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NATURAL ENVIRONMENT AND THE HOLOCENE SETTLEMENT PATTERN IN THE NORTH-WESTERN PART OF THE USSR

Abstract

The initial settlement of the North European Plain by supposedly Uralian speaking communities occurred during the Late Glacial climatic warming, ca. 13,400–11,000 b.p. A marked increase in population density took place in the Neolithic (6,000–4,500 b.p.), when both Indo-European and Finno-Ugrian speaking communities are distinguishable. The Corded Ware cultures are seen as an undifferentiated Balto-Slavic-German linguistic entity. An expansion of the Slavonic language in the 5th–10th centuries AD went alongside the spread of intensive agriculture in the forest zone.

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The choice of settlement location patterns by prehistoric populations depended on various environmental, economic and cultural factors. Among the first, one should especially mention, the general climatic pattern, which largely determines landscape features, including the distribution of phyto- and biomass; eustatic and tectonic processes which influence the hydrosphere, including changes in sea- and lake-levels. Subsistence pattern was the most important among the social factors; apart from purely ecological elements, it was affected by the level in the development of the productive forces and by the long-standing cultural traditions of prehistoric communities.

It may be shown that the choice of settlement pattern was determined in accordance with the 'minimax strategy principle', aimed at maximizing the minimum yield and at minimizing the maximum risk.

The present article deals with problems related to the settlement location patterns of prehistoric populations in the north-western part of the Russian Plain in the course of the Holocene. A large amount of archaeological and paleoenvironmental evidence secured recently and supported by a series of radiocarbon dates[1], makes this task feasible.

I

The initial settlement of the North European Plains occurred during the last deglaciation, which started ca. 16.000 b.p. As indicated by changes in insect assemblages (Coope 1977), as well as by benthonic and planktonic oxygen isotopic records (Ruddiman and McIntyre 1981), warm climatic conditions with summer temperatures exceeding the present ones, lasted in Europe between 13.400 and 11.000 b.p. Harsh climatic conditions, similar to those which had existed during the glaciation maximum, prevailed in the course of the following millenium, 11.000–10.000 b.p.

The oldest camp-sites of reindeer hunters, known in the North-European Plains, correspond to the Hamburgian Culture (Rust 1937, 1943). According to paleogeographical estimates

[1] In the present article uncalibrated radiocarbon dates (b.p.) are used, calculated for the half-life value of 5565±30.

(Menke 1968) they date to ca. 13–12.000 b.p. The next wave of settlement coincided with the Alleröd Interstadial in the classical Late-Glacial sequence. At that time (11.800–11.000 b.p.) predominantly spruce forests invaded the North European plains. Numerous epi-paleolithic sites are regarded as belonging to numerous 'groups' of the 'Federmesser technocomplex' (Schild 1975, Kozlowski 1975).

'Tanged point industries' (Lyngby, Ahrensburg, Hintersee, Chwalibogowice, Swiderian) appeared on the plains in the course of the final Alleröd and Younger Dryas (11.000–10.000 b.p.). This wave of advance included Lithuania. According to Rimantiene (1971) two traditions are distinguishable there: 'Peribaltic Magdalenian' and 'Swiderian'. The sites are usually located either on river terraces of the Niemen basin or on high terraces of the lakes.

The origin of late glacial cultural groups in the North European plains may be satisfactorily explained as an influx of populations from two major concentration zones of the Upper Paleolithic in Europe: the eastern one, which included the Middle Danube basin, southern Poland, Middle and Upper Dnieper, Middle Don and Upper Volga; and the western one, mainly restricted to Franco-Cantabria. This process was ecologically motivated: a large number of Upper Pleistocene species, the principal prey of Late Paleolithic hunters (mammoth, wooley rhinoceros etc.: Vereshchagin 1971) became extinct at that time. This induced a large-scale displacement of paleolithic population to the north, into the tundra and forest-tundra, where the reindeer population had increased markedly. An assumption was made (László 1985) that the Late Paleolithic groups in that area used Uralian related languages.

A large scale climatic warming occurred between 10.400 and 10.000 b.p. This resulted in climatic conditions similar to these prevailing today (Ruddiman and MacIntyre 1981, 188). The vegetational cover of the Early Holocene featured prevailing forests (coniferous and birch forest formations). As indicated by the palynological evidence (Khotinsky 1977) a major cooling (Pereslavl' interval) occurred in the Russian Plain around 10.000–9.500 b.p. Pine and birch forests remained dominant in the course of the Boreal phase (9–8.000 b.p.); by the end of the phase broad-leaved species penetrate the area (Khotinsky 1977). Populations of large forest animals (elk, brown bear, wild pig and also – wolf, glutton, European hare, lynx) markedly increased during the Old Holocene. The same applies to populations of water fowl, forest birds, fishes and sea animals (common seal, in the first place) in the seas and in large lakes (Vereshchagin 1971).

Important paleohistorical processes occurred in Europe during the Early Holocene. They were at least partly related to the rise in temperature and humidity. Early farming communities (Proto-Sesclo, Karanovo 1 and 2, Starčevo, Körös) appeared in the Balkan intermontane depressions and in the Low- and Middle-Danubian plains during the 7th–5th millenia B.C. The mechanism of the dispersal of early farming in Europe remains an object of controversial hypotheses. A statistical model proposed by Ammerman and Cavalli-Sforza (1973, 343–357) remains fairly popular. According to them, 'the spread of early farming is seen as a linear wave of advance of a logistically increasing population forcing or exterminating the Mesolithic one'. New investigations (Dolukhanov 1985) indicate this process to be a much more complicated one. The 'initial' spread of early farming in the Balkans may be seen as resulting from the penetration of a relatively small population originating from the agricultural area of Western Asia. Consequently, the local Mesolithic population was included in the farming activity while retaining elements of foraging with in the framework of a complex economy. Economic and cultural contacts both inside and outside the early farming area (with those of predominantly foraging communities) became more intense. They stimulated the spread of a common ideology, reflected in the symbolic elements of material culture, as well as that of a common language (*lingua franca*) as an instrument of intertribal communication. The present writer holds the opinion, that an Indo-European proto-language could have accomplished this function (Dolukhanov 1985).

At the same time, Mesolithic groups with economies entirely based on hunting, fishing and food-collecting occupied the greater part of Europe. An intensive settlement of the off-shore area was one of the main features of the Mesolithic in the northern Europe. The sites arose in the fjords and in off-shore lagoons all along both Atlantic and Baltic shores of Fenno-Scandia. The economy of these sites was based on the exploitation of food-resources of the littoral zone, sea-hunting, fishing and food-collecting being of importance (Brinch Petersen 1973, Siiriäinen 1982).

Pulli, the earliest mesolithic site in Estonia, was situated in an off-shore lagoon of the Yoldia sea, in the vicinity of Pärnu (L. Jaanits–K.

Jaanits 1975). Two ^{14}C dates were obtained for the archaeological layer: 9.600±120 b.p. and 9.575±115 b.p. The large Mesolithic settlement of Kunda was located on islets within – and on shores of a lagoon in northern Estonia (Indreko 1948). The site of Narva occupied the southern shores of a large lagoon (L. Jaanits 1965). Judging from the faunal records (Paaver 1965) the hunting of land animals (elk) and of sea animals (seal) was the main focus of the food quest on the off-shore Mesolithic sites.

Sites situated within depressions of lacustrine basins, residual ice-dam basins, formed the second type of Mesolithic settlement. An example is the Mesolithic sites of Osa located on the mineral shore of the huge Lubana Lake depression (Zagorskis 1967). The site, radiocarbon dated to 7000–6500 b.p., existed in the course of a transgressive rise of the lake-level (Dolukhanov 1979, 139). The hunting of elk and wild pig constituted the basis of the economy (Paaver 1965).

The maximum spread of broad-leaved species around 8000 b.p. heralded the beginning of the climatic optimum in Europe. According to Khotinsky (1977), the width of the belt of broad-leaved forests in the western part of the Russian Plain reached 1200–1300 kms during the Atlantic, while broad-leaved elements spread 500–600 kms north of their present-day position. There occurred a considerable increase in the biomass. According to Khodasheva (1966) the biomass of plants of mixed coniferous/broad-leafed forests and of broad-leaved forests were respectively 22,000,000 and 26,000,000 kg/km^2 (dry weight). The corresponding figures for animals are 552 and 1292 kg/km^2.

The economic pattern of prehistoric Europe changed considerably during the Atlantic phase. Sites of the Linear Pottery Culture spread across the loess plains of Central Europe roughly between 6500 and 5800 b.p. The economy of these sites was based on stable food production and foraging strategies were of minor importance. The sites were usually situated in the dampest areas, on the fringes of the loess plains, not far away from major water courses in areas rich in fertile arable soils (Rulf 1983, 35–93).

At the same time, early Neolithic sites with a foraging-type economy spread in the valleys of the major rivers crossing the southern part of the Russian Plain (the Dniester, Bug, Dnieper, Severski Donets and tributaries) (Dolukhanov 1979). These sites belonged to the Bugo-Dniestrian and to an early stage of the Dniepro-Donetzian (Strumel'-Gastyatin type) cultures. Similarities in the ornamental patterns as well as imported pottery indicate existence of multi-faceted contacts with early agricultural communities in the Balkans and in the Linear Pottery area.

Early Neolithic sites in the eastern Baltic area (early stage of the Niemen Culture – Dubiçiai Type; Narva Culture) are approximately of the same age. Radiocarbon dates obtained for the Neolithic site of Osa (6000–5700 b.p.) may be seen as indicative of the lower limit of the Narva Culture (Dolukhanov and Liiva 1979). The settlement pattern remained unchanged, related to the Mesolithic stage. The sites were situated in the river valleys, on off-shore lagoons, and on the shores of residual ice-dam lakes (Fig. 1). No marked changes occurred in the subsistence pattern. Hunting (elk, wild pig, red deer, water fowl), fishing and food-collecting remained the only food-quest strategies. The flaked stone inventory retained its Mesolithic outlook. Swiderian and Janislawician points are present in the tool inventory of the Dubiçiai sites (Charnyauski 1979, 84). Tools of Mesolithic types (asymmetrical antler adzes, bone epiphyses sawn at an angle of 45°) are reported in the inventory of the Narva Culture (Zagorskis 1973).

Pottery was the principal innovation of the Early Neolithic in the eastern Baltic area. The pottery included large vessels with pointed bases, as well as small 'blubber lamps'. The most commonly used ornamentation consisted of rows of comb impressions; in rare cases sparsely set pits and incised lines were used (Dolukhanov 1979, 158). Similar pottery was typical of the Strumel'–Gastyatin sites in the Middle Dnieper valley (Telegin 1973), as well as of the sites belonging to the Bugo-Dniestrian Culture (Danilenko 1969, Markevich 1974). This ornamentation was widely used in some varieties of Early Neolithic pottery in the Balkans (barbotine pottery, impressed ware).

If one accepts the hypothesis according to which an Indo-European language was spoken by the early agricultural population of the Balkans, the expansion of Linear Pottery (which is satisfactorily approximated by a 'wave of avance'-model *sensu* Ammerman & Cavalli-Sforza) may be seen as a penetration of an Indo-European dialect into Central Europe. Similarity of both settlement patterns and working tools makes valid a suggestion that the eastern Baltic Early Neolithic resulted mainly from the evolution of the local mesolithic substratum (which in turn had originated from the Late Paleolithic in the Periglacial zone). At the same time, based

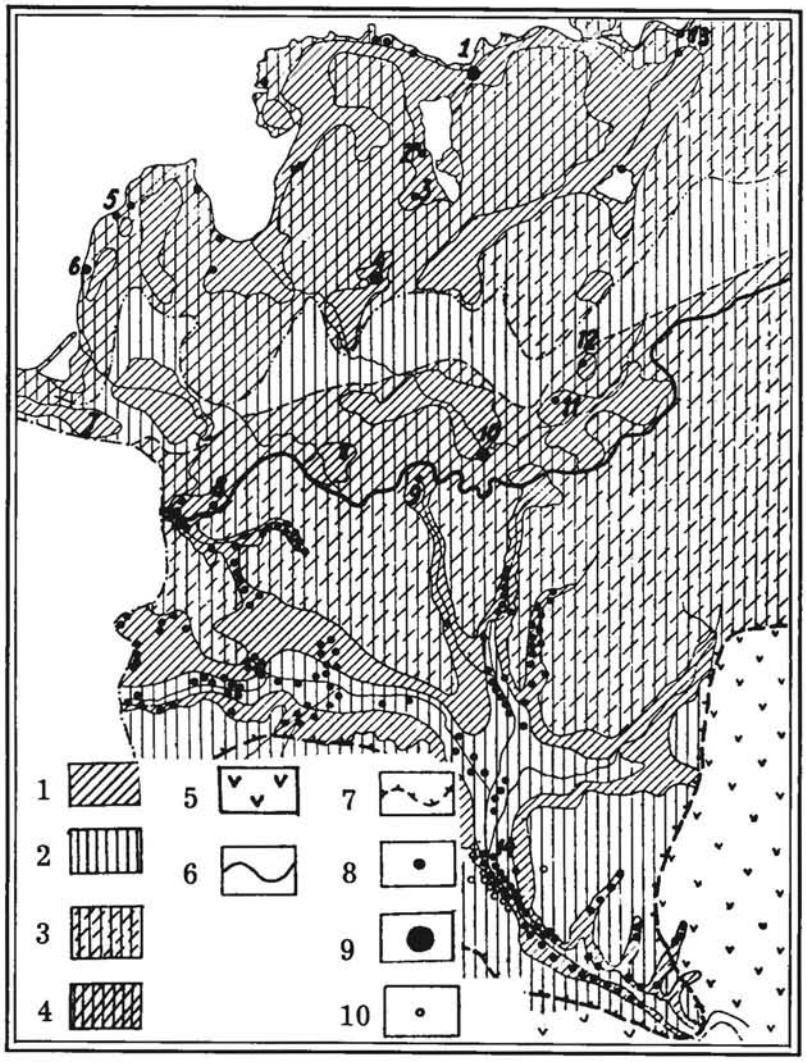

Fig. 1. The North-Western Russian Plain during the Neolithic (4th–3rd millenium B.C.)

Key. 1 – Pine forests; 2 – Mixed broad-leaved forests; 3 – Broad-leaved forests with coniferous elements; 4 – Coniferous/ broad-leaved forests; 5 – Forest-steppes; 6 – Limits of the Last (Valdai; Weichselian) glaciation; 7 – Limits of the Middle Pleistocene glaciations; 8 – Dwelling sites with foraging economy; 9 – Cluster of sites; 10 – Agricultural settlements.

Important sites: 1 – Narva; 2– sites at the mouth of the River Emajõgi; 3 – Kääpa; 4 – Lubana sites; 5 – Sarnate; 6 – Šventoji; 7 – Zedmar; 8 – Dubiçiai; 9 – Zatsen'ye; 10 – Krivina peatbog sites; 11 – Usvyaty; 12 – Naumovo; 13 – Ust'-Rybezhnoye; 14 – Strumel'-Gastyatin.

on the similarity of pottery ornamentation, one may include the eastern Baltic Early Neolithic in a vast 'cultural zone' incorporating early neolithic sites in the valleys of the Dnieper, Southern Bug and Dniester and in the Balkan area (Dolukhanov 1979). The emergence of this zone, which included several traditional archaeological cultures, was essentially similar to that of the Impressed Ware culture in the Western Mediterranean (Lewthwaite 1981). The latter is seen as resulting from 'participation in a sphere of interaction', where the spread of 'pre-

stige objects' (in this case a particular pattern of the pottery ornamentation) symbolised an increase in economic and cultural exchange.

Approximately at the same time, sites belonging to the Upper Volga Culture appeared in the central regions of the Russian Plain (Krainov 1977; Krainov and Khotinsky 1984). The sites were situated mainly on the river flood-plains, on shores and on islets inside lakes and bogs. The economy of the Upper Volga sites was based on hunting (elk, brown bear, wild pig, water fowl), fishing and food-collecting. The bone and lithic industry was of Mesolithic character. Numerous radiocarbon dates obtained for the sites fall into the time-span of 6500–5200 b.p.

According to chronological estimates based mainly on the postglacial shore displacement (Siiriäinen 1969) the early Neolithic Comb Ware Culture sites (Sperrings or 1:1 and 1:2) date back to the time-span 6200–5300 b.p. Relatively small and mainly seasonal camp-sites were situated inside deep bays of the Finnish Gulf, Lakes Ladoga and Onega, as well as on the shores of smaller lakes in Finland and Karelia (Gurina 1961, Pankrushev 1978). The economy of the sites was exclusively of foraging character. Siiriäinen (1982), referring to the faunal record, asserts that the subsistence base of the Sperrings sites in Finland centered on seal-hunting.

The opinion expressed by A. Äyräpää (1956) and by G. Pankrushev (1978, 39) according to which analogies of Sperrings pottery are found in the Middle Dnieper area particularly in the assemblages of the Dnieper-Donets Culture, are not shared by the majority of Soviet archaeologists. P.N. Tretyakov (1966, 25–27) was the first to stress similarities between Sperrings, Upper Volga (this term was not in use at that time) and Kama-Urals potteries. V.P. Tretyakov (pers. comm.) sees similarities between Sperrings pottery, on the one hand, and that of the early stage of the Volga-Kama Culture (Khalikov 1964), on the other. A definite judgement cannot be pronounced, until the representative sampling of the pottery corpus related to the above mentioned groups are processed by means of multivariate methods.

At present, one may only assert that cultural groups of pit-and-comb decorated pottery more definitely attributed to the Finno-Ugrian linguistic entity spread over the area stretching from the north-eastern Baltic to the Urals in the course of the following archaeological stage (that of the 'developed' Neolithic). Similarities in both settlement and subsistence patterns make valid a suggestion that the transition from the Early to the Developed Neolithic was not accompanied by a marked cultural (or linguistic) change in that area. There occurred a cultural consolidation of a linguistically related (Finno-Ugrian) population. A similar point was put forward by P.N. Tretyakov (1966, 61).

To the Developed Neolithic in the Russian Plain one should classify the following: the middle and later stages of the Dniepro-Donetsian Culture (Telegin 1979) radiocarbon dates of which lie in the time-span of 6000–4600 b.p. (Sobotovich et al. 1980); the Usviaty Culture in the upper stretches of the Zapadnaya Dvina basin (5000–4000 b.p., Dolukhanov et al. 1979); several sites in the Lubana depression (e.g. Piestina 4600–4200 b.p.); dwelling-sites in the Sārnate peat-bog, near Ventspils (4700–4400 b.p.); dwellings of the lower layer ('Narva'-type) in the coastal peatbog of Šventoji in Lithuania (Dolukhanov and Liiva 1979).

Sites of the Dniepro-Donetsian Culture are situated exclusively on the flood-plains of rivers belonging to the Dnieper and Sev.Donets basins. The largest sites in the eastern Baltic area are found either inside off-shore lagoons (Sārnate, Šventoji) or inside depressions of residual ice-dam lakes (Lubana, Kääpa, Emajõgi). Pile-dwellings that evolved in the off-shore areas of shallow lakes in the Zap. Dvina basin presented a successful mode of adaptation to the Late-Atlantic early Sub-Boreal environment in that area (Dolukhanov and Miklyayev pres. vol.) In all of the cases, economy was entirely of a foraging type. Subsistence was based on the exploitation of food resources of mixed coniferous broad-leaved forests and of lake and lagoon biotopes. Sea hunting was important in the littoral areas.

At the same time, the area of agricultural civilisations had expanded considerably in Central Europe. The Funnel Beaker Culture (TBK) spread over a vast territory, from the Rhine to the West Bug, and from southern Scandinavia down to Bohemia, by the end of the 4th – beginning of the 3rd millenium B.C. The economy of the settlements, some of which were of considerable size, was based nearly exclusively on agriculture and animal husbandry, foraging strategies being of negligible importance (Murrey 1970).

A detailed comparison of the funnel beaker ornamentation with that of several cultural groups of the Developed Neolithic in the Russian Plain shows the coincidence of several patterns. Geometric patterns made by strokes,

typical of several groups of the TBK, appeared on the Dniepro-Donets pottery with the transition from the 1st to the 2nd stage (Dolukhanov and Tretyakov 1979). The funnel beaker influence is seen in the assemblages of the second stage of the Niemen Culture (Charnyauski 1979, 85), as well as in these of the Usvyaty Culture. This coincidence is seen as resulting from economic and cultural contacts existing between various groups of linguistically related Indo-European population. The density of population increased considerably by the time in the eastern Baltic area, as one may judge from the number and on the size of the sites. A cultural differentiation became more clear. This may be seen as indicative of a dialectal divergence of Indo-European speaking population.

In the course of the stage of the Developed Neolithic, cultural groups related to pit-and-comb decorated pottery spread over the vast territory of the Russian Plain. These groups are generally considered as belonging to the Finno-Ugrian linguistic entity. Radiocarbon dates obtained for Lyalovo-type sites in the central area of the Russian Plain lie in the time-span 5200–3800 b.p. (Krainov and Khotinsky 1984, 116–117). The age of Comb Ware cultures (II and III) in Finland, according to Siiriäinen (1969, 68), is 3500–1800 B.C. (or 5400–3700 b.p.).

The western limit of the pit-and-comb decorated pottery crosses the territory of Latvia (Loze 1984). This type of pottery was established at a number of sites inside the Lubana depression. Thus, a pure pit-and-comb pottery assemblage was found at the Sulka site. Apart from that, a hybrid type of pottery was discovered. According to Zagorskis (1967, 17) the Piestina-type pottery resulted from the development of local early Neolithic (i.e. Narvian) assemblage under the impact of pit-and-comb pottery. One may assert that the eastern Baltic area in the course of the Developed Neolithic was a contact zone between Indo-European and Finno-Ugrian populations, which contacts are attested by the methods of historical comparative linguistics.

II

Starting around 4500 b.p. there occurred significant cooling and aridisation of world climate (Lamb 1977, 372–3). In several cases it resulted in a decrease in agro-climatic potential and in disruptions of agricultural productivity. Between 4600 and 4400 b.p. the agricultural Tripolye civilisation in the forest-steppic zone of the western Ukraine rapidly faded off. Simultaneosly, the Pit-Grave Culture, the economy of which was based on nomadic stock-breeding, spread into the area.

Considerable changes took place in the area of the Funnel Beakers. In the course of the Middle Neolithic phases IV–V, the age of which, according to radiocarbon dates (Tauber 1972) is 2350–2300 B.C. (i.e. 4300–4250 b.p.), ovicarpids became dominant in the herd structure (Malmer 1962 800–802).

In the middle and in the second half of the 3rd mill. B.C. the Corded Ware culture spread into northern and western Europe. According to radiocarbon dates obtained for sites in Poland (Jankowska et al. 1979) the initial proliferation of Corded Ware in that area began around 2400 B.C.

According to Machnik (1970, 1979), the basic features of a 'pure' Corded Ware assemblage include the combination of beakers, amphorae and stone battle axes in a single grave. Homogeneous assemblages are typical of the 'European' stage of Corded Ware, which dates to 2300–2200 B.C. According to the above author, the following cultural groups are seen as belonging to this stage: Lubaszowian (similar to that of Single Graves in southern Scandinavia); Silesian (or Silesian-Thuringian) and Western-Malopolonian. Apart from that, one notes the existence of 'heterogeneous' groups: that of Zlota-linfluenced, the Globular Amphorae and Rzuczewo situated on a coastal strip of the Baltic Sea and penetrating into the coastal area of Lithuania and present in the upper layers of the Šventoji sites (Rimantiene 1980).

It is generally acknowledged (Wislański 1970, 443) that the economy of Corded Ware groups was based mostly on nomadic stock-breeding, with the dominance of ovicaprids. Nonetheless, Malmer (1962, 280) notes that at least some Corded ware groups were engaged in agriculture and cultivated spelt wheat and naked barley. The Rzuczewo economy was based mostly on hunting and fishing, which is seen as an adaptation to the coastal ecotones (Machnik 1970, 1979).

The dominance of foraging strategies was typical of Corded Ware sites in the eastern Baltic area. The percentage of domesticated animals in the faunal lists of the North-Bielorussian sites in the Upper Zapadnaya Dvina sites never exceeded 14% (pig, sheep, goat). This percentage is even less at the Lubana sites: Eini – 6%, Abora 1 – 6.1%, Lagaža – 3.7% (Loze 1979,

125–6). Only 2 cattle bones (0.2% of the total fauna) were recorded at the site of Tamula in Estonia. Few cattle bones are reported from the Corded Ware sites at Šventoji (Rimantiene 1980).

In no cases were any indications of agriculture established at the Corded Ware sites of the eastern Peribaltic. In this respect, assumptions concerning the existence of agriculture at the sites of the Corded Ware or Kiukainen cultures in southern Finland, based on the sporadic occurrences of *Cerealia* in peat-bog profiles (Siiriäinen 1982, 20–4), should be treated with caution. Statements by T. Edgren (1970, 55–6) based on the archeological records, and that by J. Donner (1984) derived from paleogeographical evidence, according to which there was no direct evidence as to the existence of agriculture at that time, seem to be fully justified.

Treating the problem of the origin of Corded Ware cultures, one should note the existence of several Corded Ware-related groups on the Russian Plain. They included Fatyanovo, Middle-Dnieprian, Cis-Carpathian and Pripyatian (Rulf 1978, map I). As for the eastern Baltic area, one may distinguish there one Estonian Corded Ware culture, and that of corded and porous ware in Latvia (Loze 1979). The North-Bielorussian Culture, an original variety of Corded Ware cultures, was spread in the lake depressions of the Upper Zapadnaya Dvina basin (Dolukhanov and Miklyayev pres. vol.). As follows from numerous radiocarbon dates, the transition from the Usvyaty to the North-Bielorussian culture occurred around 4000 b.p. The radiocarbon dates of sites with corded and porous wares in the Lubana depression lie in the time-span 4200–3600 b.p. The Tamula site in Estonia is radiocarbon dated to 4000±180 and 3600±180 b.p. (Dolukhanov and Liiva 1979, 147–248).

There are three main hypotheses concerning the origin of the Corded Ware cultures: 1) the area of the Pit-Grave Culture (Gimbutas 1963); 2) the Saxonian-Thuringian area (Kossina 1934, Kilian 1955); 3) development from a number of local cultures. Malmer (1962) quotes the following arguments in favour of the development of the Corded Ware from local Funnel Beaker groups: Coincidence in the main types of material culture; similarities in the subsistence patterns (the transition to ovicaprid breeding had occurred at the late stages of the Funnel Beakers) and similarities in the settlement patterns.

The wide dispersal of Corded Ware may be seen as resulting from a general decline of agroclimatic potential during the late 3rd millenium B.C. In one area it had the effect of restructuring the farming economy (a transition to predominantly ovicaprid breeding); in other areas a transition to nomadic stock-breeding occurred; in yet other places no marked changes in the subsistence pattern are observed. Nonetheless, in all areas a substantial increase in economic and ideological spheres was accompanied by a diffusion of symbols, reflected in the material culture.

As shown by the multivariate analysis of pottery assemblages of the Usvyaty and North-Bielorussian cultures (Dolukhanov and Fonyakov 1981), the cultural change was a gradual one. One may conclude that the new tradition was absorbed by the old one, being more stable. At the same time some new ornamental patterns were accepted. Elements of stockbreeding emerged, while the subsistence pattern as a whole retained its foraging nature. Judging from existing archaeological records, one may conclude that similar processes occurred in north-western Bielorussia (Charnyauski 1969), in eastern Lithuania (Gyrininkas 1981) and in eastern Latvia (Loze 1979).

One may assume that the processes described above proceeded in an environment of Indo-European speaking populations which probably corresponded to an undifferentiated Balto-Slavic-German linguistic entity. At the same time, linguistic contacts between Indo-European and Finno-Ugrian groups in the north-eastern Baltic area became more intense.

III

Based on both paleoclimatic and historic records (Lamb 1977, Rauner et al. 1983, Shvetz 1978), one may conclude that the cooling of the climate that started in the 3rd millenium B.C., lasted until the 6th century A.D. There were glacial advances both in the Alps and in Scandinavia. Such glacial advances occurred in the Alps from 3000–2400 B.C. and during an interval between 150 B.C. and A.D. 100 (Lamb 1977, 153). The most intense advances of glaciers in Scandinavia occurred in the intervals: 1300–1900 B.C.; 1300–50 B.C. and A.D. 350–450 (Karlèn 1982). Both paleoclimatic records and the general climatic model (Dolukhanov 1985) indicate that the climate at that time was predominantly arid. Beginning with the 6th cent. A.D. the climate becomes increasingly wet and warm. Temperatures reached maximum values between A.D. 950 and 1200, when the climate was similar to that of the climatic optimum (Lamb 1977,

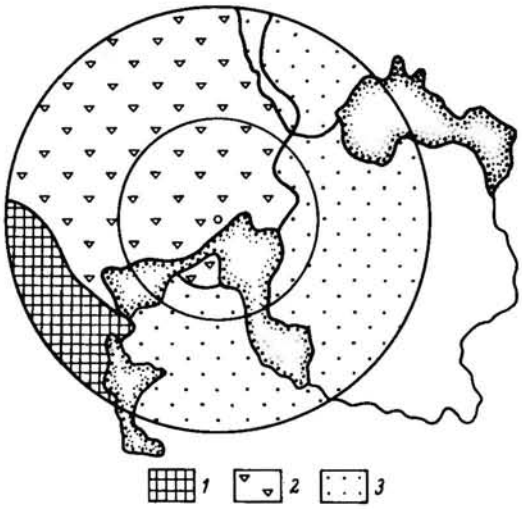

Fig. 2. Podgai hill-fort. Site catchment.
Key. 1 – end-morainic upland; 2 – glaciofluvial plain with loamy soils; 3 – glaciofluvial plain with sandy soils.
Note. The outer ring corresponds to the radius of 10 kms; the inner ring – to that of 5 kms.

435–8). The Little Ice Age, which manifested itself in low values of long-term mean temperatures and in glacial advances, reached its climax between A.D. 1430 and 1850 (Lamb 1977, 461–73).

The Bronze Age cultures developed in the eastern Baltic area in the course of the 2nd millenium B.C. As follows from archaeological records this development was predominantly of an autochtonous nature. An example of an indigenous development is presented by thoroughly investigated Bronze Age sites in the Upper Zapadnaya Dvina area.

During the 2nd millenium B.C. there was a large-scale transgression of the lakes, during the course of which the sites were transferred to the upper levels. At that stage the construction of pile dwellings was abandoned and never resumed. No other changes are observed in the material culture.

During a consequent regression of the lakes, sites arose again on a low level. At that time the importance of animal husbandry increased, the percentage of domestricated animals reaching 34%. One may assume that grazing ground was restricted mostly to low-lying terraces within lake depressions. All elements of the material culture reveal a direct continuity in relation to the preceeding stage.

By the end of the 2nd millenium B.C. the levels of lakes were stabilized at their present-day position. Contemporary sites (of Late Bronze Age) are normally found on high lake terraces. At several sites iron implements and slag were found. If these facts are further substantiated, one will have evidence proving the emergence of iron metallurgy in the area in the Late Bronze Age. Neither in the Upper Zapadnaya Dvina area nor anywhere else in the eastern Peribaltic there was any definite record related to the existence of agriculture.

The most striking changes in both settlement and subsistence patterns in the area occurred in the middle-late 1 st mill. B.C., at the time when the 'hill-forts' (*gorodishche*) of the Early Iron Age spread there. These sites are regarded as belonging to the Upper Dvina and Dniepro-Dvina cultures, those of 'stroked', 'network' potteries etc. (Sedov 1970, Fig. 9). The most significant aspect of the change in settlement pattern was the penetration of sites in to the marginal area of the end-morainic zone. Upper Dvinian hill-forts are found mostly within end-morainic plains. The hill-forts of the 1st millenium A.D. (e.g.Podgai, Fig. 2) are often situated on fragments of end-morainic belts within a glaciofluvial landscape. A similar setting was typical of the Dniepro-Dvina hill-forts.

As shown by osteological records (Stankevich 1960; I.M. Gromov 1960) stock-breeding (with the dominance of cattle and horse) was important in the economy of the Upper Dvinian fortified settlements. Hunting retained its significance as an additional source of nutrition. The percentage of domesticated animals in the faunal lists of Dniepro-Dvinian settlements varies between 40 and 80%. Pigs make up about a third of the assemlage; cattle – 24%; ovicaprids – 20–23%; horse – 15% (Sedov 1970, 27).

Layers of the Podgai settlement contained a large amount of grain, which belonged to bread wheat (*Triticum aestivum*) and to naked six-row barley (*Hordem vulgare* var.*nudum*) (G.G. Gromov 1960, 323–4). These finds indicate the existence of agriculture at Early Iron Age sites. In all probability, it was of slash-and-burn type.

At Early Bronze Age sites in Latvia a rich paleoethnobotanical material included spelt-wheat, six-row and two-row naked and hooded barley (Krasnov 1971, 16–7). As follows from palynological evidence (Tolonen et al. 1979), early forms of agriculture existed in Finland during the Pre-Roman Iron Age. Indicators of intensive cultivation and grazing were reported for Later Iron Age occupations.

As far as the Upper Zapadnaya Dvina basin is

concerned, the local development of agriculture was much influenced by contacts with developed farming communities in the west (Lausitzian) and in the south (Milogradian) (Bukowski et al. 1979). Archaeological groups identifiable with 'Agricultural Scythians' were situated further to the south. The economy of that area was based on highly productive agriculture, the cultivation of oats being the most important (Shramko 1971, Yanushevich 1976). There was historical evidence (Herodotus History, IV §17) that a large amount of grain was exported. The area of the Pontic steppes was inhabited by 'Royal Scythians' with whom a 'Steppic archaeological group' is identified (Rybakov 1979). The nomadic stock-breeding (horse, cattle, ovicarpids) was the sole basis of the economy there (Il'inskaya and Terenozhlin 1983).

A vast zone with sites containing early types of textile pottery lay to the north of the above-mentioned area. Several archaeological cultures are distinguishable in this zone, which stretched from southern Finland and Estonia up to the Upper Volga and the Volga-Oka interfluve (P.N. Tretyakov 1966, 134). V.P. Tretyakov (1975, 25–30) argues that unfortified sites with textile pottery developed from the pit-and-comb decorated pottery in restricted areas, and later on expanded over a huge territory.

Unfortified sites of the Pozdnyakov Culture in the low streches of the Oka and the Volga-Oka interfluve contained bones of domestricated animals (horse, cattle, pig), grains of wheat and barley (P.N. Tretyakov 1966, 129). Bones of horse, cattle and ovicaprids were recovered at the sites of the Late Kargopol Culture in the lake basins of Vozhe, Lacha and Bieloye (1st millenium B.C.: Oshibkina 1975). In both areas fishing and hunting of large animals were important.

A large number of sites of the 'Early Metal Age' are situated in lacustrine basins and in river valleys of the Leningrad region. According to Gurina (1961) the economy of these sites was based on foraging.

As follows from the existing evidence, the forest-steppic areas in the Ukraine were the only zone of the East European Plain where productive agriculture existed in the 1st millenium B.C. Agriculture retained a high level of productivity there until the 1st century A.D., where the sites of Zaribincy and, subsequently, these of the Chernyakhov cultures thrived in that area. Food-producing patterns in other areas of the Russian Plain were based mostly on animal husbandry. Agriculture of the slash-and-burn type was obviously of secondary importance. Foraging strategies retained their significance, particularly in north-eastern areas.

The occurrence of metallurgy and of fortifications indicates that craft specialisation and class stratification (military leadership) was under way, particularly in the southern and in western regions.

There exists a large degree of consensus among archaeologists relating the identification of textile pottery assemblages with Finno-Ugrian-speaking ethnicity (cf. P.N. Tretyakov 1966, 166). Specialists are equally unanimous in attributing Scythian and Sarmatian antiquities in the Pontic steppes to Iranian tribes. As for Lausitzian, Milogradian, Dniepro-Dvinian groups and 'stroked' pottery assemblages, they are seen by researchers (Machnik et al. 1978, Bukowski et al. 1979) as descendents (through the intermediary Bronze Age civilisations, e.g. Trzsiniec Cultures) of Corded Ware assemblages. These may be interpreted as belonging to an undifferentiated Slavonic-Baltic-Germanic linguistic entity. As the above Iron Age groups correspond to central and eastern variaties of Corded Ware cultures, one may suggest that these groups contained predominantly Baltic and Slavonic linguistic elements. In the present writer's view the task of ethnic identification of concrete archaeological entities can never be attained; in most cases archaeological entities are of multiethnic nature. One can only speculate that Slavonic linguistic elements were more in use in the southern forest-steppic areas of the Russian Plain, where stable agricultural traditions were deep-rooted.

Beginning with the 5th–7th centuries A.D. definitely Slavonic antiquities appeared in Eastern and Central Europe. They are the sites of the so-called Prag-Korczakow and Prag-Pieńkowo types (Sedov 1982). One may suggest that these sites resulted mainly from the outflow of the population from the forest-steppic area. An ecological crisis, caused by the growing aridity of climate, on the one hand, and by pressure from nomadic communities (particularly, invasions by the Hunes in the 4th century A.D.), on the other, induced large-scale migrations of agricultural populations. These migrations were directed mostly to the north-west, to loessic plains of Central Europe where favourable agroclimatic conditions prevailed, due to an increase in temperature and humidity, since the 10th century A.D. One may hypothesize that the expanding population was Slavonic-speaking, if one accepts the view that this language

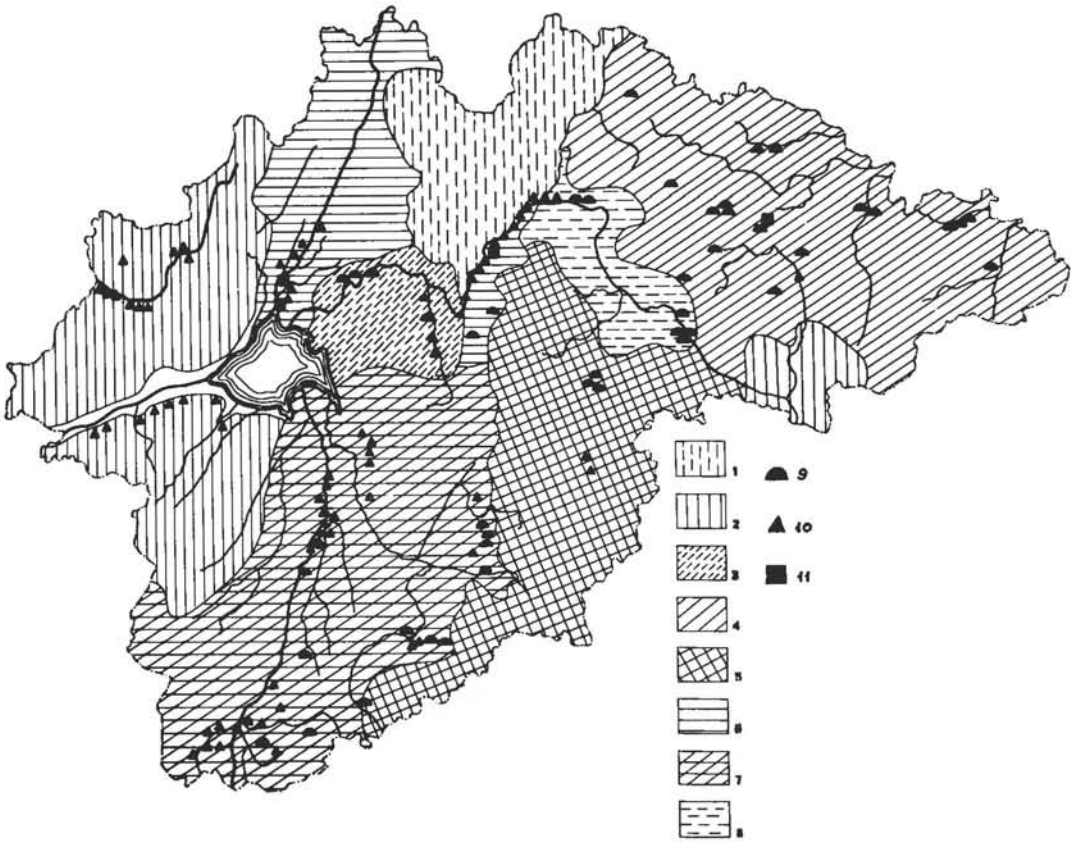

Fig. 3. Novgorod oblast'. Landscape-archaeological map.
Key. 1 – Low-lying plains formed on abraded morainic loam; 2 – Low-lying plains on carbonate morainic loam; 3 – Low-lying plain on glaciofluvial sands; 4 – Undulated plains on glaciofluvial sands; 5 – endmorainic upland; 6 – Low-lying plain on abraded morainic sands; 8 – Terraced loamy glaciofluvial plains; 9 – kurgans; 10 – sopki; 11 – dwelling-sites.

was in use among the agriculturalists of the forest-steppes.

In the second half of the 1st millenium A.D. burial sites belonging to the Culture of Long Barrows and that of Conic Mounds (*sopki*) emerged in the forested areas in the north-west of the Russian Plain. Long Barrows, which are normally found together with spherical ones in the same cemetreries, are distributed from the Upper Zapadnaya Dvina up to the Peipus Lake basin and the Mologa-Desna depression. They date to the time-span from the 6th–7th to 9th–10th centuries A.D. (Sedov 1982, 52). As for the conic mounds, they are concentrated in the Ilmen Lake basin, Zapadnaya Dvina, Luga and Plyussa. The date of the conical mounds is estimated to be mainly 8th–9th century A.D. (Sedov 1982, 66). As indicated by special investigations (Miklyayev 1974, Dolukhanov and Nosov 1985) Long Barrow cemeteries are normally situated on undulated glaciofluvial plains covered with sandy soils. As for conical mounds, they are usually located on the margins of endmorainic formations and on high terraces of glaciofluvial plains, with predominantly clayey soils. All known dwelling sites are located in the same landscape types as the cemetries (Fig. 3).

There is all reason to assume that the observed differences in the environmental setting are primarily due to distinctions in the subsistance patterns. The population that left behind long barrows practiced agriculture of slash-and-burn type. Agricultural implements were found at dwelling sites belonging to the Long Barrow Culture (Nosov 1981a). This was the only type of agriculture that could be used on sandy glaciofluvial soils at that time. Slash-and-burn agriculture was largely in use in the Novgorod district until the early 20th century (Petrov 1968, G.G. Gromov 1958).

The Long Barrow Culture resulted mainly from an indigenous development; an uninterrupted cultural evolution may be followed in the area of Dniepro-Dvinian hill-forts, where both types of sites are found in the same landscapes. It has been established (Nosov, 1981b) that surface graves preceded long barrows in many areas in North-Western Russia.

On the basis of the above evidence one may conclude that the rite of burial under long (and spherical) barrows may have emerged as a result of the development of slash-and-burn agriculture in the North-Western Russia. An increase in population density, which normally occurs at initial stages of agricultural colonisation (Green 1979) led to an intensification of economic and cultural interactions between the groups involved. At that stage, common ideological symbols (e.g. burial rites) may have spread among basically multiethnic populations. The Slavonic language could be used as a 'lingua franca', as an instrument of intertribal communication.

On the other hand, the economy of the Conical Mound groups was based on intensive types of agriculture. This assertion is substantiated by numerous finds of iron tilling tools under barrows and in related dwelling sites in the valley of Volkhov (Nosov 1981b). Numerous finds of grain of spelt wheat, bread wheat, rye, barley, oats, hemp (Yakubziner 1956) were established in the lower layers of Staraya Ladoga, undoubtedly related to a group of conical mounds (Nosov 1984). In most cases fertile arable soils in the landscape where conical mounds clustered were sufficiently difficult to cultivate. The pioneering of such lands necessitated sophisticated iron implements, a large investment of labour, as well as a social organisation of labour. In this respect it is tempting to explain conical mounds in terms of a 'chiefdom model' (Service 1962, Sahlins 1974), eleborated by Renfrew (1973) in connection with late neolithic funeral monuments in Essex and applied by Seger (1982) to the analysis of Bronze Age cairns in coastal Finland. One may convincingly show that conical mounds contain the main elements of the chiefdom model, which features a ranked society and the redistribution of produce organized by the chief. Among these attributes, organisation and deployment of public labour and more clearly defined territorial boundaries are the most important.

A part of the Long Barrow population moved into areas of fertile morainic soils and consequently underwent profound social and cultural transformations which are archaeologically re-

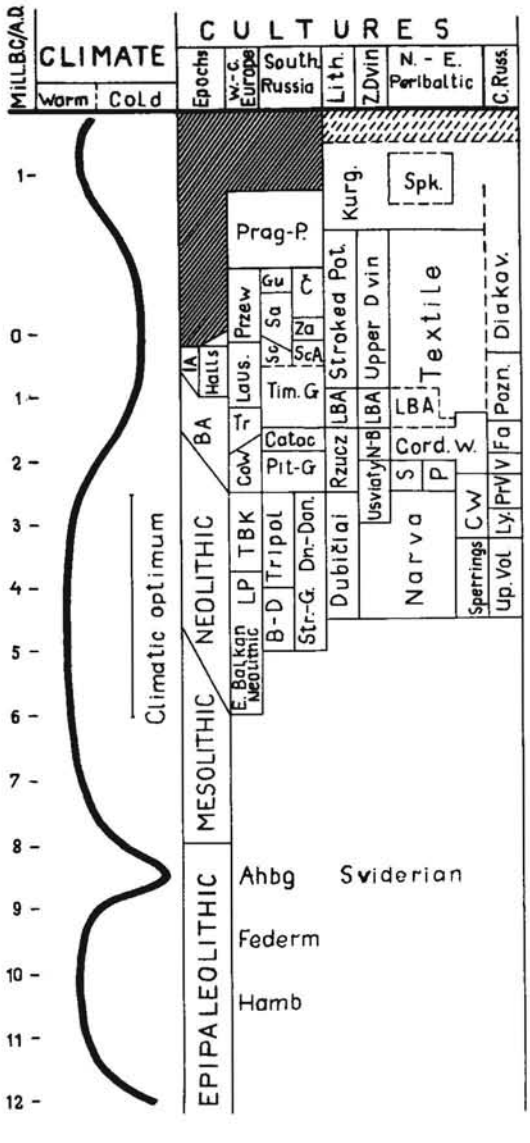

Fig. 4. Holocene civilisations of the North-West Russian Plain. Chronological table.
Abbreviations:
Hamb – Hamburgian; Federm – Federmesser; Ahbg – Ahrensburg; LP – Linear Pottery; TBK – Funnel Beaker Culture; B-D – Bugo-Diestrian; Str.-G. – Strumel'-Gastyatin; Dn-Donec – Dniepro-Donetsian; Up Vol – Upper Volga Culture; Ly – Lyalovo; C-W – Comb-Ware; PrV – Protovolosovo; V – Volosovo; S – Sarnate; P – Piestina; BA- Bronze Age; CoW, Cord W – Corded Ware; Fa – Fatyanovo; Rzucz-Rzuczewo; N-B – North Bielorussian Culture; Pit-G – Pit Grave Culture; Catac. – Catacomb Grave Culture; Tim.G – Timber Grave Culture; Tr – Trzciniec Culture; LBA – Late Bronze Age; IA – Iron Age; Halls – Hallstatt; Laus. – Lausitzian; Pozn – Pozniakov Culture; Sc – Scythians; ScA – Agricultural Scythians; Sa – Sarmatians; Za – Zarubincy Culture; Przew – Przeworsk Culture; C – Cherniakhov Culture; Gu – Huns; Prag P – Prag type pottery; Kurg – kurgans; Spk – Sopki.

flected in the emergence of the Conical Mound Culture. The profusion of progressive economic and social patterns intensified social, economic and cultural links within the area, thus stimulating the expansion of the Slavonic language.

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ABBREVIATIONS

FM = Finskt Museum
SM = Suomen Museo
SMYA = Suomen Muinaismuistoyhdistyksen Aikakauskirja
FFT = Finska Fornminnesföreningens Tidskrift
КСИА = Краткие сообщения Института археологии АН СССР
МИА = Материалы и исследования по археологии СССР
JMAA = Journal of Mediterranean Anthropology and Archaeology