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THE CULTURE OF BRONZE AGE NET WARE IN KARELIA

Abstract

This article presents some of the results of a study on the so-called Net Ware culture which formed during the Bronze Age in Karelia (second half of the second – first half of the first millennium BC) and is represented at 83 sites. Several of the main research problems are discussed, including the origin of the culture, its spatio-temporal changes, chronology and relation with the ancient Fenno-Ugrians against the background of the whole area of the culture covering vast territories from the middle reaches of the River Volga to northern Scandinavia.

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Archaeological sites with so-called 'net ceramics' represent a considerable stratum of the prehistoric record of Northern Europe. Within the area of this tradition of technical pottery decoration, researchers distinguish several kinds of pottery: 'textile', 'pseudo or imitated textile', 'mat' or 'wafer' ceramics. The technically neutral term 'net', corresponding to the concept of 'reticular', is best suited as a general name for this pottery. The overall area of 'net' pottery covers a number of the Volga regions, the territories of Northwestern Russia, and parts of the East Baltic region and Fennoscandia, including Karelia (Fig. 1).

OUTLINE OF PREHISTORIC DEVELOPMENTS

According to the summarized data of several researchers, archaeological cultures with net pottery emerged approximately as follows. During the second half of the second millennium BC the Bronze Age culture of Net Ware formed in an area bounded by the Upper Volga in the south, Lake Onega in the north, the upper reaches of the River Sukhona in the east and in the west by the area to the southeast of Lake Ladoga and possibly as far as the River Volkhov. Later, during the first half of

the first millennium BC, it spread over a wide area, extending to the coasts of the Baltic and the White Sea, along the middle reaches of the Volga to the mouth of the River Kama, and to a lesser extent southwards to the basin of the River Kama (Fig. 1). In its latest stages, this culture was markedly differentiated. From the middle to the second half of the first millennium BC it ceased to exist independently and merged with a new wave of Early Iron Age culture of the so-called Ananyino type that spread over the vast territories of the forest zone to the north of the Volga between the Ural Mountains and the Baltic Sea. Along the southern right bank of the middle and upper Volga basin in a partially forested steppe environment, Net Ware was made among the Gorodetskaya and Dyakovskaya cultures at least during the first quarter of the first millennium AD. Early forms of cattle husbandry and agriculture took root in the Volga basin, probably as early as the Early Bronze Age, and fortified settlements appeared during the Iron Age. On the other hand, hunting and fishing predominated in the northern part of the forest zone.

RESEARCH PROBLEM

The general level of knowledge about the new pot-

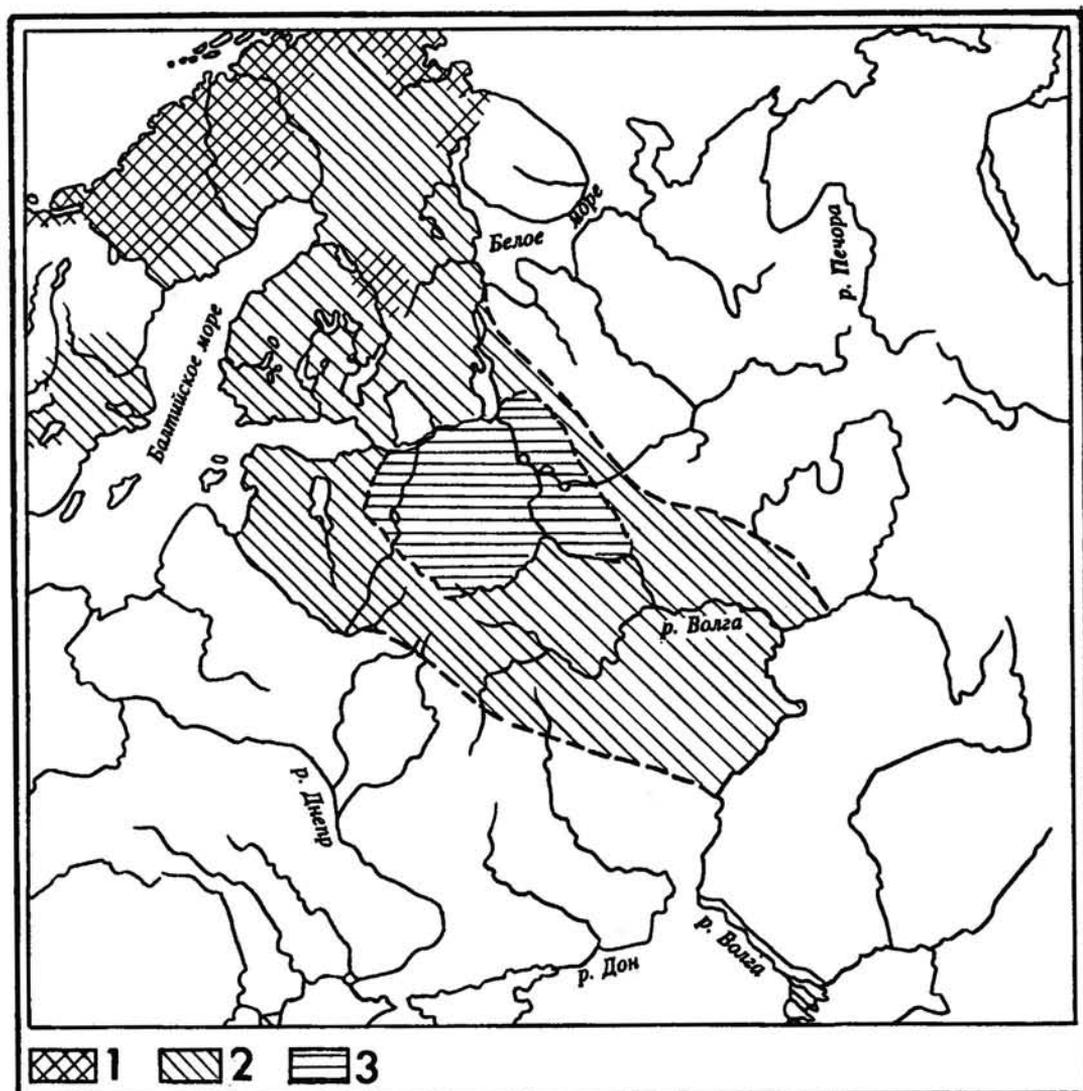


Fig. 1. Distribution of Net Ware in Northern Europe. 1 'Wafer' ceramics; 2 Area of Net Ware; 3 The area in the early stage.

tery cultures remains low given the objective of detailed reconstructions of the formation processes of these cultures within the whole area and the goal of modelling these processes using quantitative data. The practical realization of these goals is associated with the solving of certain methodological and technical problems in the descriptive analysis of archaeological materials.

It remains clear that with such an approach, the focal points of analysis are to a major degree limited to attempts to reflect adequately the changing of features of culture in space and time, as well as to elucidate their degree of mutual correlation, i.e. the stability of combinations of features determin-

ing the uniqueness of the local archaeological cultures.

It should be emphasised that process whereby any stratum of antiquities forms is unique. The appearance of prehistoric culture greatly differs in the various parts of the area of Net Ware. Accordingly, concrete schemes and, naturally, the results of descriptive analysis will differ considerably, for instance in northern Scandinavia, Karelia and the districts of the northern Volga basin. The methods of analysis should obviously be based on similar principles conditioned by the unity of objects. Otherwise, a mosaic of incompatible fragments will result. For example, it is impossible to compare many

descriptions based on the method of the 'verbal portrait', or statistical reports on pottery based on counts of the numbers of vessels (Kosmenko 1992; 1993) with those based on the fragments of pottery in collections (Patrushev 1989). These problems and the problem of the degree of minuteness in analysis are to be discussed and conventionally solved.

The present survey presents the experiences and results of a systematic analysis of Bronze Age Net Ware culture in Karelia (Kosmenko 1992; 1993). The available archaeological materials are represented by five categories: dwelling sites, remains and traces of various constructions, ceramics, lithic artefacts, evidence of metallurgy, and individual bronze artefacts.

DWELLING SITES

At present (1994), 83 sites with Bronze Age net Ware are known from the Republic of Karelia (Fig. 2). There are mainly represented by complexes of artefacts at multistrata settlements. Dwelling sites of a single stratum are found only rarely. All the dwelling sites can be conventionally assigned to three groups according to their area and the minimum number of vessels obtained: large sites of over 1000 square metres and over 100 vessels; medium-sized sites up to 1000 square metres in area (10–50 vessels); and short-term sites up to 200 square metres with usually only 1–2 vessels (Fig. 2).

An analysis of the geographic locations of the sites in various parts of Karelia reveals a pronounced tendency towards smaller numbers of sites and a smaller quantity of materials in the northern direction and to a lesser extent in the western direction from the eastern parts of the Lake Onega basin (Fig. 2). In southeastern Karelia, 37 sites are known, including the only large (Kelka III) and seven medium-sized ones, with a total of some 400 vessels. There are 24 sites in southwestern Karelia, including 6 medium-sized ones, with a total of around 200 vessels. In the northeastern Lake Ladoga district eight sites exist, with about 100 vessels, and in the White Sea basin are 14 sites with some 70 vessels.

The tendency towards the reduction of this stratum of antiquities in the outlying, especially northern, parts of this area is quite distinct if in spite of the lack of precise data one uses comparative materials from adjacent territories. According to estimates by I. S. Manjuhin, there are 85 sites with Net Ware south of Karelia, in the Kargopol and Belozero areas. On the whole, they contain more ves-

sels than their Karelian counterparts.

Over 20 sites in the southern and western parts of the basin of Lake Ladoga and in the eastern Baltic region south of the Gulf of Finland are on the whole poor in material except for the rather large dwelling site of Ust-Rybezhna II (Gurina 1961; Graudonis 1967; Lõugas 1970; Timofeev 1993). Over 20 sites on the Karelian isthmus and in southern Finland contained undetermined numbers of vessels of Net Ware. Several dozen sites poor in finds are known from northern Fennoscandia (Meinander 1954; Jørgensen & Olsen 1987; Hulthén 1991; Huurre 1983; Lavento 1992).

Over 50 sites with Net Ware are known from the basin of the upper and middle Volga, but often only as an admixture in the settlements of the Pozdnyakovo and Prikazan cultures of the Late Bronze Age. Thirty relatively homogeneous complexes of Net Ware demonstrate the obvious reduction in the number of sites and materials towards the mouth of the River Kama (Patrushev 1989). Accordingly the maximum concentration of sites and materials, i.e. the main volume of Bronze Age Net Ware, is to be found in the areas between the upper Volga and Lake Onega.

Bronze Age dwelling sites in Karelia only partially point to the traditional topographic pattern of locations at the mouths and sources of rivers flowing into large lakes (Fig. 2). In contrast with Eneolithic sites, they are almost absent on the sandy shores of remote bays, another tradition of settlement pattern.

THE PLAN AND LAYOUT OF DWELLING SITES

At Karelian Bronze age sites, the cultural layer usually extends along the shore of a body of water in strips 10–13 metres wide and up to 150 metres long. The area of mass concentration of artefacts around one or several dwelling centres is usually limited to 300–500 square metres at large and medium-sized settlements and 50 square metres at short-term sites. The dwelling centres contain evidence of repeated occupation in the form of numerous disorderly situated hearths and aggregations of artefacts. Short-term sites of the Elmenkoski contain traces of single occupations.

Owing to several reasons, the remains of dwellings are rarely found. Usually, traces of fire in the form of charcoal lenses up to 1.5 metres in diameter are observed, but stone-laid hearths are found more rarely. Pot sherds, stone artefacts and remains of bones are concentrated around them. Field work at Kelka III in southeastern Karelia revealed the re-

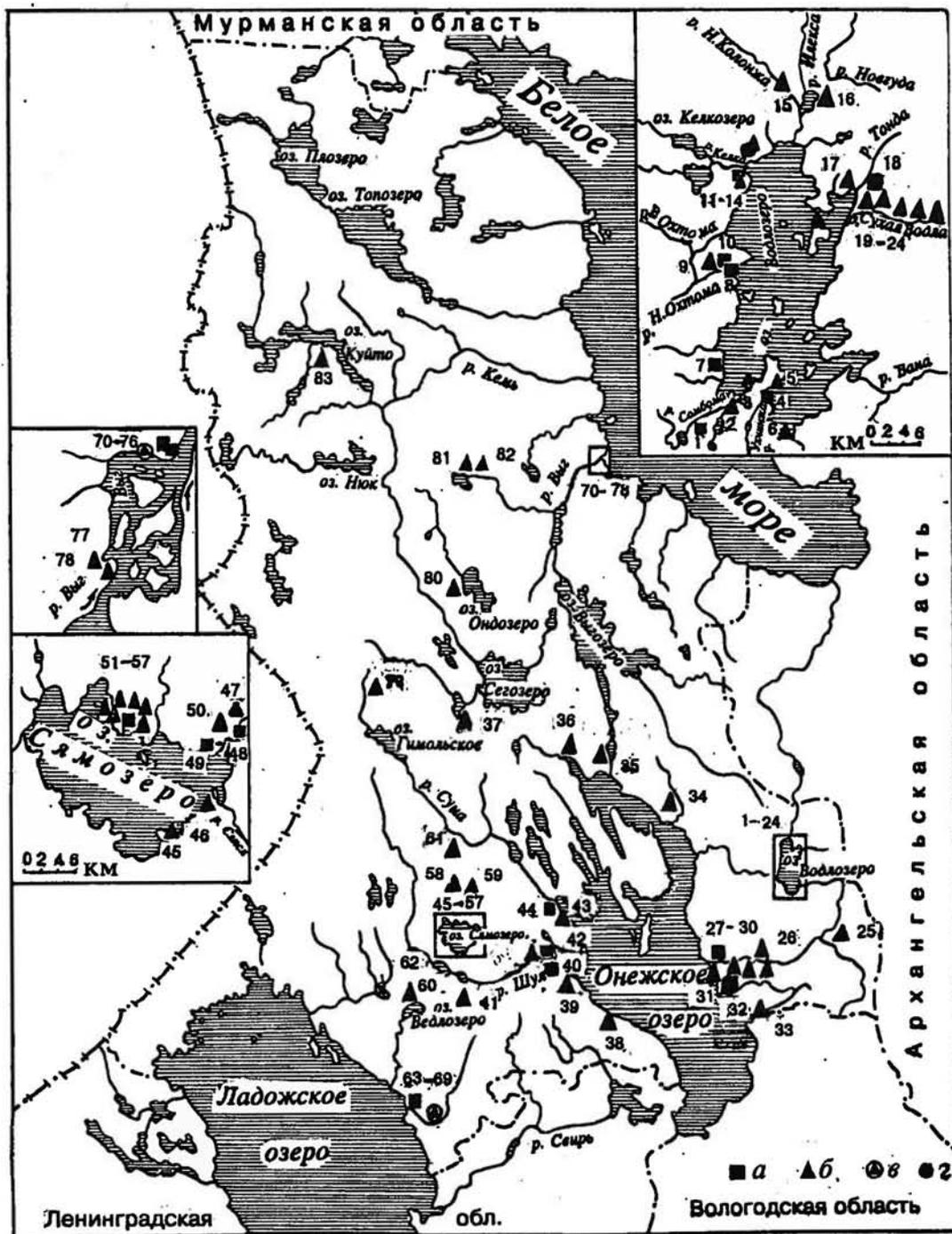


Fig. 2. Karelian sites of the Net Ware culture. *a* – medium; *b* – small; *v* – large settlements; *z* – complexes; 1 Somboma I; 2,3 Malaya Poga I, II; 4 Bostilovo II; 5 Kevasalma; 6 Matkalahta I; 7 Poga I; 8–10 Ohtoma I–III; 11–14 Kelka I–IV; 15 Nizhnayaja Kolonsha I; 16 Pleksa II; 17,18 Tonda I, IV; 19 Koskosalma; 20 Vodla I; 21,22 Suhaya Vodla I, II; 23 Shagnozero; 24 Vodla V; 25 Vodla Gurij; 32 Chernaya Rechka V; 33 Muromskoe III; 34 Nemen-na; 35 Povenchanka IV, 36 Voinavolok XXXIV; 37 Seletskoe III; 38 Sheltozero I; 39 Sainavolok; 40 Tomitsa, 41,42 Pichevo III; VII; 43 Verhovie I; 44 Suna VI; 45 Syamozero II; 46 Shapnavolok; 47–48 Malaya Suna I, IX; 49, 50 Chuinavolok I, II; 51–54 Lahta I–III, XI; 55–57 Kudoma IX–XI; 58 Cheranga I; 59 Vyatchelskoe II; 60 Svyatozero VIII; 61 Chudozero I; 62 Salostrov I; 63–69 Olonka I, Ia; II–VI; 70–76 Gorelyi Most II–VIII; 77,78 Zolotets VIII, XV; 79 Sukkozero III; 80 Ondozero IV; 81 Tunguda III; 82 Bohta II; 83 Elmenkoski.

mains of an oval dwelling measuring 6 x 3.5 metres and originally situated above ground. The dwelling had two entrances and stone hearths in the centre and near one of the entrances. An originally above-ground dwelling of roundish shape, measuring 3.2 x 3.0 metres was excavated at Elmenkoski in north-western Karelia. To all appearances, these dwellings resembled skin-tents. Traces of other constructions including storage pits and specialized locations for metallurgical production are lacking in Karelia. Nor are there any rectangular semi-dugout constructions which are typical of the Late Neolithic and Eneolithic of Karelia (Pankrushev 1988; Vitenkova 1991).

Semi-dugout dwellings of round shape, however, are known from the southern parts of the Net Ware area, at Ust-Rybezhna II (Gurina 1961) on the southern coast of Lake Ladoga and in the oldest layers of the fortified settlement of Dyakovskiy (Krasnov 1964; Smirnov 1974). In the Volga region, rectangular above-ground dwellings have also been found (Smirnov 1974, Patrushev 1989), but roundish semi-dugouts are the oldest type (Krasnov 1964).

Summing up the available information on the dwelling sites of the Bronze Age in Karelia, we can conclude that the population which produced Net Ware followed the rather mobile life of forest hunters and fishers, as dictated by adaptation to the local environment. There are no features of settled life as in the Volga basin. The existence of a nomadic lifestyle as indirectly testified by materials from the northernmost regions of the area have not yet been observed. Throughout the Bronze Age, the way of life of the population did not appreciably change.

CERAMICS

From collections from 23 sites in Karelia, 547 vessels were chosen as suitable for statistical counts. Selected for this purpose were the upper parts of pots with a completely or mostly preserved ornamental zone and the profile preserved.

In the majority of the vessel the diameter at the mouth is 25–35 cm; pots measuring less than 15 cm or over 40 cm in mouth diameter are unique. The pots were possibly made for shaping the clay on blocks or through the addition of clay coils as in the vessels of the Late Neolithic-Eneolithic, but with a partial overlapping of one strip of clay over the other, followed by the smoothing of walls.

Sand and crushed stone were mostly used as temper. However, 10–15% of the pottery, particularly in Eastern Karelia contained burnt organic temper

in addition to sand, and 0.4% had temper combining sand and asbestos fibres. There was no marked correlation between temper and other features of the pottery.

The 'net' or reticular imprints on the outer surface (only rarely on the inside) are the densely applied, superficial and shallow impressions of a long comb stamps, sometimes changing over to hatching, i.e. to combing with the same tools, or to a smoothed surface (Figs. 3–5). There are no real 'textile' ceramics in the Karelian material, although finds from the Vodlozero district in south-eastern Karelia include individual vessels with the impressions of cord wound on a rod (Kelka III, Bostilovo II). Vessels with smooth surfaces are rare (Figs. 4:9; 5:4), although their number obviously grows in the late phase of the Bronze Age (Tonda IV, Bostilovo II, Gorelyi Most V).

The making of reticular imprints is a special mode of the technical decoration of the vessel surface, being similar to hatching, smoothing, polishing or enamelling. Technical decoration is ornamentation proper, nor a constructional-technological way of manufacturing a vessel, but a procedure giving pottery an aesthetically complete appearance. The diversity of 'net-technical' variants within the area testifies to the fact that it was not the technique itself but the result of the operation that was important to the potters; in other words, it performed as aesthetic function. Reticular imprints made with comb stamps are typical of the corresponding Bronze Age culture of the Volga region and the northwestern regions of Russia (Patrushev 1989; Manjuhin 1989). During the Iron Age, 'textile' ceramics with impressions of fabrics and other organic material spread among the fortified settlements of the Volga region. The ancient 'pseudo-textile' ceramics characterizes the lower strata of these settlements (Rosenfeldt 1974). A reticulated surface is one of the main distinguishing features of Bronze Pottery in Karelia, but it provides no clearly defined information on the cultural origins of this period.

A statistical analysis of the shapes of Net Ware vessels from Karelia shows that they can serve as the source of a great deal of information. Due to the abundance of profiled vessels, the composition of shape markedly differs from the preceding asbestos-tempered pottery of the Late Copper Age. The origin of the latter can be determined by distinguishing prototypes in the foregoing or simultaneous cultures of the neighbouring regions and by analysing the spatial variations of these shapes. The Bronze Age pottery of Karelia includes four variants of profiled vessels with necks (68.1%) and two kinds of unprofiled pots (31.9%) out of a total of

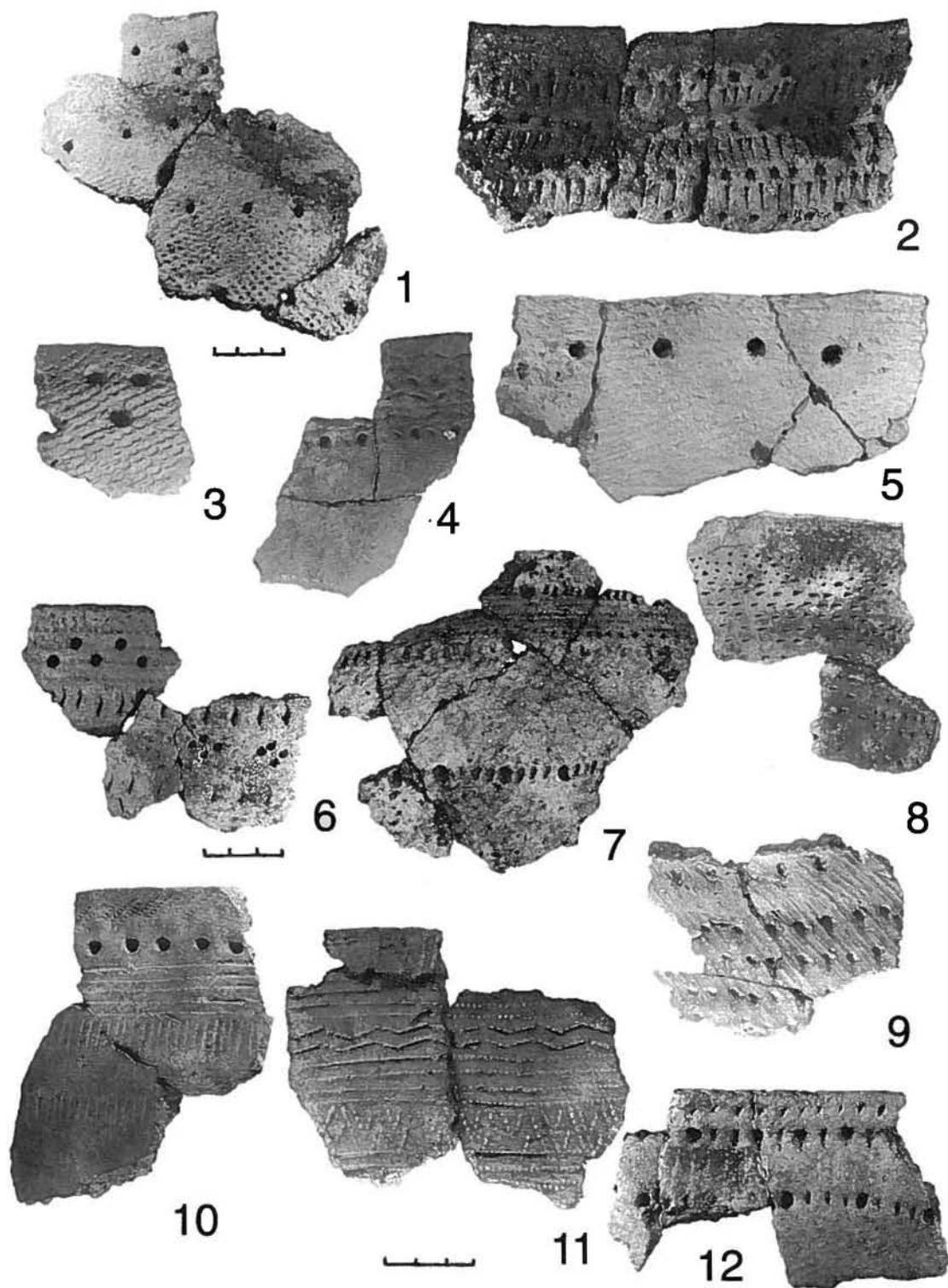


Fig. 3. Pot sherds with reticulated (1-3, 5-8, 12), hatched (4, 9, 11) and smoothed surfaces (10). 1 Malaya Suna IX; 2 Ohtoma I; 3,4 Ohtoma III; 5,6 Pichevo III; 7 Elmenkoski; 8-12 Kelka III.

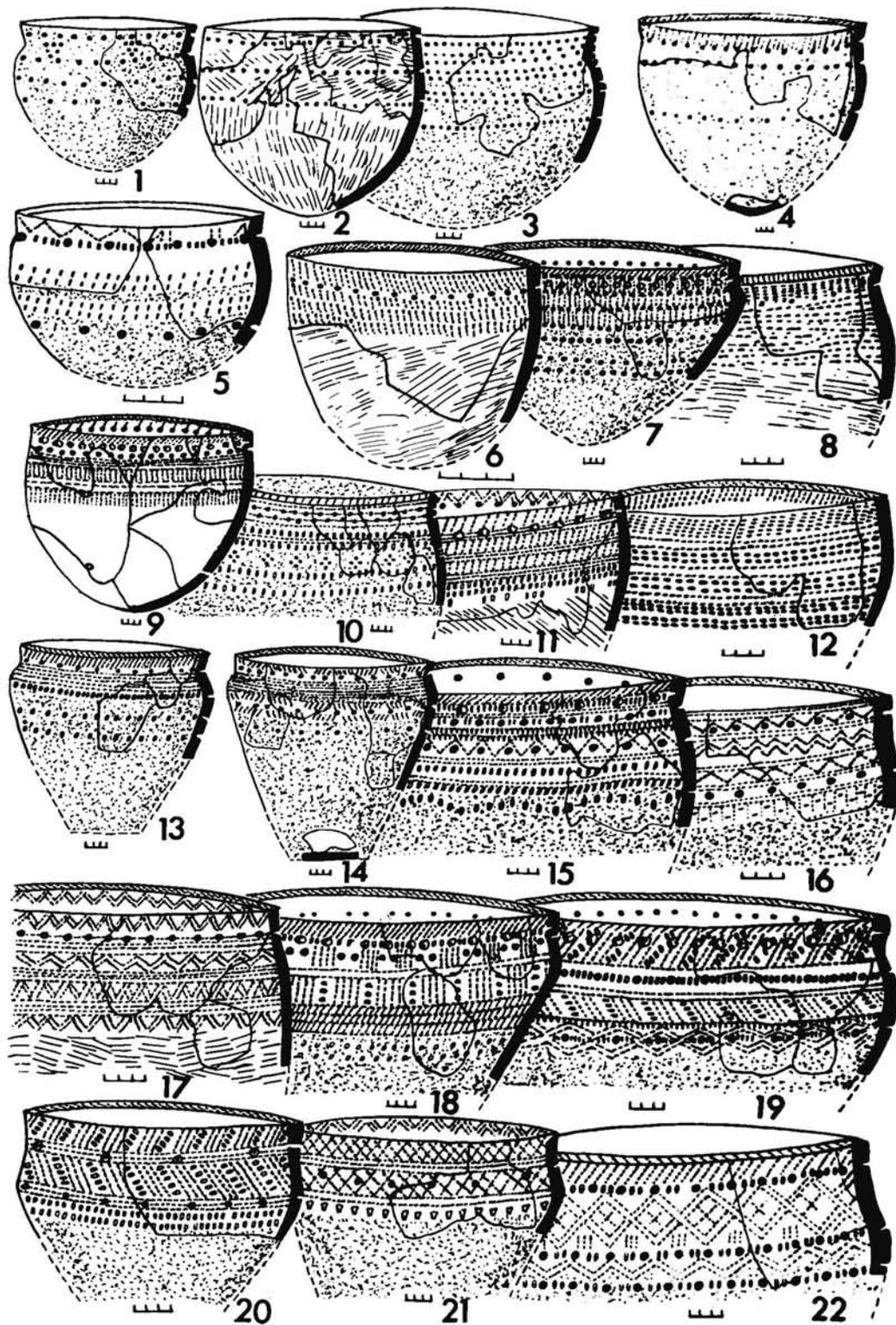


Fig. 4. Vessels of the Net Ware culture from Karelia with zonal ornaments. 1 Malaya Suna IX; 2-4, 6, 8, 9, 11, 12, 17, 19, 21, 22 Kelka III; 5, 15, 18 Ohtoma III; 7 Ohtoma I; 10 Pichevo III; 13 Poga I; 14 Lahta III; 16 Chernaya Rechka V; 20 Somboma I.

547 specimens belonging to three types of different origin.

Type A (42.5 %) is represented by variants 1 and 2, absent among the local pottery of the Eneolithic and ultimately originating from the corresponding vessel shape of the Fatyanovo culture of the Early Bronze Age in the upper Volga region (Krainov 1987). Variant 1 (17.8%) includes round-based, nor very high vessels of bomb shape with rims curved slightly outwards, a deep neck and convex sides (Figs. 4:1,3,5,17,19; 5:11,12,15). They are not found in northern Karelia, although in the southern parts they amount to 24.1 % of the pottery. Vessels of variant 2 (24.7%) are a derivative form of variant 1, being more distant from the original prototype. They have a short rim, a neck that is not very deep and a more elongated body, sometimes with a small, flat bottom (Fig. 4:14,18; 5:13,14,16,17,19). In southern Karelia they account for 26.4% of the material concerned, while in the northern parts they amount to only 9.2%.

The vessels of variants 3 and 4 are related to type B. Their origin is most probably associated with the Late Bronze Age Pozdnyakovo culture of the Oka basin. It reflects the indirect influence of the steppe cultures of this period, possibly the Srubnaya culture. Round- and flat-bottomed pots of medium height with broad necks and moderately convex walls (Fig. 4:8,10,15,16,22; 5:4,13,21) are characteristic of variant 3 (24.8%). They are most numerous in southeastern Karelia (30.1%), being found less often in the northern (16.3%) and western (12.4%) districts. It goes without saying that they are more numerous in the Kargopol and Belozero areas than in Karelia (26.7%). Although vessels of similar shape are quite widespread in various Bronze Age cultures of the forest zone, the complex of features makes it possible to link their appearance in Karelia directly with the Pozdnyakovo culture. This is most clearly illustrated by not very large flat-bottomed vessels with broad necks and a weakly pronounced rib on the body that are found in southeastern Karelia. Their origin can be connected with similar vessels of the Srubnaya and Pozdnyakovskaya cultures (0.6%, Fig. 4:20,21). These have not been found in other parts of Karelia, but are known from the Kargopol and Belozero regions (2%).

Unprofiled vessels without necks of variants 5 and 6 are related to type C (32.1%). It is difficult to establish the precise origin of these pottery forms because of their wide distribution among the Stone and Copper Age cultures of the forest zone. Variant 5 (28.3%) is represented by relatively high round- and flat-bottomed vessels with straight upper parts or slightly contoured necks (Fig.

4:2,4,6,9,11,12,17; Fig. 5:7,9,10,20).

Their distribution in Karelia is quite noteworthy. In the southeastern parts they constitute 27.1% of the material concerned; in the west 14%; and in the White Sea basin 74.5%. They completely predominate in the northernmost regions (Jørgensen & Olsen 1987; Hulthén 1991), but according to I. S. Manjuhin they amount to only 5.6% in the Kargopol and Belozero regions. Shallow round-bottom vessels of variant 6 with slightly concave upper parts (3.8%, Fig. 5:5,6) are the most archaic ones of the type in Karelia. The prototypes of this form are easily found in the preceding cultures of the forest zone, especially among Pit-Comb Ware.

The general tendency in spatial change in the forms of Net Ware in the northern parts of its area, including Karelia, is an obvious decrease in the number and variety of profiled pot shapes of southern origin. Hence the composition of forms closest to the prototypes can be traced back to the earliest sites of the Net Ware culture in the territory where it initially formed, i.e. in the Volga basin.

The shapes of the rim profiles of Net Ware in Karelia are quite varied and include 5 variants. Rims with straight or rounded profiles predominate (84.1%). Less common are rims with profiles inclined inward (10%) or outward (3.3%) or of slightly acute or tapering shape (1.7%). Only in the White Sea region are there rims with a thickening of the inner edge (0.9%). The origin of the bevelled and tapered rims is most probably associated with similar forms in the preceding Pit-Comb Ware materials.

Pottery ornamentation is one of the most reliable sources of information on the origin of the Net Ware culture. It should be noted that the spread of Net Ware in Karelia marked the beginning of a new stage in the general process of regressive change in the ornamentation of hand-turned ceramics in the forest zone that had been in progress throughout its period of manufacture (Kosmenko 1993). The ornamentation of early Net Ware in Karelia still displays features peculiar to the ceramic patterns of the Neolithic and Eneolithic periods, but on the whole ceramic ornamentation rapidly deteriorated in the Bronze Age. Moreover, there was a very rapid spatial deterioration of ornaments in marginal, particularly northern, parts of the area. This process can be illustrated with quantitative data if we conventionally class all ornaments into two main categories: first, the archaic 'zonal' patterns of more than two motifs or elements alternating vertically (Fig. 4), and secondly, the simplified 'border' ornaments including 1–2 elements (Fig. 5). As a result, zonal ornamental patterns in southeastern Karelia account for 34%, while the 'border'

ornaments constitute 61.1%. The proportion of undecorated pottery is 1.9%. In western Karelia the respective figures are 31.2%, 67.8% and 0.8%; in the White Sea region 14.5%, 85.5% and 0%.

Net Ware in Finland (Meinander 1954; Huurre 1979) and the southern parts of the East Baltic region (Graudonis 1967) is decorated far less richly than in Karelia, and in northern Scandinavia and the Kola Peninsula it usually bears no ornamentation except for individual vessels with bands of pits or impressions (Jørgensen & Olsen 1987; Hulthén 1991). In a similar way, though not completely, the ornamentation of Net Ware of the beginning of the first millennium BC declines in the southern and southeastern parts of the area concerned, i.e. the Oka and middle Volga regions (Popova 1975; Patrushev 1989). Thus, the most richly ornamented Net Ware with early features is chiefly concentrated in the original territory between the upper Volga and Lake Onega. It is precisely here that the features of the initial cultures, i.e. their genetic components that have survived in more or less integral form, can be revealed in their most vivid manifestations.

In order to reflect the process of change in the ornamentation of Bronze Age pottery in Karelia, all ornaments should be classified according to the structural-technical principle, which is aimed at detecting the dynamics of change in time and space of the main technical modes and structural types of patterns.

Ornaments appear on 98.5% of the vessels. The technique of decoration is relatively simple. The most common features are bands of round pits (83.5%), which in 85–90% of observed cases were made with notched tools and have uneven walls. Ornaments made with comb stamps (48.6%) are more varied and include bands, zig-zag designs and more rarely groups of impressions and rhomboid figures. Short stamps with 2-3 denticulations were used more rarely (9.5%); incised ornaments (2%) usually copy comb pattern as their simplified variants. Bands of shallow oval or triangular impressions are numerous (45%), while tubular (0.9%) and 'cat's paw' imprints (0.7%) are rare. Extremely rare are bands of impressions made with twine wound around a rod (1.5%) and cord impressions (0.2%).

In all vessels ornamentation follows a horizontal division, being concentrated in the upper parts; the lower parts and vessel bases were not decorated. Zonal ornaments (occurring in 31.4% of the vessels) occupy 1/3 – 1/2 of the body (Fig. 4). In order to establish their genetic components, it is rational to divide them into simple and geometricized groups. Simple zonal ornaments (16.6%) are repre-

sented by several main variants: sparse bands of pits (7.3%, Fig. 4:1–4) and more rarely impressions (1.5%, Fig. 4:8), as well as combinations of pits and impressions (5.3%, Fig. 4:5–7), including the archaic combination of pits and comb stamps (5.3%, Fig. 4:6–7). The structure and technique of these patterns demonstrate a close resemblance with the ornaments of Late Pit-Comb Ware in the forest zone of European Russia. At the same time, they deteriorated markedly.

Geometricized zonal ornaments (14.8%) are of mixed origin, but nevertheless typical of the 'forest' Bronze Age. They are represented by three main variants: comb band, or belt, ornaments (8%, Fig. 4:9–14), framed zig-zag designs (4%, Fig. 4:15–17), and complex compositions in which various geometrical ornaments alternated (2.8%, Fig. 4:18–22).

It is difficult to carry out any genetical analysis of these ornaments, as the material combines ornament motifs of different origin, which usually changed in comparison with prototypes. The motifs consisting of groups of impressions (Fig. 4:18–20), the prototypes of which are distributed among Neolithic Pit-Comb Ware from Karelia to the basin of the River Oka (Gurina 1961; Tsvetkova 1963; Pankrushev 1978) are identified quite easily. Complex ornaments combining comb bands, zig-zag designs and groups of imprints, find parallels among the Bronze Age 'Post-Fatyanovo' ceramics of the Belozero region, the upper reaches of the River Sukhona and the upper Volga region (Gurina 1963). There are also ornaments specific to the Pozdnyakovo culture: triangular festoons of impressions, cord bands, crossed rhomboid designs and especially bands or belts of pits on the inner surface forming bulges ('pearls') on the outer wall (Fig. 4:7,9,11,15,18,19). A specific motif of Net Ware in Karelia is a band of pits with notched or stamped imprints between the pits (Fig. 4:5,7,15,18,19,22), which is not found in Copper and Iron Age pottery. This motif also appeared in the Pozdnyakovo culture (Popova 1985).

The border ornaments of Net Ware (67.1%) are simplified variants of zonal patterns, and they show how quickly the process of regressive change in ornamentation took place in different parts of the area concerned. Like the zonal designs, the border ornaments are also subdivided into simple and geometricized groups and they include the same principal variants. They consist of one – more rarely two – zones of 1–2 motifs, having a total width of no more than one-third of the vessel's body (Fig. 5).

Among the simple borders (45.5%), single or double bands of pits predominate (20%; Fig. 5:1–

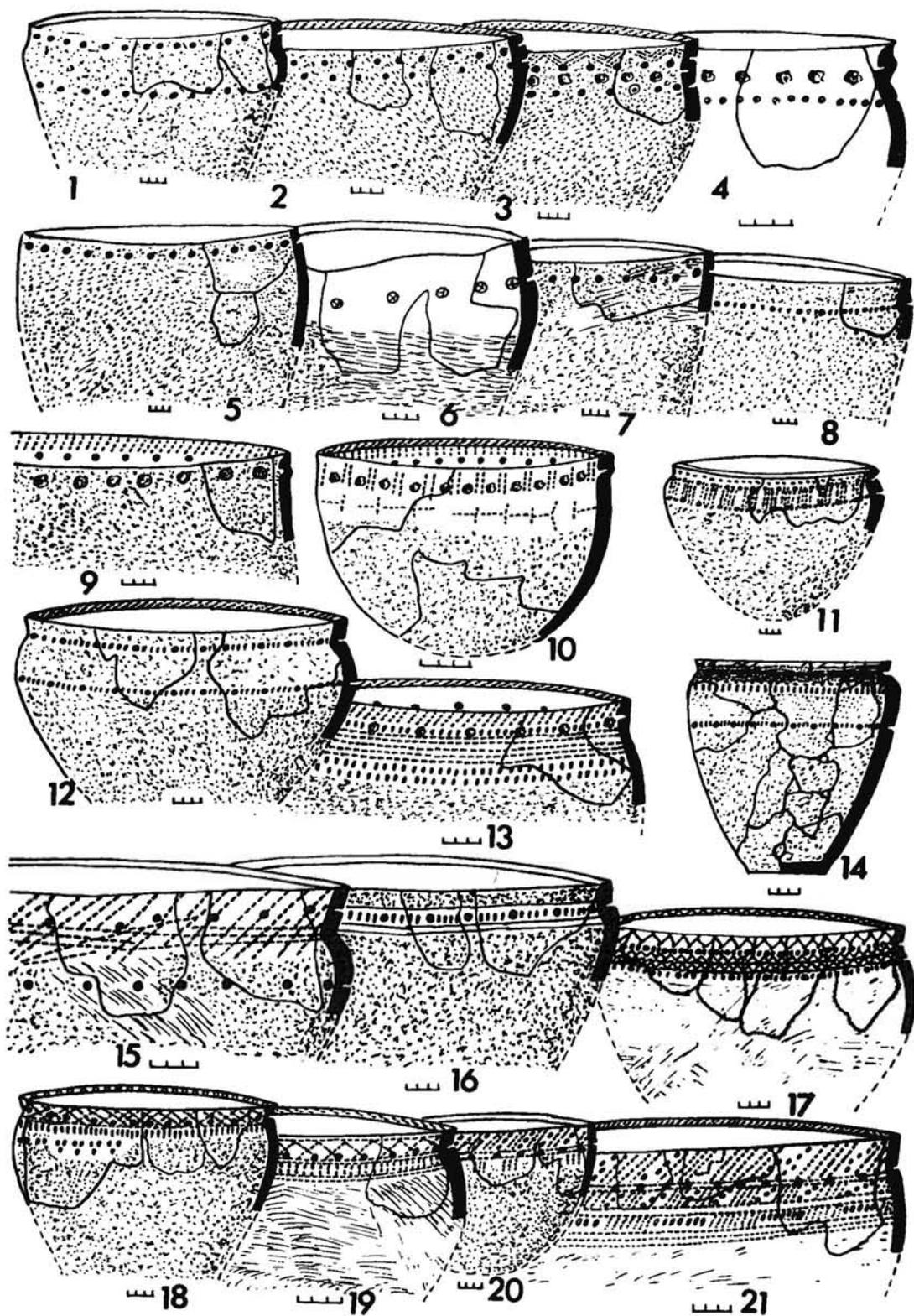


Fig. 5. Vessels of the Net Ware culture from Karelia with border ornaments. 1-3,17-20 Ohtoma III; 5 Somboma I; 4,6,9-11,13,15,21 Kelka III; 7 Pichevo III; 12 Kudoma XI; 14 Elmenkoski; 16 Malaya Suna IX.

3,5–8,12). In some cases 'pearl' belts occur (2.3%; Fig. 5:4,9). Combinations of pit belts and rows of comb imprints (14.7%; Fig. 5:10–11) are numerous, while combinations of pits and various impressions occur more rarely (8.8%).

Geometricized borders (21.6%) most often consist of bands of comb impressions (14%; Fig. 5:13–15); only rarely of bands of incised markings (1.3%; Fig. 5:16). Also among the material are horizontal single or criss-crossing zig-zag designs (4.5%; Fig. 5:17–20) and groups of comb impressions, usually enframed within the same belt (1.8%; Fig. 5:19,20). These ornaments often have a structural centre consisting of belts of pits or 'pearls'.

All the principal techniques except pits were used for rim-top decoration (68.5%). Vessels with border ornaments mostly have undecorated rims. On the rims are oblique imprints of comb (54.5%) or 2–3 notched stamps (3.1%), comb zig-zag designs (2%), groups of impressions (0.5%), incised lines (1.1%) or zig-zags (1.1%). The inner top edge in some vessels is decorated with similar motifs (9.5%; Fig. 4:11,12,17,21), mostly in southeastern Karelia (6%), the White Sea region (3%) and the southwestern districts of the area (0.5%).

The presented information illustrates the composition of Bronze Age pottery ornamentation in Karelia. It should be noted that in addition to the above-mentioned tendency of a deterioration of spatial ornamentation towards the north and west, there is also a decrease in the number of certain elements of southern origin. For example, the 'Post-Fatyanovo' zonal ornaments are found only in the eastern parts of the Lake Onega catchment. The proportion of vessels with bands of 'pearls' (amounting to 23.6% in the Kargopol and Belozero regions) was only 14.3% in southeastern Karelia, 4.1% in southwestern Karelia, and 5.4% in the White Sea region. They also occur sporadically in Finland (Meinander 1954; Huurre 1983), but are naturally lacking in northern Fennoscandia. In the border ornamentation found in the northern and western territories of the Net Ware area it is already difficult to distinguish genetic components that are still quite clearly traced in southeastern Karelia. Yet even there homogeneous elements do not form stable combination. In other words, heterogeneous components are already strongly mixed and considerably changed.

LITHIC ARTEFACTS

The stone artefacts of the Bronze Age lack special traits, which is why it is difficult to distinguish

them among the materials of multistrata settlements of the Stone-Copper Ages. In Karelia, however, we have succeeded in determining complexes of tools in single-stratum sites (Ust-Vodla II, Bostilovo II) and in a number of multistrata settlements (Suna VI, Pichevo III, Kelka III and Elmenkoski). It should be kept in mind that the specific composition of lithic assemblages depends on the features of the raw materials concerned: flint, quartz and slate. The use of these raw minerals in turn primarily depends on the distance of the sites from deposits of raw materials.

Throughout the whole period of utilizing stone in Karelia from the Mesolithic to the Iron Age, flint was preferred for the majority of tools and implements. Quartz was used when flint was not available and slate was mainly the material for slashing and gouging implements. There are no flint deposits in Karelia. They are found within the Devyatinskaya layer deposits of the Carboniferous era stretching in a narrow north-south zone from the lower reaches of the River Onega to the southern shore of Lake Onega (Kravtsov 1959). Eastern flint penetrated far west into Finland and northern Scandinavia (Kinnunen et al. 1985; Huggert 1984), whereas quartz was rarely used in the east. The area of the mass use of flint covers the eastern parts of Karelia. Throughout the period when lithic materials were utilized, including the Bronze Age, flint artefacts accounted for 95–99% of the total number of flint and quartz tools. In the western regions of Karelia, the proportions of flint implements strongly fluctuated between 36 and 80%, depending on the geographical location of dwelling sites (Kosmenko 1993). The dynamics of the use of quartz and flint raw materials during the period of stone utilization in Karelia is characterized by a successive increase of flint entering the western districts. Interestingly, the Bronze Age witnesses a kind of peak in the use of flint in western Karelia even in comparison with the Iron Age, which reflects the close connections of the Net Ware culture with the eastern regions (Kosmenko 1993).

Slate, deposits of which are known from southern Karelia, especially near Lake Onega, was quite widely used during the Bronze Age. In northern Karelia, mainly complete tools are found, and few remains of manufacture. The Bronze Age population thus utilized and developed local mineral resources, but its degree of adaptation in this respect was not quite high.

The composition of Bronze Age implements on the whole is common for Karelia. Scrapers of various shape account for around 60% of all tools. Wide flint scrapers are characteristic of complexes containing Net Ware (Fig. 6:1,2). There are also a

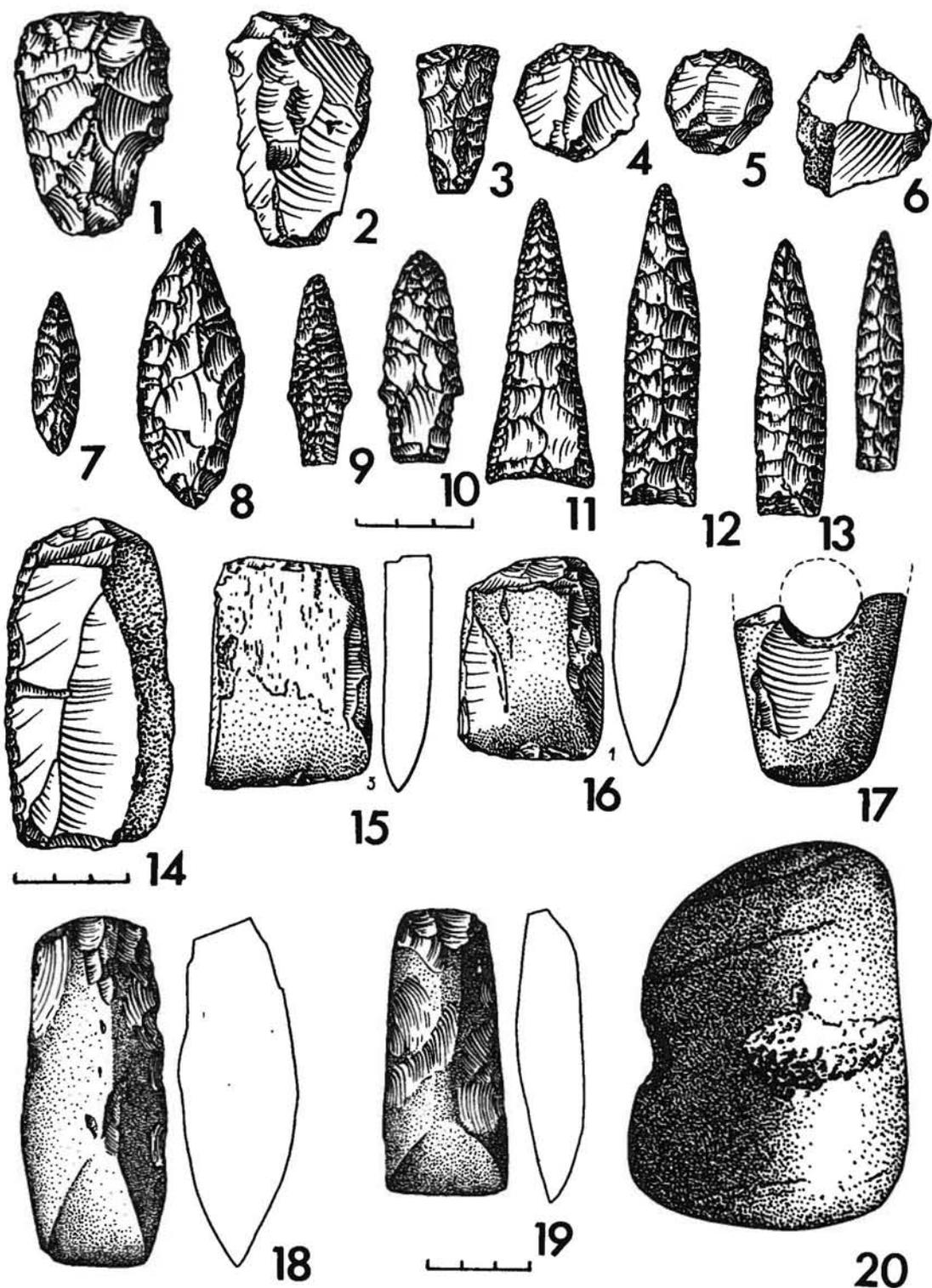


Fig. 6. Tools of flint (1-15) and slate (16-21) of the Net Ware culture from Karelia. 1,5,6,11 Gorelyi Most III; 2,15 Elmenkoski; 3,12,16,18,21 Gorelyi Most VI; 4,17 Usta vodla II; 7,10 Ohtoma I; 14 Ohtoma III; 13 Gorelyi Most V; 19,20 Kelka III.

few finds of cutting and piercing implements and knives of flint (Fig. 6:6,14). Arrowheads and spearheads of flint are represented by three types: leaf-shaped, a rare type with a wide flat haft, and a more widespread projectile point with a straight or slightly concave base (Fig. 6:7-13). Also among the finds is a slate point with a wide notched haft and an engraved schematic design. This object is obviously of Scandinavian origin (Fig. 7:3).

Rectangular axes with symmetrical blades and adzes with asymmetrical blades predominate among the slate tools, while slotted gouging tools of the chisel type are found less often (Fig. 6:14,16,18,19). The material from southern Karelia includes short flint axes (Suna VI, Kelka III). There are also individual finds of perforated slate axes, hammering implements (Fig. 6:15-21), pendants, casting moulds for bronze celts (Fig. 7:2), and quartzite sinkers with grooves along the sides.

The majority of the Bronze Age tools have no distinctive traits relating to the same material of the Eneolithic. There are no gouges, long slate arrowheads of triangular and rhomboid section, or other objects of East Baltic type such as amber pendants and buttons which were characteristic of the Copper Age culture of Karelia. A number of new tool types emerged and the correlations of the lithic raw materials changed. During the late phase of the Bronze Age the number and variety of tool types used for slashing decreased probably as a result of the introduction of bronze celts.

METAL PRODUCTION

Information on the sources and production of non-ferrous metals in the Bronze Age is limited and reflects the low general level of metallurgy among the Net Ware culture. The natural copper deposits near Lake Onega, which were exploited during the Eneolithic were probably not utilized and developed during the Bronze and Iron Ages (Kosmenko 1993). Analyses of non-ferrous metals from certain dwelling sites in Lake Ladoga region (Gurina 1961), southern Finland (Meinander 1954) and the southeastern shore region of Lake Onega (Kosmenko 1993) have shown them to be bronze, although its sources are not precisely known. At least in southern Karelia bronze was most probably obtained from the Volga region in the form of imported goods.

However, the early and late Bronze Age sites of Kelka III and Tonda IV respectively revealed traces of the smelting of metal. These are the fragments of small drossed crucibles with net imprints on the outer surface. In the late stage, the celts of

the Akozino-Mälär type and those combining features of the Maaninka and Ananyino types appear (Fig. 7:1,2). In the late stage of the Bronze Age in Karelia the casting of metal is indicated by finds of compound stone moulds. The sources of this tradition are most probably connected with the Volga region.

In the northern parts of this area, including Karelia, no reliable information on iron production is available. The superficial conclusions of some researchers (Brjusov 1940; Gurina 1961; Anpilov 1966) concerning the connections of Net Ware and traces of iron smelting at a number of sites in southern Karelia and the Ladoga region are not based on verified facts. These sites also contain Iron Age and medieval assemblages, including aceramic ones, that are usually connected with furnaces and iron slag.

Concluding the survey of the main categories of materials, we should mention individual finds from southern Karelia of flat clay discs 3-6 cm in diameter with holes in the centre (Fig. 7:4,5). These have been identified as spindle whorls (Gurina 1961) or as fire-making tools (Brjusov 1940), but their precise function remains to be determined.

ORIGINS OF THE CULTURE

As a result of an analysis of all the available data, N. N. Gurina's hypothesis concerning the upper Volga origins of the Net Ware culture in Karelia is corroborated. The composition of genetic components suggests that it most probably formed originally in the northern left-bank districts of this region and later spread mainly northwards to the Barents Sea coast and eastwards to the middle Volga region. The monocentric character of the emergence of this culture can be traced back to successive divergent changes in a number of elements that were independent of the influence of the local environment (shapes, details, ornaments in material) and other elements susceptible to adaptation, demonstrating local 'colour' (camp-sites, topography, dwellings, stone tools etc.). The local cultures of the Eneolithic did not participate in shaping the Bronze Age culture of Karelia, but the problems of local cultures participating in other, particularly marginal, territories of the Net Ware area remain of topical interest.

CHRONOLOGY

The description of spatio-temporal stages during the existence of a culture or group of cultures with

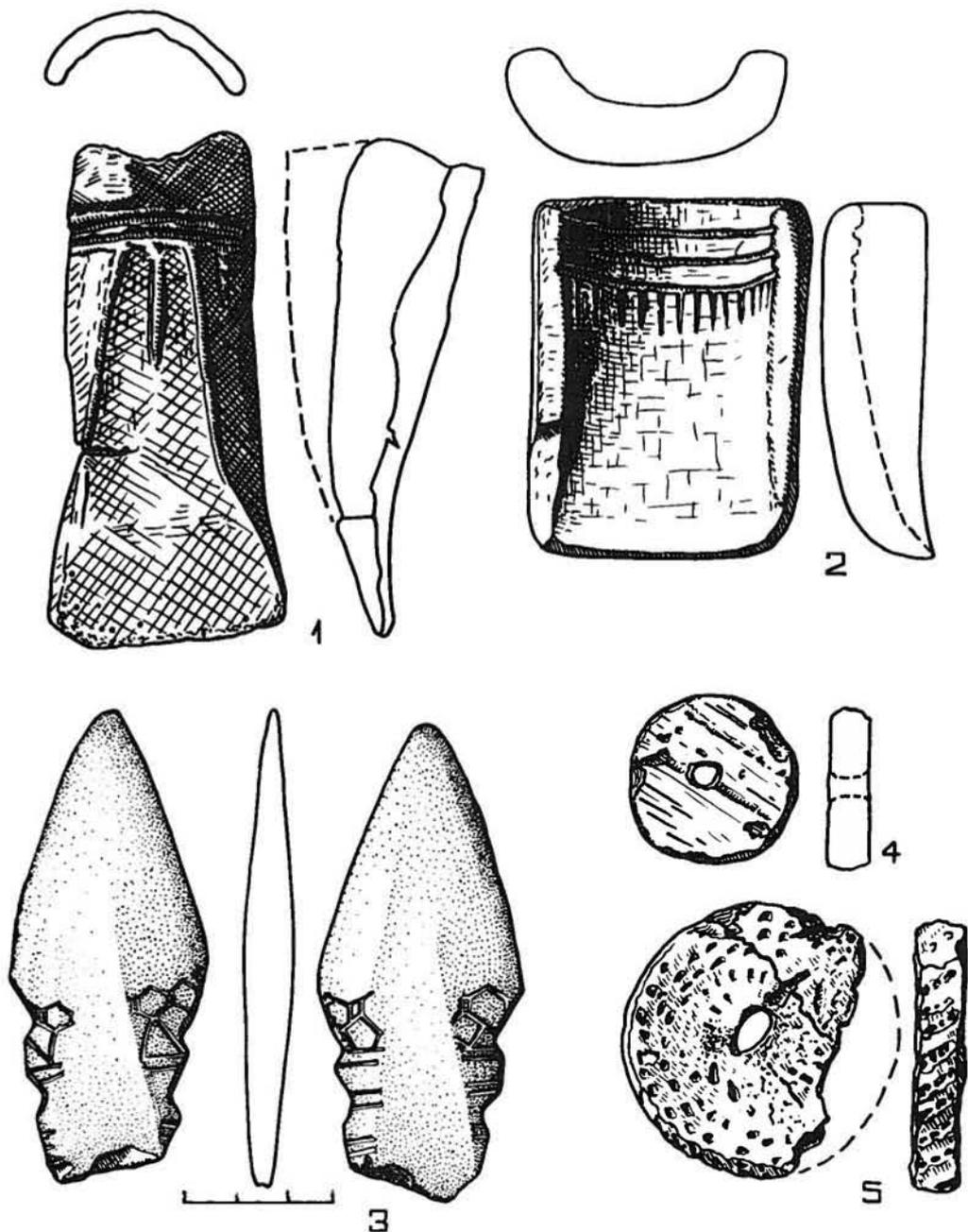


Fig. 7. Artefacts of bronze (1), slate (2,3) and clay (4,5) of the Bronze Age from Karelia. 1 Kudoma XI; 2 Elmenkoski; 3 Ohtoma III; 4-5 Kelka III.

Net Ware encounters the problem of lacking or inconsistent information for dating the sites. So far, two chronological stages can be established in Karelia with regard to the appearance of the ceramics, other artefacts and individual radiocarbon dates.

The dwelling sites of the early stage, belonging on the whole to the second half of the second millennium BC are known only from southeastern Karelia (Kelka III, Somboma I, Ohtoma I and III and probably Tomitsa and Pichevo III). These assemblages contain an average of around 50% of

pots with archaic zonal ornaments, some 10% with 'pearl' bands, and roughly 70% with decorated rims. The Net Ware culture probably appeared in this culture slightly after the middle of the second millennium BC. The radiocarbon date obtained for a hearth in a dwelling at the typologically earliest site of Kelka III is 3100 ± 70 BP (TA-2268) and that for the bottom of the cultural layer adjacent to the dwelling is 3520 ± 80 BP (TA-2269). Meanwhile, comparative analysis shows that in the early stage the dwelling sites of Karelia exhibit less 'Post-Fatyanovo' and Pozdnyakovo elements than in the Kargopol and Belozero regions and they are further removed from the prototypes. Maximum incomplete similarity is observed with pottery not of the early but of the middle (14th–13th centuries BC) and late stages of the Pozdnyakovo culture (end of the second – beginning of the first millennium BC) of the River Oka, as according to T.B. Popova (1985).

The line between the early and late stages is quite conventional. On the whole, it coincides with the broad and rapid spread of Net Ware in the forest zone around the turn of the second and first millennia BC, as noted by several Russian researchers (Chalikov 1960; Tretyakov P. N. 1966; Tretyakov V.P. 1975; Popova 1985; Patrushev 1989). During the late stage, in the first half of the first millennium BC, the culture of Net Ware spread throughout the whole territory of Karelia. The most significant materials have been obtained from the following sites: Bostilovo II, Tonda IV, Kelka I, Ust-Vodla II in the southeast; Kudoma X & XI, Suna VI, Malaya Suna IX, Olonka IV in the southwest; and Gorelyi Most III & V and Elmenkoski in northern Karelia. At these sites less than one-third of the vessels had zonal ornaments; 'pearl' belts occur individually or are absent, and the rims are decorated in less than 60% of the pottery. The composition of shape changes towards the disappearance of the markedly profiled vessels of type A. The bronze celts of the Akozinsko-Mälär type appear, and in the southeast imprints of short comb stamps spread in the pottery evidently as a result of contacts with the early Ananyino culture of the Volga region.

The site of Ust-Vodla II is dated to the 2700 ± 100 BP (TA-1892). At Kudoma XI, in the western part of the Lake Onega basin, a dating to the 8th–7th centuries BC is provided by a socketed axe of the Akozino-Mälär type, if we accept the chronology of the Volga region for these tools (Chalikov 1977). The chronology of the sites by the coast of Lake Ladoga near the River Olonka is determined by their position on the bank formation of the maximum Subboreal transgression, for example Ust-Rybezha II on the River Pasha (Gurina 1961). The

maximum transgression deposits along the north coast of Lake Ladoga are radiocarbon-dated to ca. 1100–1000 BC (Lak et al. 1978). Consequently, all the known sites there belong to a stage not earlier than the turn of the second and first millennia BC. It is more difficult to determine the chronology of sites in northern Karelia. On the whole, they belong to the first half and perhaps partly to the third quarter of the first millennium BC, as for example the camp-site of Elmenkoski.

The end of the Net Ware culture in Karelia coincides with the spread of Early Iron Age culture of the Ananyino type. This process began in the sixth-fifth centuries BC in the southeast and came to an end during the second half of the first millennium BC in the western districts of Karelia (Kosmenko 1991, 1993).

The problem of the chronology of Net Ware of 1800–700 BC in north Fennoscandia and the overlapping cultural stratum containing so-called 'Arctic' pottery (Kjelmøy type) of 1400 BC – AD 100 is a topical issue (Jørgensen & Olsen 1987; Hulthén 1991). The reason for such a wide range of dates and overall ageing in comparison with similar pottery in the territories towards the south is explained by B. Hulthén (1991) by the fact that the inhabitants burnt very old deadwood in their hearths and fireplaces.

This is a possible, though hardly the only, reason for the mass ageing of dates. The procedures of sampling and analysing charcoal also require to be checked. In my opinion, the Net Ware of the northern periphery of the area can hardly be dated to earlier than the beginning of the first millennium BC, and the pottery of 'Arctic' type to earlier than the middle of the first millennium BC (Kosmenko 1993). The processes whereby these strata of antiquities formed took place in the vast territories of the forest zone quite consecutively and the discrepancies of the dates for its phases should be explained and eradicated.

TERRITORIAL VARIANTS

The changing of various elements of culture during the process of its spreading determined the formation of local variants also in Karelia. Differences between the culture of southeastern Karelia and the more southern territories of the area begin to appear at an early stage. But these differences did not attain a quantitative threshold, following which it would be possible to clearly distinguish assemblages visually. In other words, the differentiation of culture was still insignificant at this stage.

In the late stage, differentiation reached its maxi-

mum, but it is still insufficiently studied within this area. In Karelia, the Onega-Ladoga and White Sea territorial variants stand out (Kosmenko 1995). Ceramics with ornamentation consisting of bands of pits alternating with notches is characteristic of southern Karelia, where it is found in 28.6% (early stage 9.7%) of the pottery, while in the Kargopol and Belozero areas in 15.6%, and in northern Karelia in 16.3%.

Pottery in the White Sea catchment differs considerably from that of southern Karelia. There are no profiled vessels of variants 1 and 5, nor unprofiled pots of variant 6. The ornamentation is markedly deteriorated. These assemblages are not distinct.

THE NET WARE CULTURE AND THE FENNO-UGRIAN PROBLEM

An analysis of contents points to various causal relationships of the changes in different elements of the culture (Kosmenko 1993). This is why the dynamics of their spatio-temporal changes do not coincide as well. A concrete social mechanism of divergent changes, for instance in pottery forms or ornament, is not to be reconstructed precisely. We can only surmise that other elements of ancient ethnol that are inaccessible to archaeology – language in particular – also underwent considerable changes.

Many Russian archaeologists traditionally maintain that Net Ware is associated with the ancient Fenno-Ugrians. This position is based on a superficial retrospective comparison of the medieval Volga-Finnish and more ancient cultures and is based on a theory of 'ethnic' features. The failings of the existing variants of the retrospective method, permitting inexact and subjective conclusions on a wide scale, also permit its critical analysis. It should be stressed that with regard to the Net Ware culture even those cultures which were its genetic components completely lacked any elements of Uralic origin, whereas all the western Fenno-Ugrian languages possess quite a pronounced Uralic component in their grammar and vocabulary.

Archaeological research over the past few decades has shown that the Net Ware culture in the territories to the north of the Volga was completely overlapped by and mixed with the Uralic Ananyino culture during the Early Iron Age. The process of their hybridization can be well traced from the middle reaches of the Volga to Karelia (Chalikov 1977; Ishmuratova 1975; Kuzminych 1983; Patrushev 1989; Manjuhin 1991; Kosmenko 1991, 1993).

Thus, the Net Ware culture of the Bronze age is not Fenno-Ugrian as such but served as a powerful substrate element when the Volga-Finnic and early northwestern Fenno-Lapp cultures formed.

A comparative analysis of the strata of ancient place names in Karelia suggests the conclusion that the earliest 'Volgic' layer of local names for bodies of water most probably corresponds to the Net Ware culture, while the Lapp (Sami) hydronyms correspond to the Ananyino stratum of the Iron Age and the Baltic-Finnish place names to the early medieval culture of the 10th and 11th centuries in southeastern Karelia (Kosmenko 1993).

In the Volga region and areas to the north there are no ancient toponyms of unidentified 'Baltic' appearance corresponding to the stratum of Copper Age cultures with amber and slate artefacts of Baltic types, or ancient Indo-European toponyms as traces of Early Bronze Age cultures with Corded Ware and battleaxes of stone. This situation suggests that the surviving toponyms of this region are not older than the Late Bronze Age. Interestingly, the oldest 'Volgic' toponyms are only partially etymologized from the Fenno-Ugrian languages. This is not a random phenomenon. A similar situation is found in toponymy and archaeology. To all appearances, it reflects the participation of the local inhabitants of the Volga region and territories further to the north in the formation of the cultures and languages – or at least the vocabulary – of the western Fenno-Ugrians during the Early Iron Age.

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ABBREVIATIONS

- FM – Finskt Museum.
 ИАН – Известия Академии наук СССР. Москва.
 КСИА – Краткие сообщения Института археологии. Москва.
 МИА – Материалы и исследования по археологии СССР. Москва-Ленинград.
 СА – Советская археология. Москва.
 SMYA – Suomen Muinaismuistoyhdistyksen Aikakauskirja.
 ТТИМ – Труды Государственного Исторического музея. Москва.
 ТМАЭ – Труды Марийской археологической экспедиции. Йошкар-Ола.