frequently we find specimens with a globular ventral part and a slightly outwardly curved rim.

Bowls

Typologically, the bowls can be considered as larger variants of the goblets. The diameter of the rim varies between 19–20 cm. The surface of the bowls found in the assemblage is typically carefully finished, smoothed, or polished. The polishing of the interior surface of the vessels is also typical here. Three variants seem to be present in the Vörs material, all of which could be occasionally completed with a low pedestal. The most frequent ornamentation consist of flat knobs placed on the belly of the vessel, sometimes dissected with vertical panels.

Variants:

(1) Most fragments represent double conical, deep bowls, with a slightly inwardly curved upper part (Fig. 5b. 8,10). Most of the biconical fragments found in the assemblage can be assigned to this type.

(2) Another characteristic type is a more robust biconical form (Fig. 5a. 6), occurring also with a slightly concave upper part (Fig. 5b. 11).

(3) A less frequently occurring variant is a deep bowl with an arched bottom with a slightly convex or slight S profile in the upper part.

Pedestals

Low, hollow pedestals belonging to goblets and bowls are quite frequent in the material. Their surfaces are smoothed and polished. Their form can be conical (Fig. 5b. 9) or slightly swelling (Fig. 5b. 7).

Coarse pottery

Pots

A very frequent type. Fragments of large vessels with different degrees of swelling and more coarse surfaces belong to this group. The diameter of the rim is 16–24 cm. The complete surface or the neck part is slubberly smoothed. In the latter case, the belly part can be covered by barbotine or hand-drawn Schlickwurf. The rim of the pots is often ornamented with finger impressions; the belly can be ornamented with vertically dissected flat knobs or flat discs ornamented with incisions. The interior part of this type is also carefully finished, often polished. We can separate on the basis of form two variants:

(1) Most typical is a biconical form with strongly inward bent upper part (Fig. 6a. 3; 6b. 4; 7. 1) or slightly inward bent upper part (Fig. 7. 4), which can also occur with a slight S profile (Fig. 6a. 2; 6b. 4). The rim can also be bent outwards due to finger and nail impressions (Fig. 7. 4).

(2) A less frequent type of vessel is the spherical pot with a narrow mouth, strong belly and arched side (Fig. 6a. 2,3). Spherical slice pots with a straight rim and slight sinus are less typical.

A few fragments can be attributed to flask-like types of varying degree of belly inflation, with a cylindrical neck (Fig. 6b. 5) or slightly convex rim (Fig. 6b. 6).

Ornamentation

Carved, incised ornaments are frequently found in the Vörs material, both on fine and coarse pottery. The patterns comprise zigzag lines, spirals and concentric circles.

(1) On fine pottery, mostly *incised ornaments* are found both on the side (Fig. 8a. 2–5) and the bottom of the vessels. The system of motifs cannot be reconstructed due to the fragmentary character of the material. On lateral fragments, parallel bunches of zigzag lines are often found which could cover larger surfaces as well. The occurrence of meandroid and spiral patterns is less typical (Fig. 8a. 1). On the bottom of the vessels, incised net patterns can also be found.

(2) On the coarse pottery, *deeply carved* parallel line patterns can be found with deep and thick lines (Fig. 8a. 6,7,8,10). Parallel deep incisions were often found on horizontal handles (Fig.

8b. 12). Light incision is less frequent on coarse pottery, typically also consisting of straight lines (Fig. 8b. 15) and only occasionally forming arched patterns (Fig. 8a. 7). Disc form knobs appearing on the coarse pottery were also ornamented by indents. In these ornaments, a characteristic form is the pattern formed by parallel V forms (Fig. 9a. 3) apart from spiral motifs and concentric circles (Fig. 8a. 1,7; 8b. 14). Motifs formed by finger impressions are less frequent (Fig. 9a. 4,5). Occasionally on the coarse pottery there are rows of impressions (Fig. 8a. 9). Also rarely there are find nail imprints over the surface in a loose array (Fig. 6a. 3).

Painting occurs only exceptionally and is not typical. We could observe black painting applied before firing. The pattern observed is constituted from narrow and wider vertical stripes and was found, probably, on a bowl fragment.

Plastic ornaments

(1) *Knobs* - the most frequently applied ornaments. Two variants can be separated.

1a) On fine pottery, the application of flat oval knobs, placed on the belly of the vessels is typical (Fig. 5a. 1,5; 5b. 10) which can be dissected by incisions (Fig. 9a. 8). This form of knob, in more robust form, and rough multiple cuts are also frequently found on the coarse pottery (Fig. 9a. 6,7). Elongated, upwardly extending knob variants are seldom found (Fig. 6a. 1).

1b) On the sides of larger and coarser pots and storage vessels, flat discoid plastic ornaments can be found, quite often in fairly large size (Fig. 8b. 14; 9a. 1,5). Their ornamentation has been presented before.

(2) *Ribs* appearing only on the belly part of large, rough surface pots and storage vessels (Fig. 8b. 11,14) and the shoulders of flasks (Fig. 8b. 13). Ribs and lath-like plastic ornaments can be applied with finger and nail impressions. It is also found combined with a discoid knob (Fig. 8b. 14).

(3) *Barbotine* - a characteristic ornament of large vessels, applied to the whole surface (Fig. 6a. 1, 2; 9b. 11,14). Among the densely patched, small clay nodules, knobs were also used (Fig. 9b. 11).

Another characteristic ornament over the complete surface of the vessel is channelled barbotine (*Schlickwurf*). On the surface of the Vörs vessels, the clay slip was pulled in a zigzag (Fig. 9b. 9,10) and wavy lines. The sometimes very thin slip was also pulled by the oblique (Fig. 9b. 13,15,16) or vertical (Fig. 8a. 4) or, rarely, arched (Fig. 8a. 6) motion of the fingers.

Evaluation

At the Vörs settlement, the pottery types were dominated by sharp or rounded biconical forms, but quite frequently the mild S-profile was also found. Both features are typical of the Spiraloid B phase of the Starčevo culture (*Dimitrijević 1974.104–106*). Similar features can be observed on other South-Transdanubian sites of the Starčevo culture (*Kalicz 1990. 73–77; H. Simon 1996.59–92*) as well as in Croatia (*Minichreiter 1992.72–73, 75*). Biconical vessels are also fairly typical of the oldest phase of Transdanubian LBC (*Kalicz 1993. Fig. 17; 19–20; fig. 18. 13, fig. 19. 2; 1995*).

One of the most apparent features of the ornamentation of pottery is the application of carved and incised ornaments, which occur both on coarse and fine pottery, and present in almost all of the excavation units.

The construction of the ***incised line ornaments*** and the wealth of motifs comprising zigzag line bunches, less frequently, meandroid incisions and spirals remind us of the characteristic features of the oldest LBC.

The Vörs site is the first and so far only locality of the Starčevo culture in Transdanubia where this ornamentation, as a possible antecedent of LBC main features is present (see LBC materials from: Becsehely, Barcs, Medina, Baja, Szentlőrinc, Budapest III, Aranyhegyi út, etc: *Kalicz 1978–79; 1993; 1995; Kalicz, Kalicz-Schreiber 1992*), as a very early and abundant feature. Perhaps it is not by chance that this deeply incised linear ornament is missing from the otherwise strongly related material of Gellénháza, which lies not very far from this site (*H. Simon 1996*). The differences between the two sites cannot be exactly specified yet, but it seems that the Vörs settlement could be a little younger. Opposed to this, the incised net pattern at the bottom of the vessels (*M. Virág, Kalicz 1999.5; Fig. 9*) can be found in considerable numbers on other sites of the Starčevo culture (*Kalicz 1990. Taf. 22, 9–10, Taf. 23, 6*).

The row of impressions under the rim of the vessels is not really typical of the Starčevo culture, and occurs occasionally in the Vörs material. This means of ornamentation, mainly characteristic of the coarse pottery, became a frequent feature of the oldest LBC pottery (*Kalicz 1993. fig. 18. 14, fig. 19. 8, fig. 22. 13–15, fig. 26. 9 etc.*).

Painting is seldom met in the Vörs material, with only a few fragments yielding reliable traces (*M. Virág, Kalicz 1999, fig. 5*). This lack of painted pottery can probably be explained by unfavourable soil conditions, similar to those in the neighbouring Gellénháza material (*H. Simon 1996.61*).

Among plastical overlays, most frequently we find ***knobs***. Horizontal oval, less frequently round knobs appear in a flat form on the bowls and goblets among the fine pottery. On large vessels, especially pots, the same type of knobs appear dissected by 2–3 cuts. Knobs with cut ornamentation can be found in several find complexes of the Classical and Late phase of the Starčevo culture in Southern Transdanubia (*Kalicz 1990, 22. t. 1, 23. t. 9, 28. t. 10, 29. t. 3, 5, 30. t. 9, 45. t. 9–13; H. Simon 1996, 3. t. 7*), and this type of ornament became a characteristic feature of the Transdanubian LBC as well (*Kalicz 1978–79, 6. t. 5–7, 7. t. 10–11, 8. t. 1, 3, 9. t. 3, 8, 10, 10. t. 9, 11. t. 12–13, 12. t. 12–13; Kalicz 1993, fig. 32. 1, 4–5, 10; Kalicz 1995, Fig. 11. 3, 4, 10, Fig. 19, 14, Fig. 20, 3, 7, Fig. 21, 1, 4–5, 10*).

The large ***discoid plastical overlays*** are striking in the Vörs material, and were probably used mainly on storage vessels, which are special features of this site. Their surfaces are typically ornamented with deeply incised lines. Similar to Vörs, this type of plastical ornament is also known from the closelying Gellénháza material (*H. Simon 1996, Fig. 1, 3, Fig. 3, 1, 3, 5, Fig. 7, 5, Fig. 9, 10*), the same richness of which was also pointed to by recent Croatian research (*Minichreiter 1992, Pl. 2, 2, Pl. 5, 8–10, Pl. 7, 10–22*). The application of discoid overlays ornamented with different patterns seem to be a local feature which was specially frequent in Southern Transdanubia and Croatia. This specific feature of the pottery appeared sporadically at the beginning of the Spiraloid A phase and lasted till the end of Spiraloid B phase, even until the final phase of the culture described by Dimitrijević (*Dimitrijević 1974, Pl. 22, 7; Kalicz 1990, Pl. 38, 2*).

Plastical ribs dissected by finger and nail imprints appear only on coarse pottery (pots, storage vessels). Such vessels appear already in the Linear A- and B-phase of the culture (*Kalicz 1990, Pl. 22, 4–5, Pl. 25, 15, Pl. 24, 6, 14, Pl. 30, 5; Minichreiter 1992, Pl. 1, 1–3*). In Hungary, it was more frequent in the Spiraloid B-phase, observable mainly in Gellénháza (*H. Simon 1996, Fig. 6, 1, Fig. 7, 4, 6–7, Fig. 11, 4*). This type of ornamentation was hereditary to the Oldest LBC pottery (*Kalicz 1993, Fig. 18, 3, 13, Fig. 21, 15; Kalicz 1995, Abb. Fig. 19, 7–8, 13–14, Fig. 20, 10, 13, 14, Abb. 21, 9*). The same can be said of the grooved ornaments on the rims of larger vessels.

The pottery surfaces covered by ***barbotine***, and ***Schlichwurf*** were already known in the Linear B phase of the Starčevo culture, but became really characteristic elements only in the Spiraloid phase. (*Dimitrijević 1974, 102–106; Kalicz 1990.66–68*). Channelling of the clay slip in zigzags and wavy patterns is known from Croatia already in the Late Classical Starčevo phase (*Minichreiter 1992, Pl. 6, 1–10*), but barbotine with patches and irregular channelling is most frequent in the Spiraloid B phase (*Dimitrijević 1974, Pl. 7, 12, Pl. 10, 1–7, Pl. 15, 5, Pl. 18, 13; Minichreiter 1992, Pl. 5, 1–13, Pl. 11, 4–6, 9, Pl. 12, 1–11, Pl. 13, 1–7*). This type of ornament is also characteristic of Syrmium (*Petrović 1984–85, Pl. 1–3; Leković 1995, Pl. 1–2, 4, 6*). Similarly finished pottery is known from other sites of South-Transdanubia (*Kalicz 1990, Pl. 42, 1–10, Pl. 43, 2, 5–11*). It is apparent that the quantity of patched barbotine pottery in SW Transdanubia, notably also at Vörs and Gellénháza, is not so essential as in other areas of the Starčevo culture (SE Transdanubia, Slavonia, Syrmium: *Kalicz 1990, 35. t. 6–12, Taf. 36–38, 41–42, 44; Dimitrijević 1974; Minichreiter 1992; Petrović 1984–85; Leković 1995, see above*). *Schlickwurfbarbotin* became one of the most important features of the Transdanubian (Central European) LBC, which can be considered as a successor to the Starčevo culture (*Kalicz 1978–79, Pl. 8,. 2–12, Pl. 9, 6, Pl. 10, t. 11; Kalicz 1993, Fig. 18, 5, 8–9, 12, Fig. 19, 7–8, 11–12, Fig. 21, 13–14, Fig. 22, 13, 15, Fig. 23, 4, Fig. 33–34; Kalicz 1995, Fig. 22–24*).

CONCLUSIONS ON THE CHARACTER OF THE POTTERY FINDS

Finds from Vörs-Máriaaszony-sziget represent the latest, Spiraloid B phase of the Starčevo culture, comprising already a number of features becoming typical of the Oldest Linearband Pottery culture. Such features include deeply incised linear patterns

in uncommonly high quantities within the Starčevo context, the dominance of biconical forms, the appearance of knobs dissected by cuts, and the application of the Schlickwurf technique.

Among others, these features help date the Vörs settlement finds to the end of the Spiraloid B phase, i.e., the formation period of the Transdanubian Linearband Pottery Culture. The geographical position of the site should be emphatically mentioned, lying along the northern marginal zone of the Starčevo culture, where local differences accumulate.

At the same time, the importance of these settlements in a marginal position is stressed, because they appear in a zone playing a decisive role in the formation of the (Transdanubian) LBC complex. In our day, we have growing evidence on this formerly hypothetical process, which is also reflected in the material of the Vörs.

Vörs-Máriaasszonysziget: the lithic evidence

Among the objects studied from an Early Neolithic assemblage, lithic finds have a very special importance. That is, due to technical innovations and revolutionary changes in economy basically modifying the "cultural" flora and fauna assemblage of the site, lithic artefacts – in the first place, chipped stone tools – should represent a continuity with genetically related ancestral groups. Chipped stone tools are fairly "conservative" over long periods: in spite of new activities related to the Neolithic (productive) way of life, basic techniques, morphological tool types and – last but not least – the raw material basis can be considered fairly stable.

The Carpathian Basin seems to have, from a purely geographical point of view, a key role in European neolithisation. The Hungarian lithic evidence, however, did not support these views until recently. Epipaeleolithic/Mesolithic assemblages in the region are few, both in site numbers and artefact numbers, and the authenticity of most sites has been questionable or rejected. To date, the intensive study of the Mesolithic sites in the Jászság region has increased the evidence greatly (*Kertész 1996*).

Early Neolithic lithic assemblages have also been regarded as scarce, especially compared to site density and intensity of settlement features and pottery. Even the systematic surveys of recent decades (*Bácskay 1976, Bácskay, Simán 1987*) could show only a limited number of very small and poor find complexes.

The first sign of another possibility – i.e., a stone-tool rich, Early Neolithic horizon, was raised in connection with Méhtelek-Nádas, a settlement of the Körös-Starčevo-Criş complex (*Kalicz, Makkay 1974; 1976*). The publication of the lithic assemblage was completed recently (*Chapman 1987; Starnini 1993*). The site was interpreted as an outpost en route to obsidian sources, which is rather surprising at a distance of around 100 km from the source regions. Only the large-scale rescue excavations of the past few years has proved that Méhtelek is not an exception, but more a regular Early Neolithic settlement, with an abundant chipped stone industry, both to the east and west of the Danube (*Biró 1996 in press*). As regards the specific subject of this paper, formerly, we had no information on Starčevo lithic material in Hungary, and only a very modest amount of doubtful (mixed) material for the earliest Neolithic horizon of most parts of Transdanubia, the oldest LBC complex (*Biró 1987*). By now, we have to consider large lithic assemblages from the Starčevo and/or Old LBC context from the southern parts of Transdanubia (Gellénháza, Zalaegerszeg-Gébárti tó, Szentgyörgyvölgy-Pityer: *Simon 1996; Bánffy in press*).

One of the sites with a considerable lithic industry discovered lately is Vörs-Máriaasszonysziget.

A minor portion of the assemblage was presented in the above-mentioned paper, based on 22 items from the site (*Biró 1996 in press Fig. 1.1–7*). The total assemblage now comprises 126 items[6]. The main features of the material will be summarised below.

Character of the assemblage

The Vörs-Máriaasszonysziget lithic assemblage is a medium-sized find assemblage among Hungarian prehistoric sites. The intensity of occurrence can also be considered as average (126 items on 500 m^2 excavation surface, 0.25 items/m^2) Comparable data are available mainly from "stone-rich" settlements (*Biró 1994* in press)[7]. The distribution of the mate-

6 As the lithic industries of the earliest Neolithic settlements have special importance, we are planning to publish the complete inventory of stone tools in the site report.

7 The question of "much" or "few" in the case of lithic assemblages is not easy to decide on (see *Biró 1998.18, 29*). However, lithic artifact density is a marker, even if it is deficient due to several factors like excavation techniques and intra-site topography.

rial is uneven within the site: most of the material comes from sections I and IV, especially unit I/2 unit and unit IV/36. Activity areas seem to be separable within the site, with more or less tool production vs. use[8].

The type/raw material distribution of the material is presented in Table 1. Type groups and raw material categories were analysed according to categories specified first for the study of LBC material (*Biró 1987*) and applied subsequently to Neolithic assemblages, including not only morphological tool types or "retouched tools", but also technological categories, polished tools and other stone utensils (*Biró 1998 with further references*).

Typology

I. ***Raw material blocks*** and ***residues*** ("rm" on Fig. 10; 11) are not present in the assemblage. This feature indicates several important things. Raw material reached the site already in an elaborate form (pre-cores, but more typically, cores and/or blanks). The inhabitants of the site, indicated by other features of the type spectrum, as well, were regular "users" or "consumers", but not stone-working artisans, even less miners. If they had a direct role in any related activities, the products were very carefully selected elsewhere.

II. ***Cores*** and ***core residuals*** ("core" on Fig. 10; 11.) are found in very small number (11 pieces, 8.7%). This feature again denotes that stone tool production was subordinate to use for the Máriaasszonysziget Early Neolithic people. The cores are of medium and small size, heavily exploited (*Biró 1996 in press Fig. 1.4, 6, 7, Fig. 12.2, 8, Fig. 14.1, 6, 9)*, mainly irregular flake-cores and a few conical, micro-blade cores (Fig. 14.9). The bipolar technique, typical "pf" Mesolithic/Early Neolithic chipped stone industries is also present (*Biró 1996 in press Fig. 1.6, 7*).

III. ***Flakes*** and ***chips*** ("fl" on Fig. 10; 11.) are present in fairly large numbers and considerable size. Part of the tools are also made on flakes (10 of 17), which denotes the flake-based character of the lithic industry rather than blades, consistently with the core forms.

As the dominant raw material of the site, radiolarite favours more of a microlithic character; large flakes (3 flakes over 5 cm, which is decidedly large) are special features here, for both the period and the material In this feature, Vörs differs essentially from Gellénháza and Z. Gébárti tó, and also from Szentgyörgyvölgy-Pityer (oldest LBC) where the character of the chipped stone industry is definitely microlithic. Vörs is larger on average, and resembles in this feature - as well as many elements of the retouched

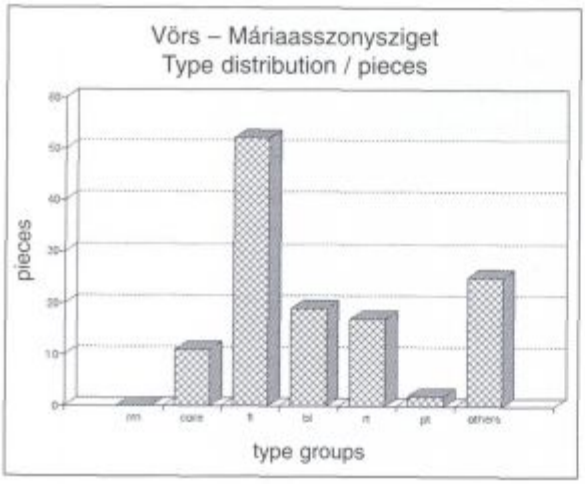

Fig. 10. Vörs-Máriaasszonysziget – Type distribution according to pieces. Key: rm: raw material, core: cores and core residuals, fl: flakes and chips, bl: blades and blade-like blanks, rt: retouched tools, pt: polished tools, others: other stone utensils (grinders, polishers etc.).

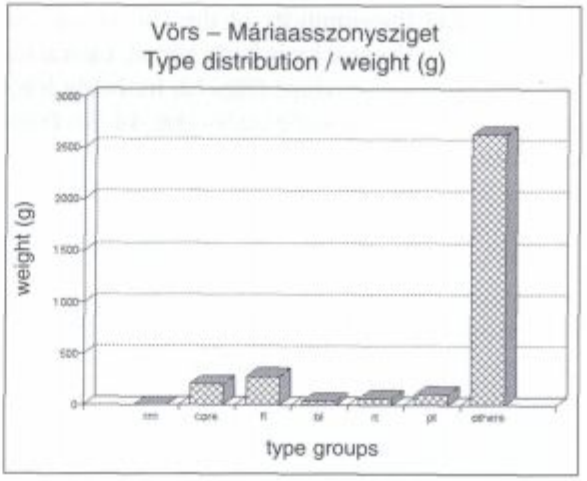

Fig. 11. Vörs-Máriaasszonysziget – Type distribution according to weight. Key: rm: raw material, core: cores and core residuals, fl: flakes and chips, bl: blades and blade-like blanks, rt: retouched tools, pt: polished tools, others: other stone utensils (grinders, polishers etc.).

8 A more detailed analysis of intra-site distribution and a complete catalogue will be published in the site report by the same authors.

tool forms - more closely the Mencshely-Murvagödrök (Classical LBC, *Biró 1992*) and the enigmatic Mencshely-Ragonya-Vöröstó assemblages (?Mesolithic-all phases of LBC, *Mészáros 1948*).

IV. ***Blades*** and ***blade-like blanks*** ("bl" on Fig. 10; 11; *Biró 1996 in press Fig. 1.2, 3; Fig. 12.7, 9, 10; Fig. 13.6, 9; Fig. 14.4*). The number of blades (knives, blade-like flakes) is comparable to the number of retouched stone tools (blanks 19, blade-based retouched tools 7) and a blade-making tradition is also attestable in some core forms. Cutting edges were obviously important elements of the inventory, but the character of the whole industry is more flake-based than blade-like.

V. ***Retouched tools*** ("rt" on Fig. 10; 11; *Biró 1996 in press. Fig. 1.1; 12.1,3,5,6; 13. 1,2,4–5, 7,8; 14. 3, 5, 7*) Formerly, all of our typological knowledge was derived from retouched tool types. Classical typological systems are based on the study of retouched (morphological) tool types, especially in the Palaeolithic period. Adding the technological types as it was presented here completes the image and multiplies evidence. The main basis of comparison within lithic inventories, however, is observations made on the class of retouched tools.

The Vörs material is relatively rich in retouched tools (17 pieces, 13.5%). Compared to the size of the assemblage and the simplicity of the LBC retouched tool inventory, the tool kit is fairly varied. Lateral retouching is found on chips (Fig. 12. 6), blade fragments (Fig. 13. 4) and knife-blades (Fig. 14. 3). Truncation is fairly common (Fig. 12. 3; 13. 5; 14.5), but no "classical trapezes" have been found at Vörs so far. The other diagnostic "Early/Middle Neolithic form", segment, is represented by two examples, Fig. 13. 1, which is unusually large, reminding one again of the Mencshely-Vöröstó finds and the especially interesting, refitted, segment-like tool in Fig. 13. 4,5). Borers and burins are present in a wide variety and relatively large number (Fig. 12. 1,5; 14. 7). End-scrapers, very common in later periods, are almost absent (Fig. 13. 8; even this piece can be regarded as a combined tool with a lateral burin). Side-scrapers, on the other hand, are well represented (3 pieces: *Biró 1996 in press. Fig. 1.1, Fig. 13.7*)[9]. Later on, side-scrapers very rarely occur in Neolithic materials, so this feature can be added to the "Early Neolithic" characters (also mentioned in *Biró 1987*).

VI. ***Polished tools*** ("pt" on Fig. 10; 11; 14. 8) The Vörs material is not especially rich in polished stone artefacts. From the two implements classified here, ID Nr. 21 (a profiled hammer) is of very complex form (Section IV, unit 28) which could belong on mere formal criteria to a younger horizon. A piece which belongs undoubtedly to the Early Neolithic material is a very usual trapezoid chisel or wedge (Fig. 14. 8), also in a photo (Fig. 17). The material of the piece, however, is most interesting: on macroscopic observation, the raw material was identified as of the porcellanite phase of Transdanubian radiolarite present in the chipped stone inventory of this and other Starčevo materials (e.g., Gellénháza). More recent finds (Lengyel III from the source environs) also yielded

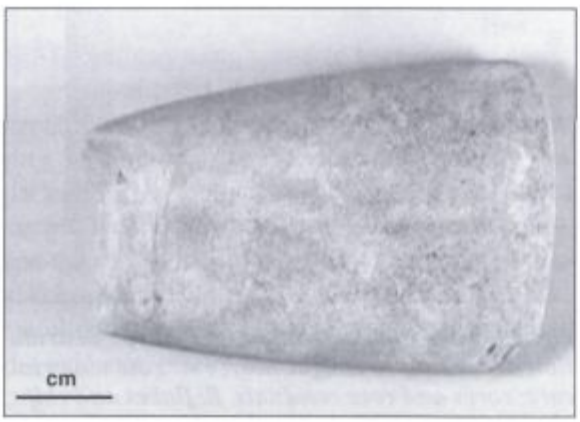

Fig. 17. Section II unit 13. Object ID 107. Fragment of polished stone tool, Transdanubian radiolarite, porcellanite, 51 x 35 x 14 mm.

Fig. 18. Section II unit 18. Object ID 117, polisher plate with "axe print", light yellow fine sandstone 90 x 61 x 20 mm.

9 ID 59, not represented here in drawing.

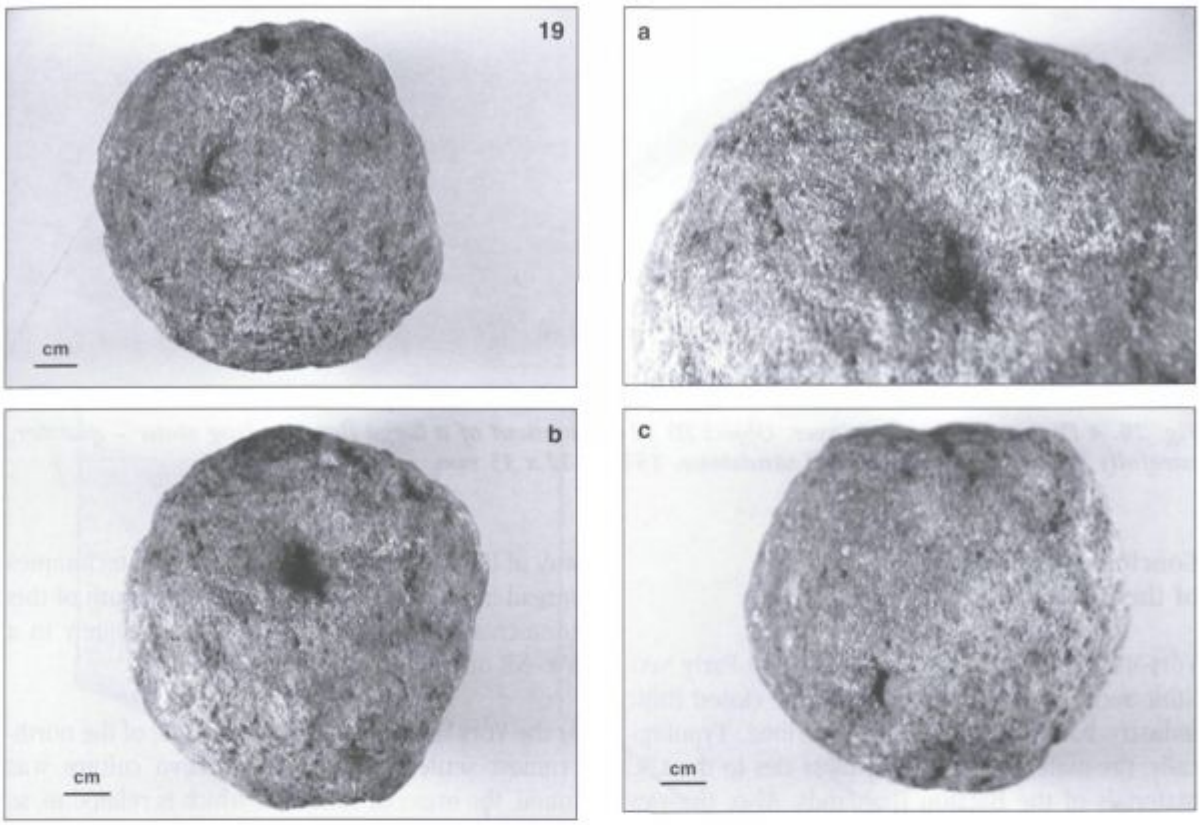

Fig. 19. a, b, c. Section II unit 13. Object ID 118, irregular pear-shaped stone ball, with bored shallow hole in it – bola?, "Permian" red sandstone, 72 x 75 x 75 mm.

polished stone tools from this material, so its presence is not unparalleled, but certainly surprising.

VII. Other stone utensils: ***grinders, polishers, used pebbles*** etc. ("others" on Fig. 10; 11) are integrated elements of the lithic inventory and comprise pieces which are very important for the technology (ID 117, Fig. 18) and stable contacts (ID 124, Fig. 20) of the site. Also, there is a special tool among these pieces, a spherical pear-shaped object with a bored, shallow hole in it, found also in a clear Early Neolithic context. The form is closest to a bola; however, the clearly intentional hole may indicate some other (so far, unknown) function (ID 118, Fig. 19). Grinders and polishers are important elements of the tool kit and show some intra-site regional distribution pattern which will be important in interpreting the site features.

Raw materials

The raw material distribution of the Vörs site is fairly homogeneous and denotes strong and stable northern contacts with the areas of the Balaton Highlands (Permian sandstone) and the Southern Bakony area (Transdanubian radiolarite, primarily Szentgál (red) variant). All these mass supply goods fall within the range of normal regional supply; the problem is that we still have no convincing evidence on the inhabitants(?) explorers(?) of the region. Notable raw materials on the site are Balaton-Highland hornstone and one doubtful piece with potentially southern connotations, a grey (Mecsek?) radiolarite (Fig. 12. 9). Different varieties of sandstone were used on the site, among which the most characteristic is the Permian red sandstone, known as an excellent building stone in the eastern parts of the Balaton Highlands (around Balatonalmádi). In our case, this material seems a very strong contact indicator, as sandstone objects are rather heavy and cannot just "accidentally" occur at such a distance from the source. With the more easily transportable, chipped stone tools (cores, precores) a chain-like transport model can also be assumed[10], but the heavy sandstone probably needed very direct and deliberate action, eventually pointing in the same direction.

10 With whom?

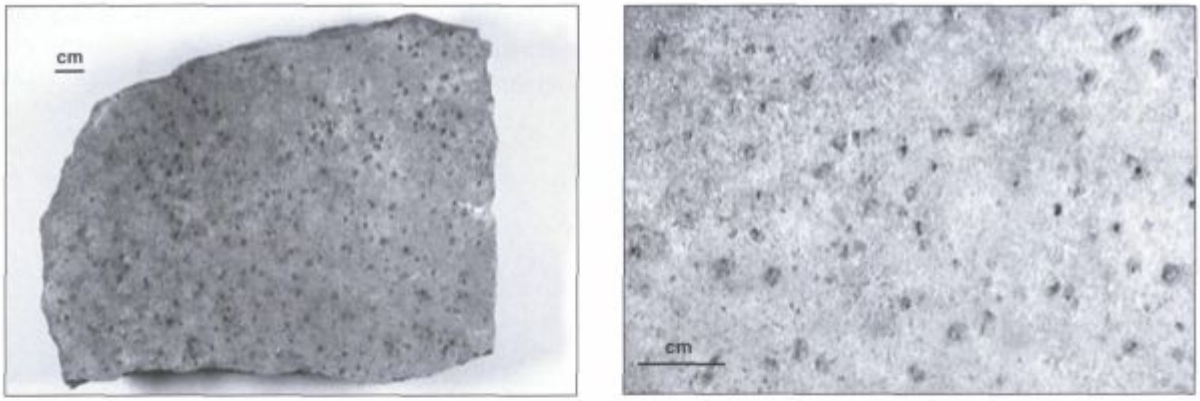

Fig. 20. 4 IV Section 4 techn. layer. Object ID 124, fragment of a large flat grinding stone – quarter, carefully finished, "Permian" red sandstone, 151 x 122 x 35 mm.

Conclusions on the character of the lithic industry

Vörs-Máriaaszonysziget is among the first Early Neolithic settlements where an authentic closed lithic industry has been found and described. Typologically, the material shows very close ties to the LBC materials of the Balaton Highlands. Also, the raw material's provenance points to the same region (and, beyond to the Southern Bakony) for contacts. "Contact" in this period, however is an empty term without content.

The analysis of Early Neolithic assemblages of similar age (Gellénháza, Zalaegerszeg, Szentgyörgyvölgy) is in progress, but they all indicate very intensive use of the above territories.

SUMMARY

The Northern distribution limit of the Starčevo – Körös – Criş cultures forms not only the periphery of the earliest Neolithic communities, but at the same time represents a frontier zone between the earliest farmers and local hunter-gatherers at the turn of the 7/6th millennium BC. On the northern side of the frontier zone, in the northern part of the Carpathian Basin, hunter-gatherer communities probably subsisted at the same time as the first farmers, although this could only be proved with certainty in a small micro-region within Hungary.

The formation of the agricultural frontier zone was primarily governed by a complex interaction of different factors such as climate, hydrology, vegetation etc., which did not favour, to the north of the frontier zone, the establishment of the early farming way of life. Consequently, early farming techniques spread in the given period only to the south of this zone crossing the Carpathian Basin obliquely in a SW–NE direction.

At the Vörs-Máriaasszonysziget site, one of the northernmost settlements of the Starčevo culture was found, the material culture of which is related to, as regards pottery in the first place, to early farming communities living between the Drava and Sava. There are, however, new features present in the pottery that turned out to be the main characteristics of the Oldest Linearband Pottery culture evolving later to the north of the frontier zone.

The raw material of the stone tools found at Máriaaszonysziget originates almost exclusively from the Balaton Highlands and the Southern Bakony, both lying to the north of the frontier zone where no traces of the Starčevo culture were found. This means that the vital raw materials were obtained from potentially uninhabited areas or, more probably, the sources were supervised by the Mesolithic forager (hunter-gatherer) communities. The system of contacts with this hypothetical base population, the nature of which is so far unknown, supplied the Starčevo population with the preferred raw material, i.e., Szentgál radiolarite, which turned to be the dominant raw material of the subsequent LBC population. These systems of contacts contributed later to the spread of notions on a productive way of life without a mass movement of the population towards the north.

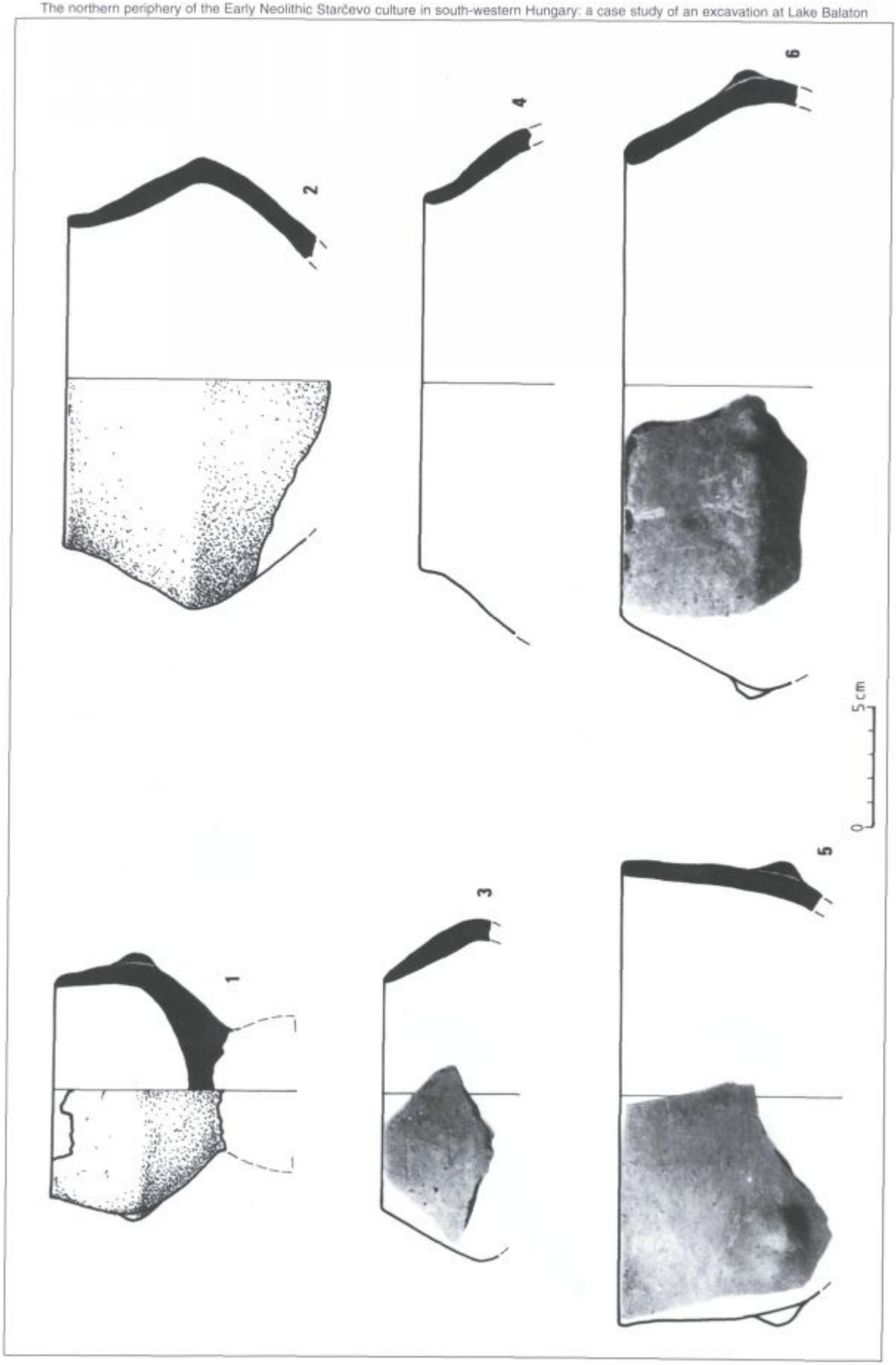

Fig. 5a. Vörs-Máriaasszonysziget, pottery finds.

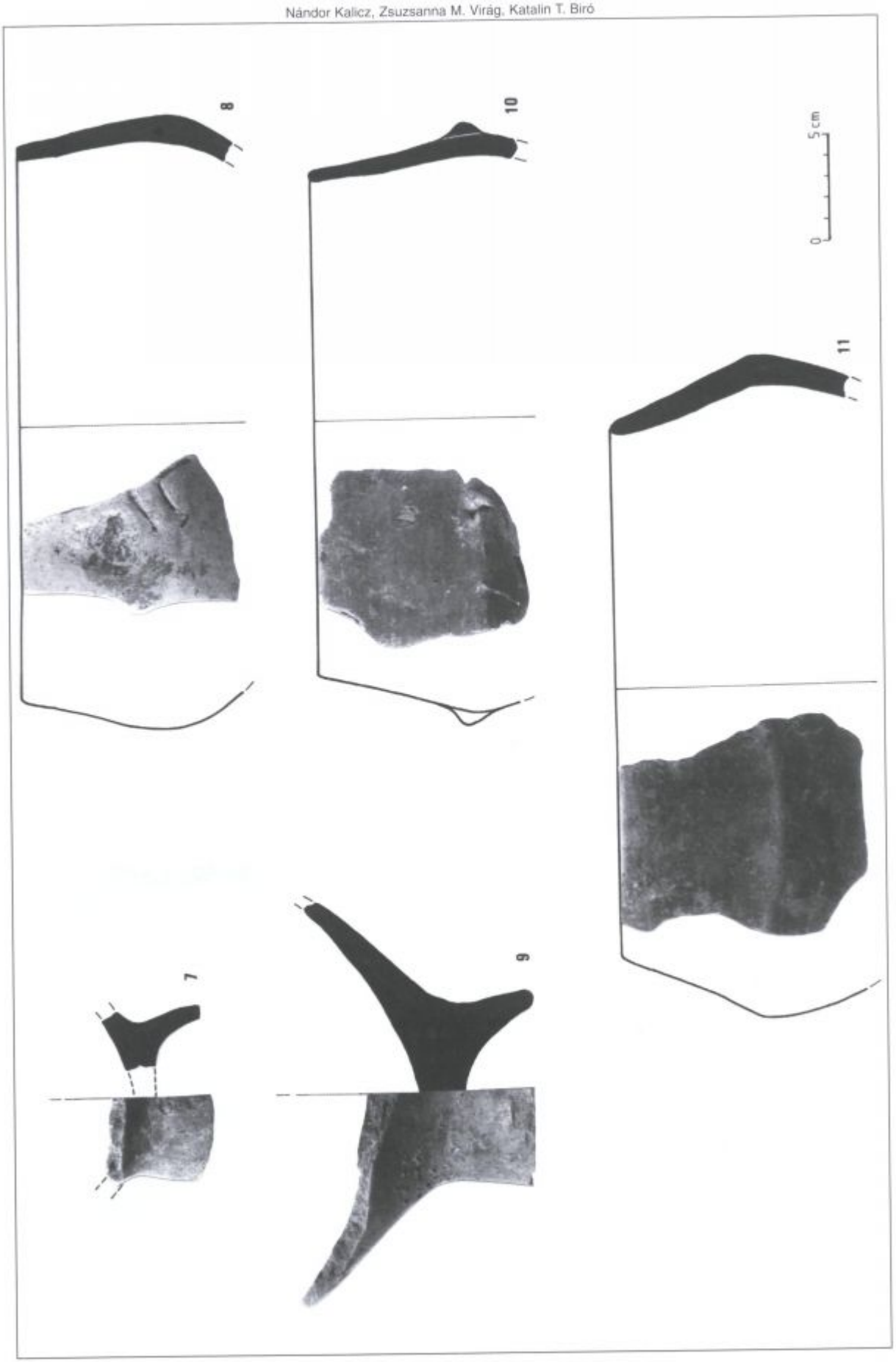

Fig. 5b. Vörs-Máriaasszonysziget, pottery finds.

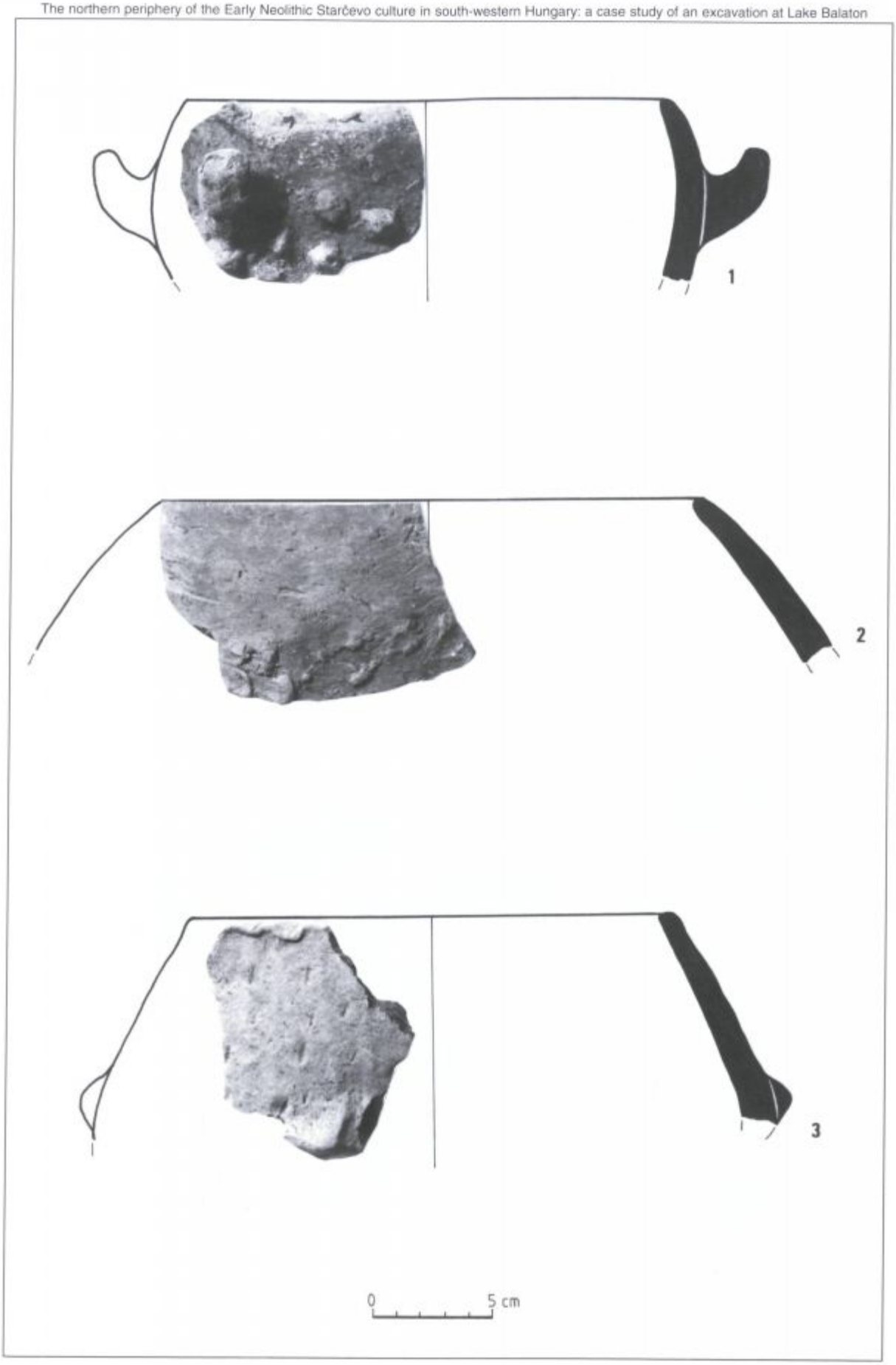

Fig. 6a. Vörs-Máriaasszonysziget, pottery finds.

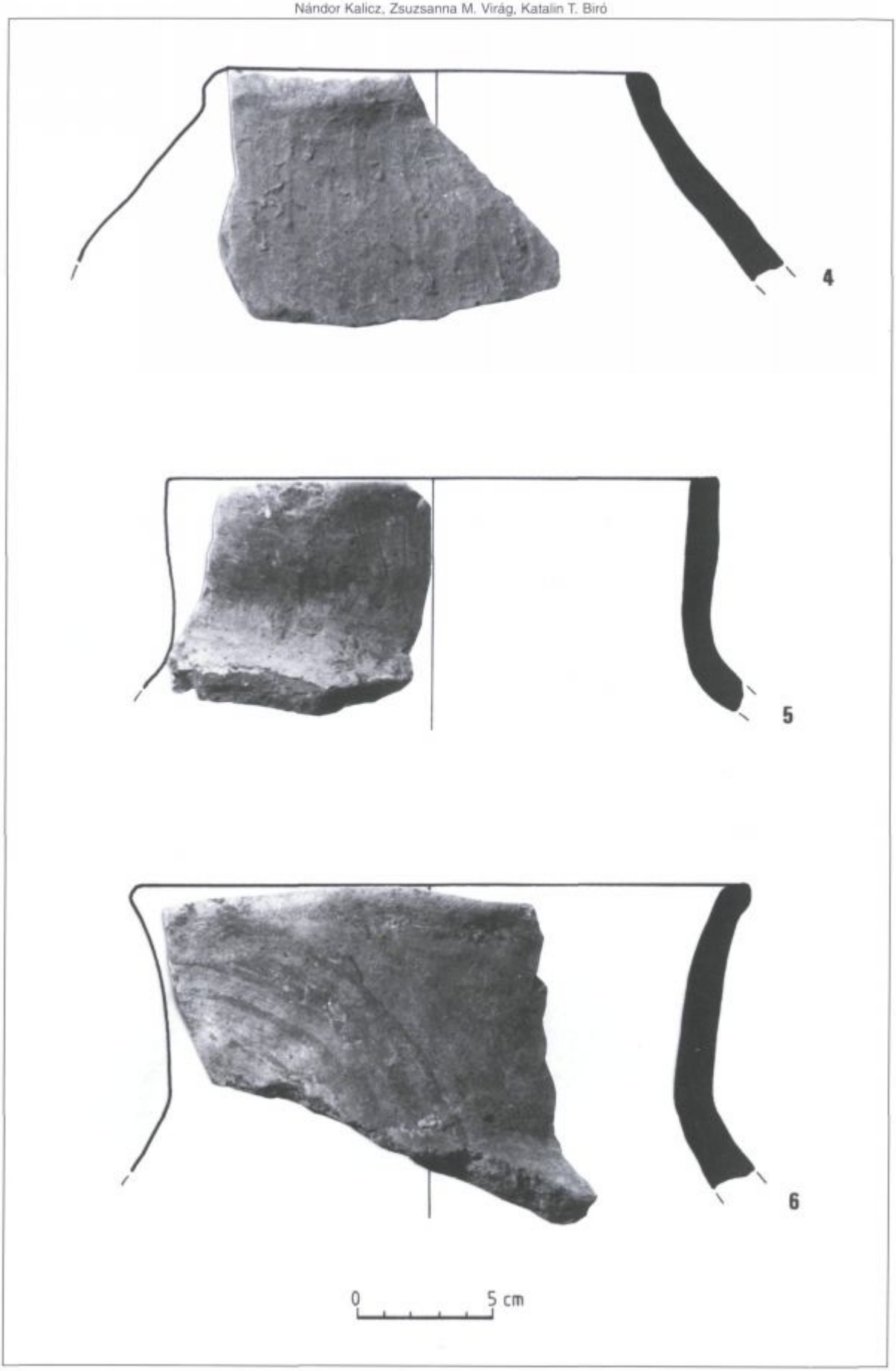

Fig. 6b. Vörs-Máriaasszonysziget, pottery finds.

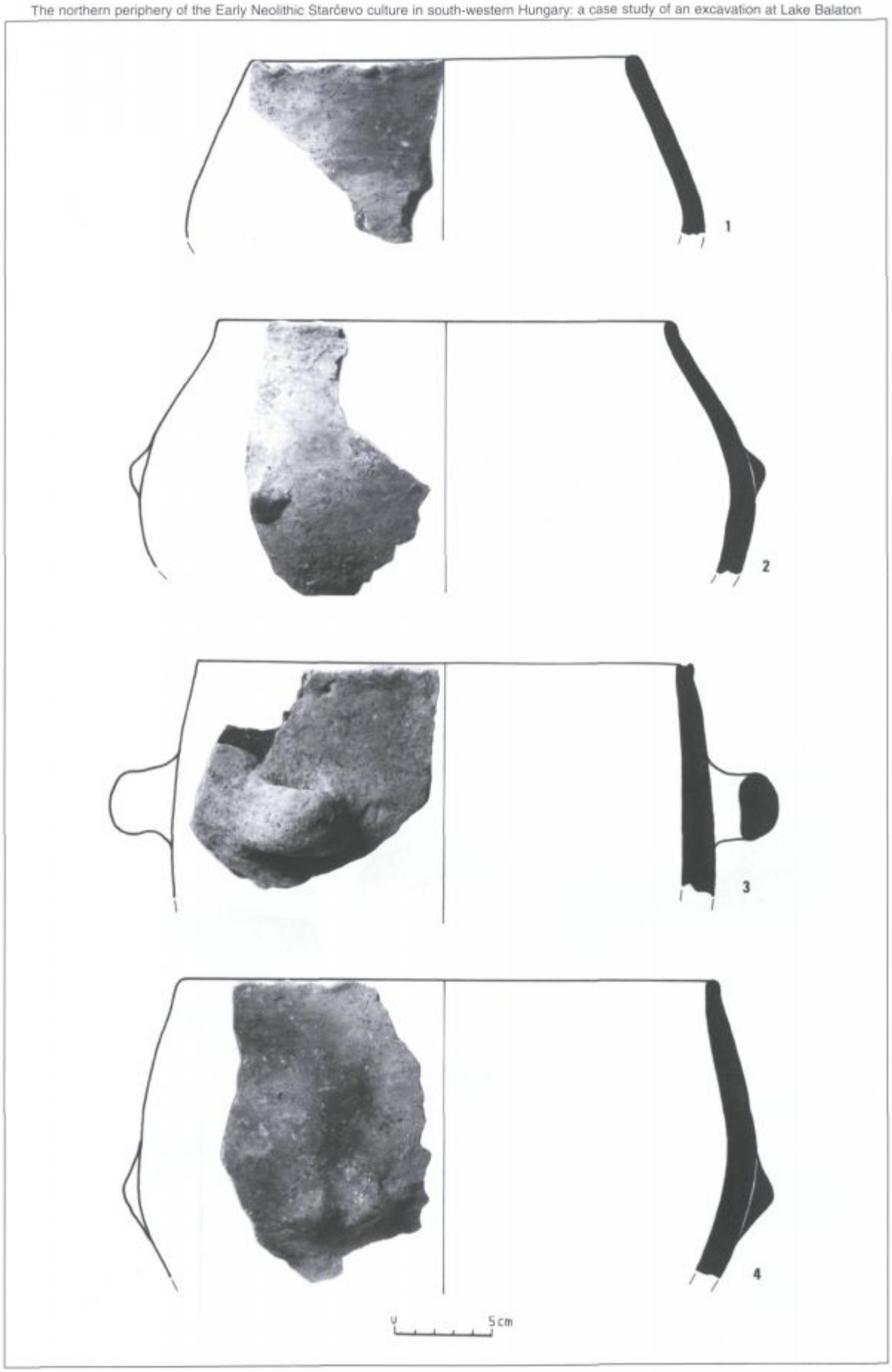

Fig. 7. Vörs-Máriaasszonysziget, pottery finds.

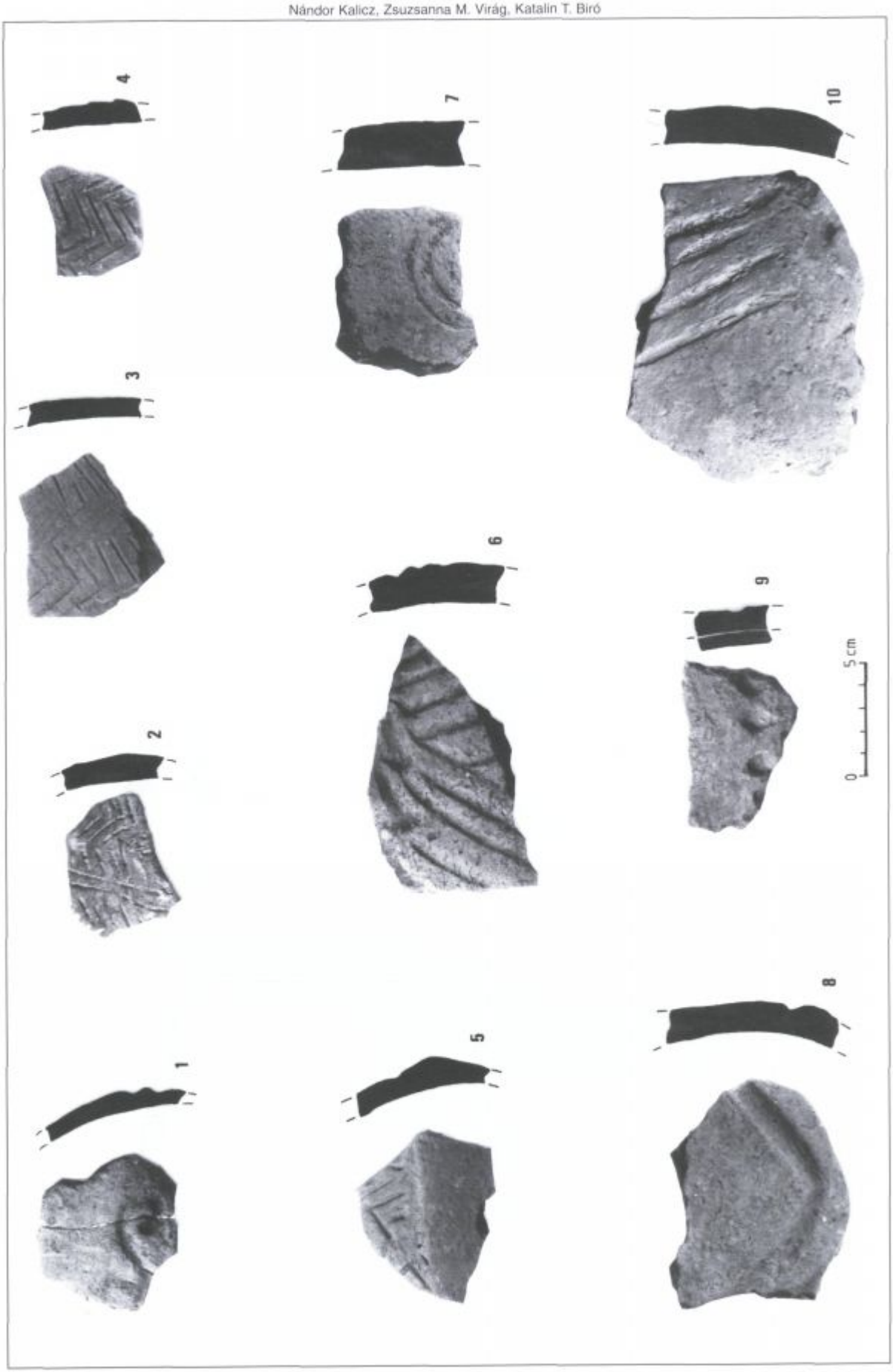

Fig. 8a. Vörs-Máriaasszonysziget, pottery finds.

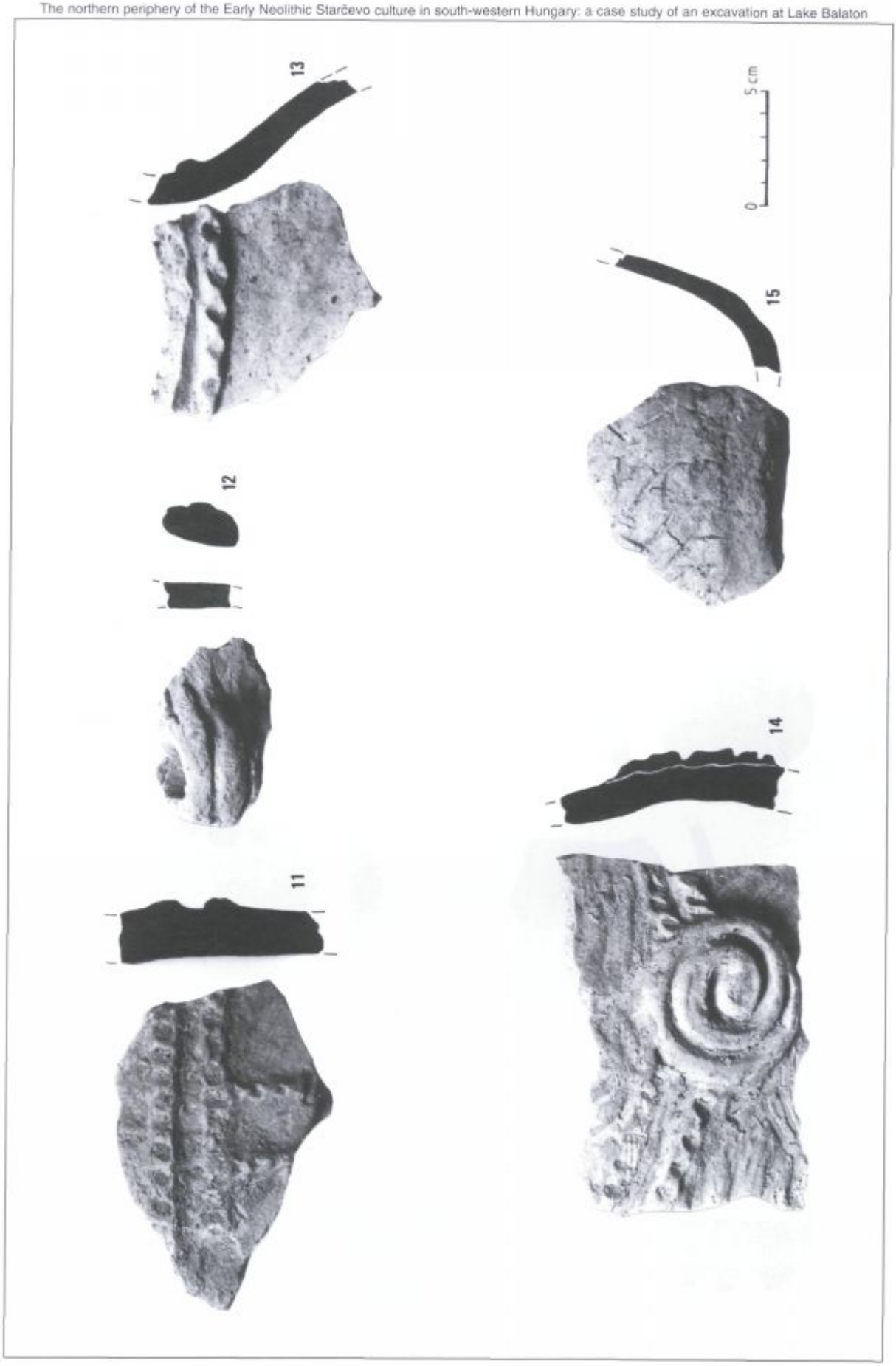

Fig. 8b. Vörs-Máriaasszonysziget, pottery finds.

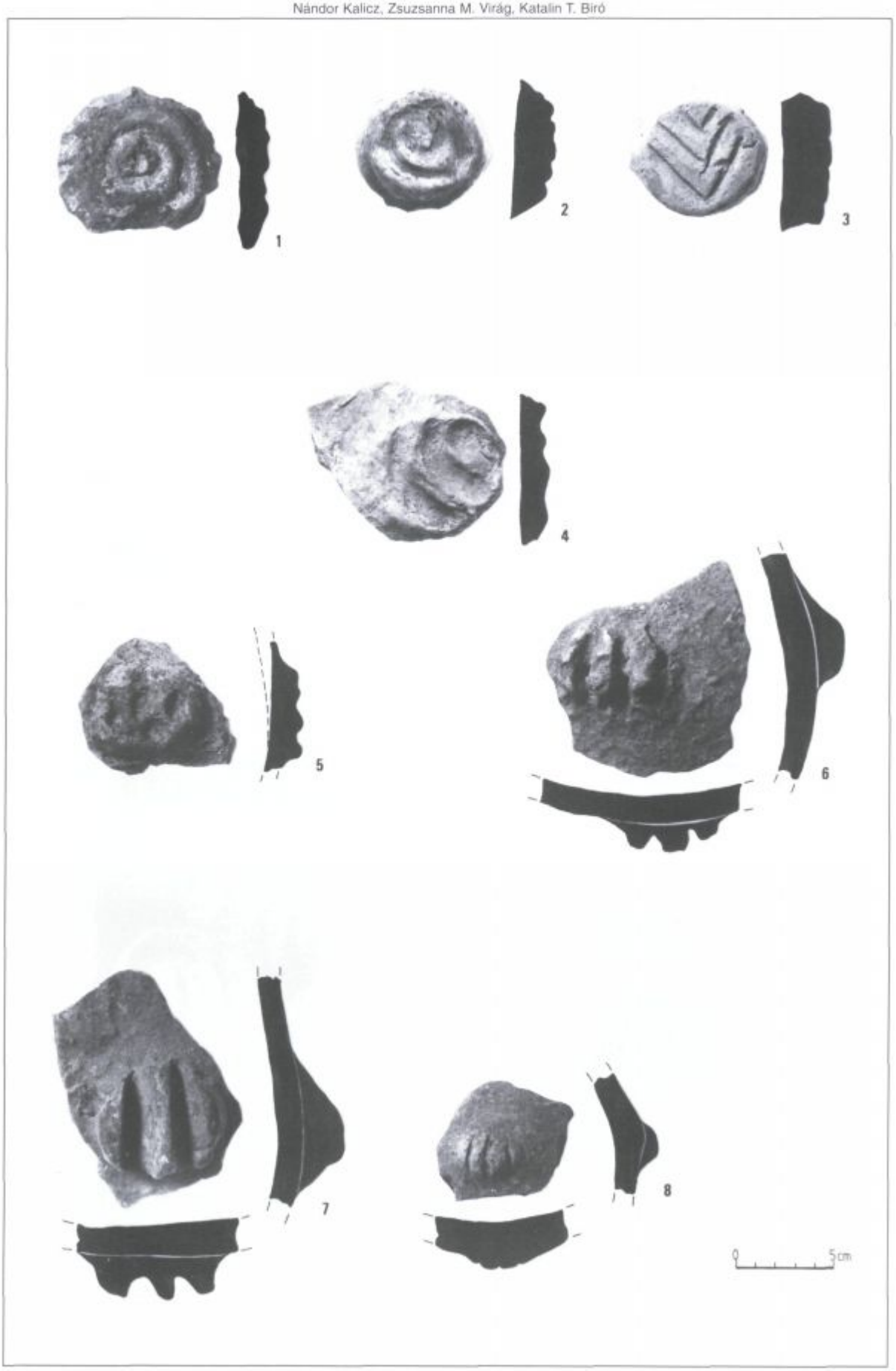

Fig. 9a. Vörs-Máriaasszonysziget, pottery finds.

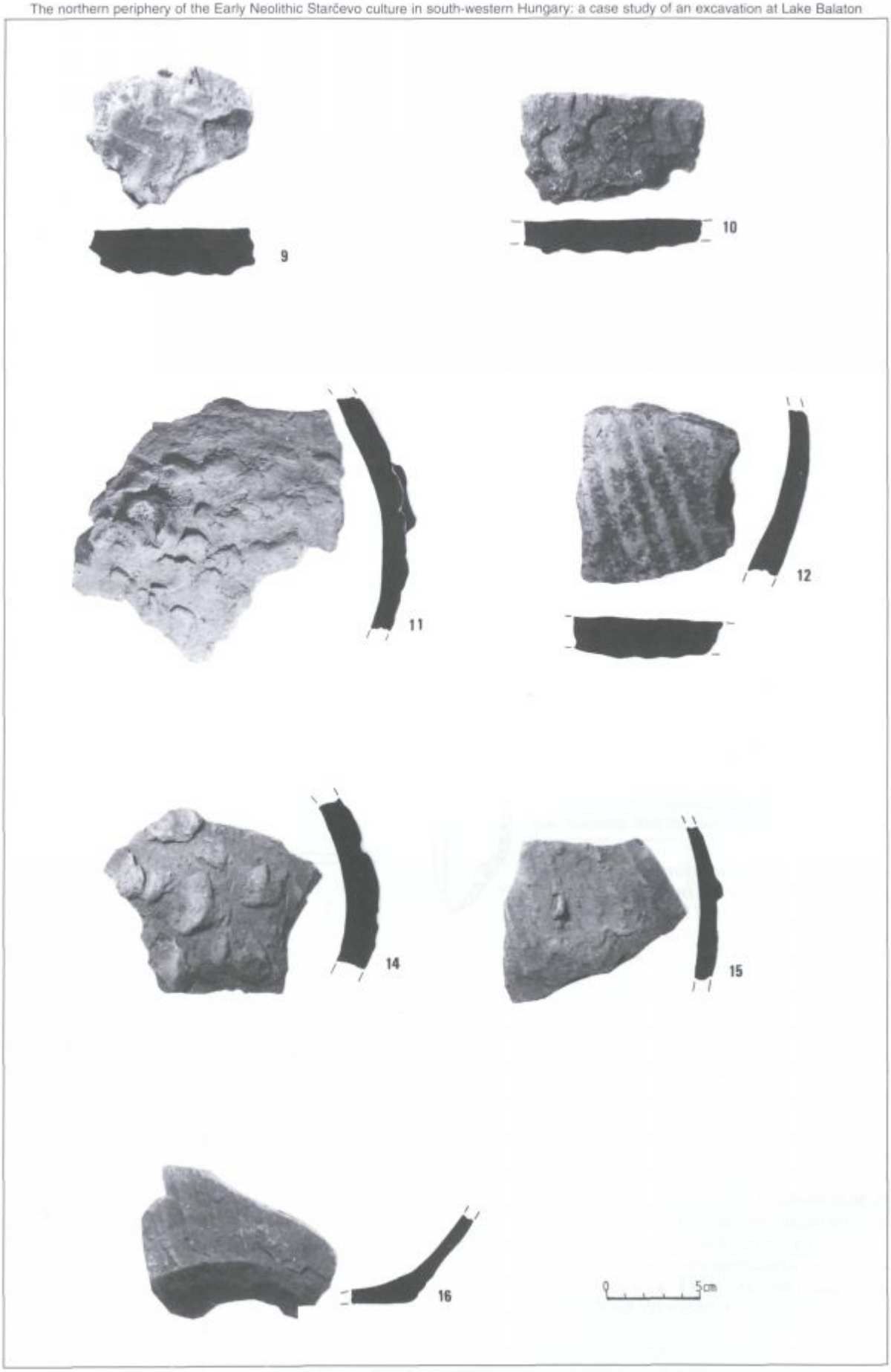

Fig. 9b. Vörs-Máriaasszonysziget, pottery finds.

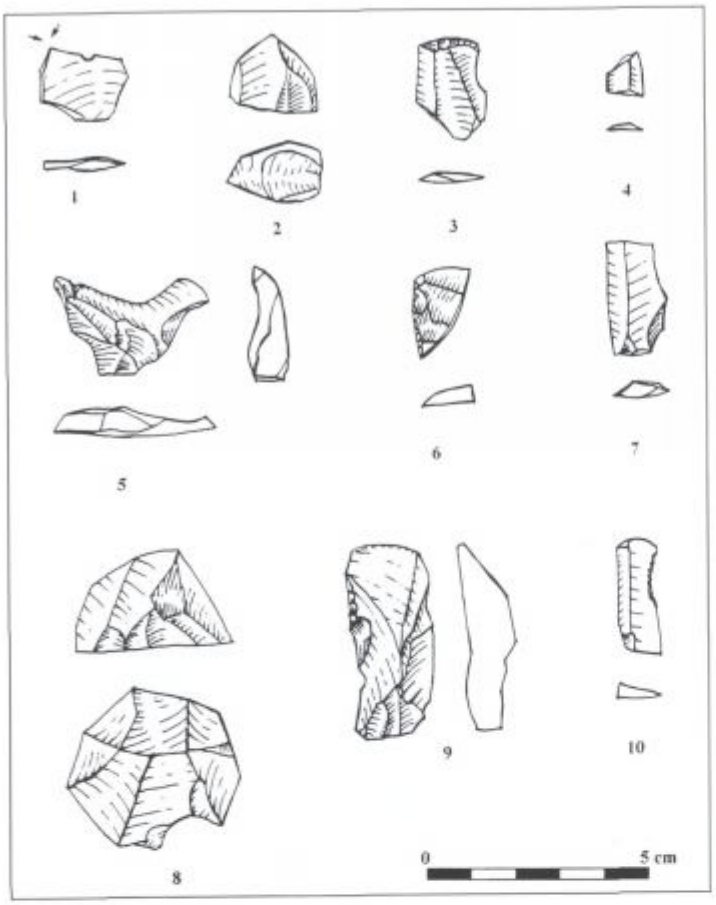

Fig. 12. Vörs-Máriaasszonysziget – Selection from the lithic industry. 1. Burin on small chip, Transdanubian radiolarite – Szentgál var. 17 x 19 x 3 mm, 2. Microcore remnant, Transdanubian radiolarite, reddish brown 17 x 16 x 12 mm, 3. Truncated blade-like flake fragment, Transdanubian radiolarite – Szentgál var. 22 x 16 x 3 mm, 4. Trapeziform micro-chip, Transdanubian radiolarite – Szentgál var. 9 x 8 x 2 mm, 5. Combined burin-borer (zinc) on transversal small flake, "bird-like" form. Transdanubian radiolarite – Szentgál var. 24 x 34 x 6 mm, 6. Retouched small chip, form reminiscent of an angular scraper. Transdanubian radiolarite – Szentgál var. 18 x 12 x 3 mm, 7. Blade, Transdanubian radiolarite, light porcellanite 24 x 14 x 3 mm, 8. Low conical core, with flake scars. Transdanubian radiolarite, reddish brown 20 x 36 x 33 mm, 9. Blade-like flake, Mecsek radiolarite(?), grey 41 x 18 x 11 mm, 10. Micro-knife blade with worn edge. Transdanubian radiolarite – Szentgál var. 25 x 8 x 3 mm.

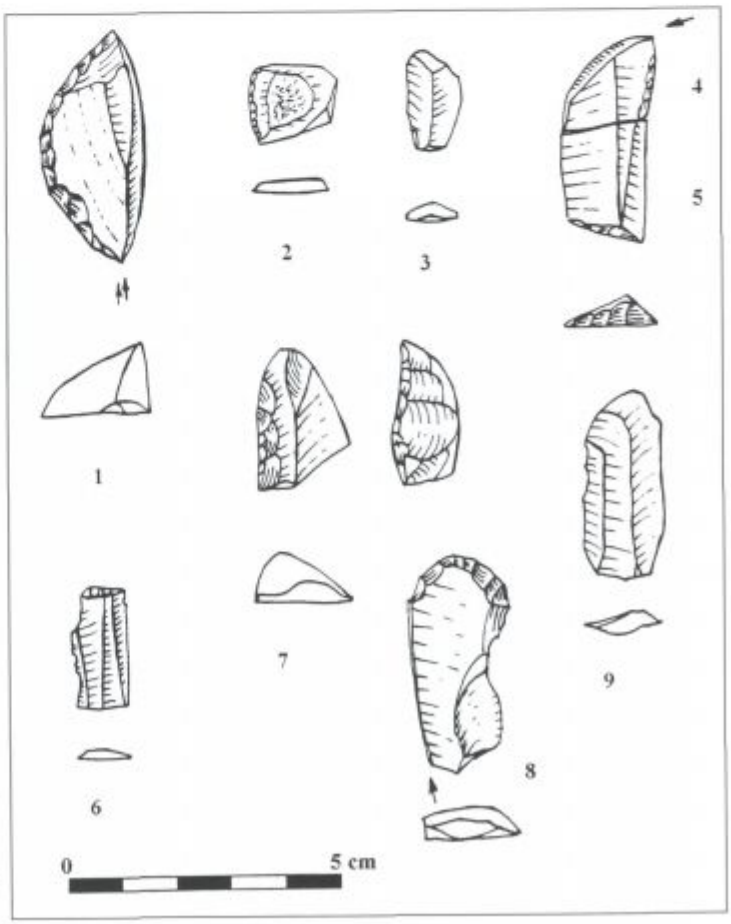

Fig. 13. Vörs-Máriaasszonysziget – Selection from the lithic industry. 1. Segment-form special tool on flake. Transdanubian radiolarite, porcellanite. 41 x 17 x 11 mm, 2. Retouched chip, Transdanubian radiolarite – Szentgál var., burnt, 13 x 16 x 3 mm, 3. Micro-chip, from unusual material, grey andesite, 15 x 10 x 3 mm, 4. Fragment of retouched blade, (fragment of a segment form tool). Transdanubian radiolarite, porcellanite, 15 x 15 x 4.5 mm, 5. Truncated blade fragment, (fragment of a segment form tool). Transdanubian radiolarite, porcellanite 21 x 15 x 4 mm, 6. Microblade, Transdanubian radiolarite – Szentgál var. 22 x 8 x 2 mm, 7. Side-scraper on small flake, with steep retouch. Transdanubian radiolarite – Szentgál var. 26 x 15 x 9 mm, 8. Atypical, high end-scraper on blade-like flake. Transdanubian radiolarite – Szentgál var. 38 x 16 x 6 mm, 9. Blade, Transdanubian radiolarite – Szentgál var. 34 x 14 x 3 mm.

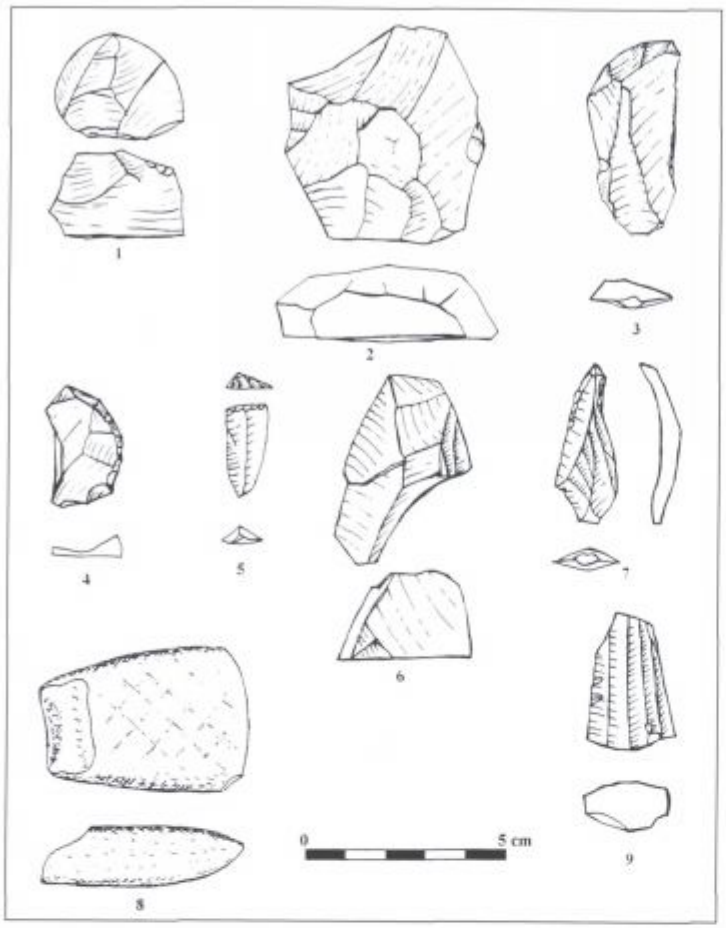

Fig. 14. Vörs-Máriaasszonysziget – Selection from the lithic industry. 1. Micro-core, heavily used. Transdanubian radiolarite – Hárskút var. 28 x 28 x 23 mm, 2. Large flake, with core base rim. Transdanubian radiolarite – Szentgál var. 51 x 50 x 18 mm, 3. Retouched knife blade, hafted with fine retouch (of use?). Transdanubian radiolarite, reddish brown 48 x 25 x 9 mm, 4. Segment form unretouched knife, with fragmented edge. Transdanubian radiolarite – Urkút-Eplény var. 28 x 17 x 8 mm, 5. Truncated microblade, Transdanubian radiolarite, reddish brown 22 x 11 x 4 mm, 6. Core remnant, cusp. Transdanubian radiolarite, light porcellanite 48 x 28 x 25 mm, 7. Borer on retouched blade, with atypical distal medial borer tip. Transdanubian radiolarite – Szentgál var. 38 x 13 x 4 mm, 8. Trapeziform polished stone chisel, with fragmented butt. Transdanubian radiolarite (light porcellanite)(?) 51 x 35 x 14 mm, 9. Micro-blade core remnant. Transdanubian radiolarite, light porcellanite 33 x 21 x 13 mm.

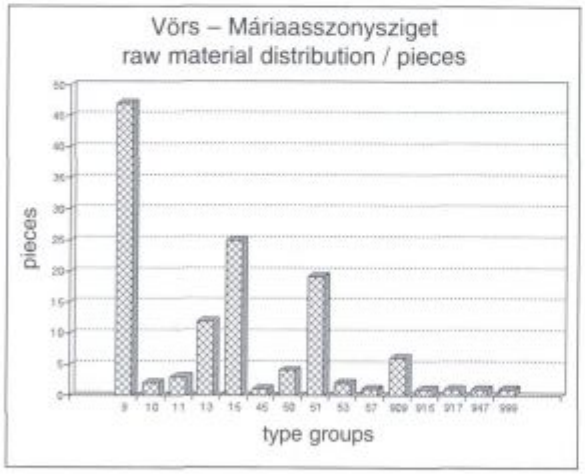

Fig. 15. Vörs-Máriaasszonysziget – Raw material type distribution according to pieces. Key: 9; Transdanubian radiolarite, Szentgál var. 10; Transdanubian radiolarite, Úrkút-Eplény var. 11; Transdanubian radiolarite, Hárskút var. 13; Transdanubian radiolarite, reddish-brown 15; Transdanubian radiolarite, others 45; Hornstone (Balaton Highlands) 50; fine sandstone 51; rough sandstone 53; quartzite 57; volcanites 909; Transdanubian radiolarite, Szentgál var. (?); 915; Transdanubian radiolarite, other (?) 917; Mecsek radiolarite (?), 947; basalt (?) 999 others.

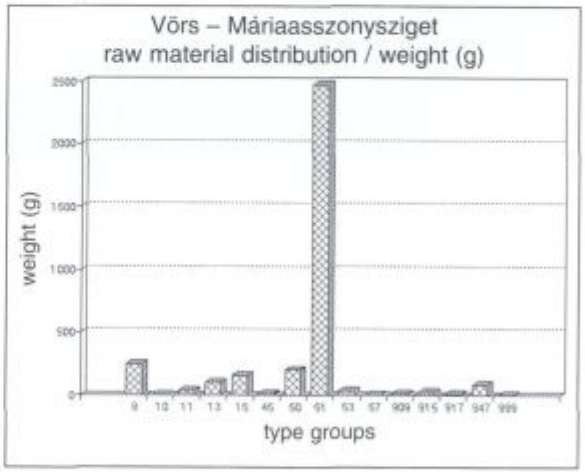

Fig. 16. Vörs-Máriaasszonysziget – Raw material type distribution according to weight. Key: 9; Transdanubian radiolarite, Szentgál var. 10; Transdanubian radiolarite, Úrkút-Eplény var. 11; Transdanubian radiolarite, Hárskút var. 13; Transdanubian radiolarite, reddish-brown 15; Transdanubian radiolarite, others 45; Hornstone (Balaton Highlands) 50; fine sandstone 51; rough sandstone 53; quartzite 57; volcanites 909; Transdanubian radiolarite, Szentgál var. (?); 915; Transdanubian radiolarite, other (?) 917; Mecsek radiolarite (?), 947; basalt (?) 999 others.

Vörs - Máriaasszonysziget

type	r 9	a 10	w 11	13	m 15	a 45	t 50	e 51	r 53	i 57	a 909	l 915	s 917	947	999	total pieces	total weight	type
B1	1			1												2	78.44	**B1**
B1w			1													1	18.03	**B1w**
B2	3			1	2											6	97.16	**B2**
B2w	1			1												2	12.78	**B2w**
B3	5		1	3	7	1					1			1		19	235.9	**B3**
B3/9				1												1	2.52	**B3/9**
B3w	2			1												3	7.848	**B3w**
B4	10				2											12	22.27	**B4**
B4/9	2															2	0.544	**B4/9**
B4w	5				1					1						7	2.477	**B4w**
B5	9				1						1					4	4.11	**B5**
B5/9	1	1	1													3	2.016	**B5/9**
B5w	1															1	0.352	**B5w**
B6		1														1	3.808	**B6**
B6w	1				1						1					3	3.291	**B6w**
B7	1			2	1								1			5	25.61	**B7**
B7/9											2					2	4.188	**B7/9**
B8				1												1	1.08	**B8**
B8/9	1															1	0.567	**B8/9**
B9	1				4											5	6.243	**B9**
B9w											1					1	0.012	**B9w**
C4	2															2	1.272	**C4**
C5/9					1											1	1.013	**C5/9**
C6				1												1	10.8	**C6**
D5/9					1											1	1.26	**D5/9**
D5w				1												1	0.968	**D5w**
D7/9	1															1	1.056	**D7/9**
F/C5	1															1	1.976	**F/C5**

F/G3	1															1	4.896	**F/G3**
F4					1											1	1.296	**F4**
G4	1															1	0.969	**G4**
G4w	1															1	0.27	**G4w**
I7	1															1	3.648	**I7**
J3					1											1	21.84	**J3**
J3w	2															2	6.822	**J3w**
M3					1											1	7.667	**M3**
P							1									1	78.75	**P**
P9												1				1	24.99	**P9**
csi.							1									1	109.8	**csi.**
csi9							1	1								6	188.1	**csi9**
g.								1								1	405	**g.**
kav									1							1	18.58	**kav**
ôrl9								12								12	1880	**ôrl9**
tör.							1	1	1						1	4	30.04	**tör.**
total pieces	47	2	3	12	25	1	4	19	2	1	6	1	1	1	1	126		**total pieces**
total weight	240.2	4.22	35.55	100.4	158.5	15.05	202.5	2475	32.84	0.45	10.92	24.99	8.11	80.9	0.09		3330	**total weight**
	9	**10**	**11**	**13**	**15**	**45**	**50**	**51**	**53**	**57**	**909**	**915**	**917**	**947**	**999**	**pieces**	**weight**	

Tab. 1. Type-raw material distribution of the Vörs-Máriaasszonysziget lithic assemblage.
Key: Type codes: B1 core, B1w micro-core, B2 core remnant, B2w micro-core remnant, B3 flake, B3/9 fragment of flake, B3w microflake, B4 chip, B4/9 chip fragment, B4w micro-chip, B5 blade, B5/9 fragment of blade, B5w microblade, B6 knife, B6w micro-knife, B7 blade-like flake, B7/9 fragment of blade-like flake, B8 blade-like chip, B8/9 fragment of blade-like chip, B9 fragment, B9w micro-fragment, C4 retouched chip, C5/9 fragment of retouched blade, C6 retouched knife blade, csi. polisher, csi 9 fragment of polisher, D5/9 truncated blade fragment, D5w truncated microblade, D7/9 truncated blade-like flake, F/C5 borer on retouched blade, F/G3 borer on retouched blade, F4 borer on chip, g. ball, G4 burin on chip, G4w burin on small chip, I7 end-scraper on blade-like flake, J3 side scraper on flake, J3w side scraper on flake, kav pebble, M3 segment on flake, ôrl9 fragment of grinding stone, P polished stone tool, P9 fragment of polished stone tool, tör. fragment.
Raw Material types: 9; Transdanubian radiolarite, Szentgál var. 10; Transdanubian radiolarite, Úrkút-Eplény var. 11; Transdanubian radiolarite, Hárskút var. 13; Transdanubian radiolarite, reddish-brown 15; Transdanubian radiolarite, others 45; Hornstone (Balaton Highlands) 50; Fine sandstone 51; Rough sandstone 53; Quartzite 57; Volcanites 909; Transdanubian radiolarite, Szentgál var. (?); 915;Transdanubian radiolarite, other (?) 917; Mecsek radiolarite (?), 947; Basalt (?) 999 others.

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