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A MODEL FOR THE EARLY SETTLEMENT OF FINLAND

Abstract

A general model for human expansion into deglaciated territories of northern Europe at the end of the Ice Age is proposed on the basis of archaeological and palaeoenvironmental data. Tentative correlations with data related to Finnish origins from disciplines like Anthropology, Genetics and Linguistics are also offered in order to promote an interdisciplinary dialogue.

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INTRODUCTION

Most works on the early settlement of Finland begin with the time when man reaches the Finnish border. Any references to earlier events are usually confined to a couple of lines about reindeer hunters following northbound herds to Finland. Although there are welcome exceptions (*eg.* Siiriäinen 1981b), the general concensus seems to be that Finnish Prehistory is concerned only with Finland's archaeological cultures and their related phenomena in neighbouring territories.

Why then worry about events that took place outside of Finnish borders at a time when the country was covered with a thick ice sheet? Because the manner in which man spread into virgin deglaciated territories at the end of the Ice Age may have had some bearing on later patterns of cultural interaction of prehistoric Finland. This paper proposes a general model for the processs that brought man to Finland 15000–9000 years ago, presenting at the same time some personal views on the subject.

Prehistoric dates will be given in conventional uncalibrated radiocarbon years, hence the expression bc. Whenever possible they will be rounded-off.

GLACIAL EUROPE 20000–15000 bc

After several millennia of relatively mild climate ice sheets spread once again. At the peak of the glacial advance, around 20000–15000 bc, northern Europe was covered by a series of coalesced ice sheets (Fig. 1). The European landscape differed considerably from that of today. The ice cap and its extensive proglacial water systems together with the expanded alpine glacials had reduced the size of habitable land by about half. Moreover, the cold glacial front had forced south plant and animal taxa that normally occupied more northerly regions.

Most literature tends to give the impression that climatic zones were displaced south and compressed into homogenous bands roughly parallel to the ice border; a generalization that has misled many into equating glacial Europe with the arctic environments of today. But no present environment duplicates that of glacial Europe. The closest approximation would be perhaps the vicinity of medium latitude alpine glaciers. Instead of homogenous compressed climatic zones, icefree glacial Europe held a mosaic of microenvironments. Unlike the present arctic/subarctic regions, glacial Europe enjoyed the daily insolation of temperate latitudes. There certainly was a world-wide cooling, and the ice sheet might have created a stormy cold front which deflected part of the solar radiation; but day after day the sun shone from a relatively high angle and, to some extent, warmed. The freeze-and-thaw processes typical of the equinoxes of higher latitudes must have been common occurence then. Winters were probably colder and snow accumulation greater, but in

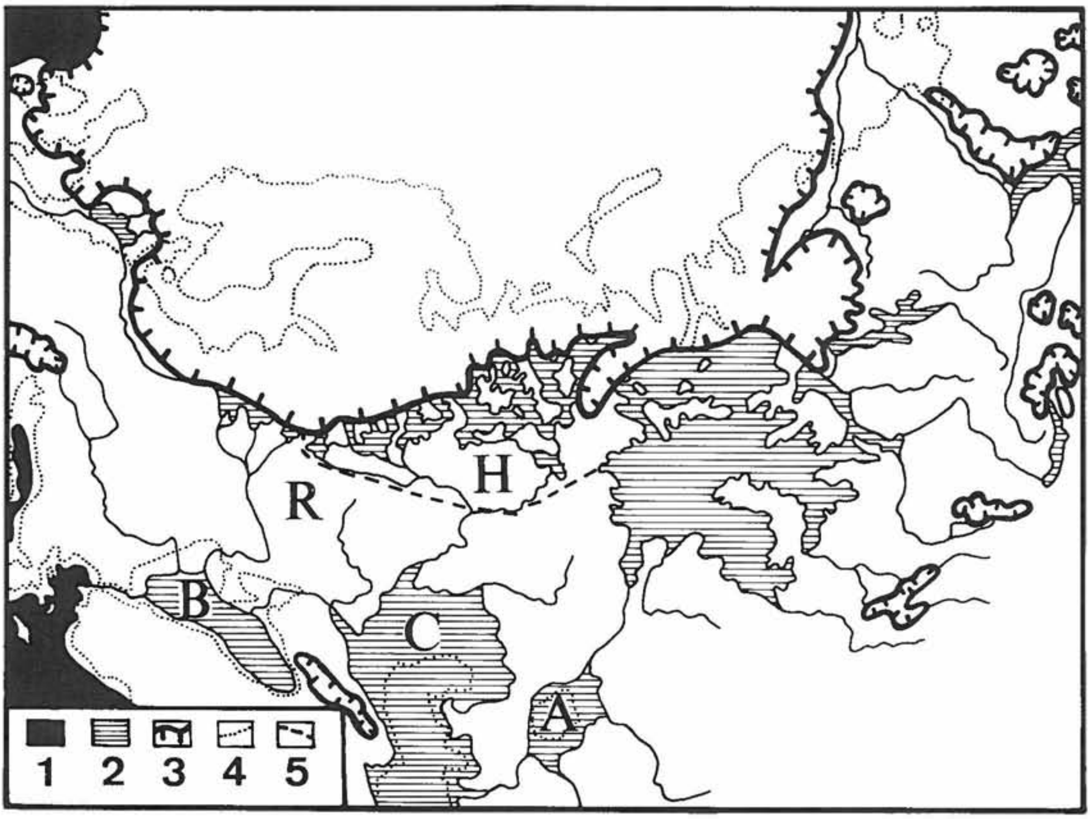

Fig. 1. Northwest Eurasia during the last glacial maximum: (1) Sea; (2) lakes; (3) border of ice sheets, mountain glaciers or pack ice; (4) present coast line; (5) area where most finnougrists place the ancestral homeland (H); (A,B,C) Aral, Black Sea and Caspian basins; (R) Russian Plain. (Grosswald 1980; Nunez 1984).

protected valleys, specially on south-facing slopes, enclaves of warmth-loving flora managed to survive. Palaeoenvironmental data indicate the existence of unique plant communities during the glacial period. Taxa that now are found exclusively in particular environments – arctic, subarctic and temperate – grew together in glacial Europe. Such a multienvironmental mosaic agrees well with the rapid northward spread of many plant species at the onset of Neothermal conditions. (Nunez 1972, 1984; Iversen 1973).

Faunas were affected in a similar fashion, though at least some species could migrate seasonally. Undoubtedly some taxa became extinct or moved permanently further south, but many adapted to the colder conditions. Temperate species must be able to survive the record winters that occasionally hit their habitats and, since climates cooled gradually, most species would have been able to develop adaptation strategies to cope with the change.

During the last glacial maxima Eurasia was divided into a series of geographical regions relatively isolated from each other by ice and proglacial water systems (Fig. 1). Differences in European Palaeolithic industries may be due to these regions acting as some sort of cultural provinces. Although the barriers were not unsurmountable, they apparently restricted information flow from one province to neighbouring ones and virtually isolated those without common boundaries. As far as the present study is concerned, the most important of such cultural provinces of glacial Europe is the Russian Plain (Fig. 1,2).

THE RUSSIAN PLAIN 20000–10000 bc

During 20000–15000 bc the Russian Plain was covered by fairly open vegetation, but "islands"

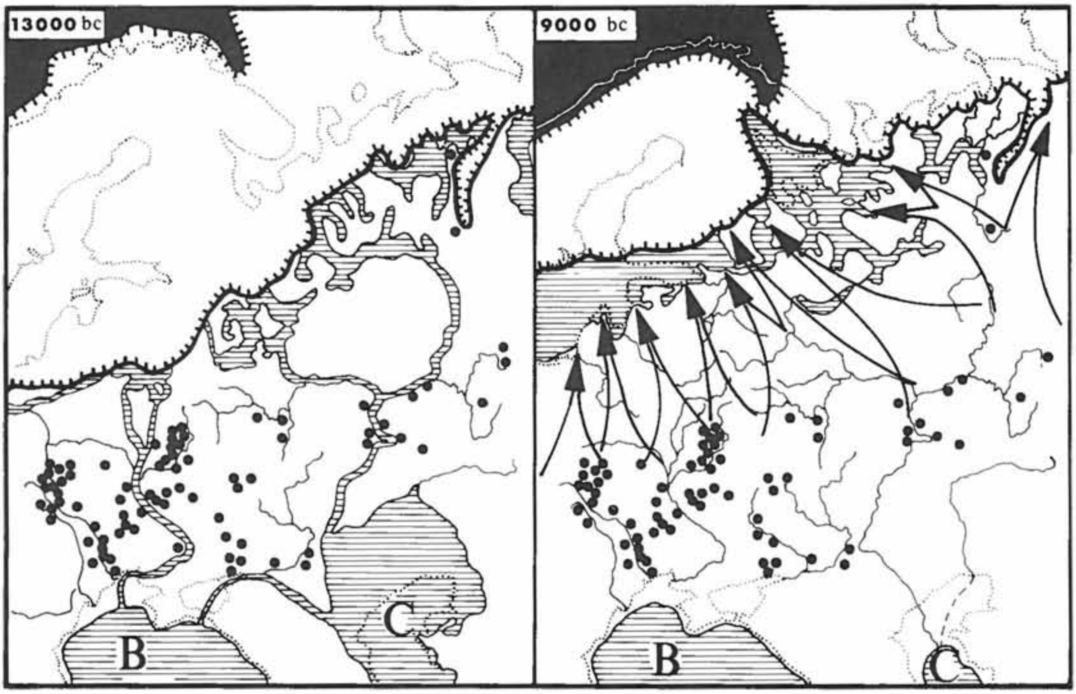

Fig. 2. The Russian Plain c. 13000 and 9000 bc. Black circles represent Upper Palaeolithic sites, and the arrows the hypothetical human expansion movement into deglaciated territory. Symbols as in Fig. 1. (Sulimirski 1970; Kvasov 1978; Nunez 1984).

of mixed forest also existed in favourable niches. The fauna appears to have been correspondingly blended, though some species may have ocurred only seasonally. (Klein 1969, 1974; Sulimirski 1970; Dolukhanov 1979; Milisauskas 1978).

Environments in the northern portion of the Russian Plain, where the ice sheet maintained its periglacial front, were obviously harsher than in the south. Fringing the ice border there was a wide chain of proglacial lakes. They drained via the major river systems (Dnieper, Don, Volga) into the Caspian and Black Sea basins and ultimately into the Mediterranean (Fig. 1; Kvasov 1978; Grosswald 1980).

Upper Palaeolithic sites were distributed along these river valleys, south and east of the proglacial lake chain (Fig. 2). For the sake of simplicity I will call marginal zone that strip of land around the ice sheet exploited by man. At certain places/times it may have included portions of the periglacial zone, but it was probably situated just outside of it. It is not clear how far north man ventured, but it seems plausible that he followed the seasonally migrating arctic fauna into the lake region in summer. Caves along the Petchora, well beyond the 60th parallel, have yielded Upper Palaeolithic remains with abundant cold fauna and some saiga antelope. According to osteological data the Upper Palaeolithic hunters of the Russian Plain had a social organization that enabled them to successfully hunt mammoth, horse, reindeer and other species (Sulimirski 1970; Klein 1974; Dolukhanov 1979).

By 13000 bc world climates had begun to warm up, forcing eventually ice sheets into negative regime. The ice retreated gradually with standstills and local advances. As climates ameliorated and the ice receded, more room was opened for plants and animals. The temperate floras that had survived in protected niches spread rapidly as surrounding areas were freed from the grip of the cold, while cold-tolerant plants and animals kept to the periphery of the shrinking ice sheet.

The ice border retreated slowly in terms of human life spans – no more than a few kilometres per generation. Nevertheless, it brought about conditions that put a strain on cold-adapted plant eaters as the periglacial front shifted to newly deglaciated territory, where the soil was chemically unweathered and supported no vegetation. Here growing seasons were short, decreasing even more as latitudes increased. And although plants spread relatively rapidly, the rate of growth was not fast enough. Winter food was not as plentiful as during the glacial maximum when the marginal zone was further south, where it could be found practically anywhere beneath the winter snow. In other words, the availability of winter food in the marginal zone decreased as this zone followed the gradually retreating ice sheet. Paradoxically, as the climate improved, reindeer and mammoths had to search harder and harder for food patches under the snow. It was certainly difficult for both, but hardest on the largest. Chances are that the mammoth would have survived the trauma of deglaciation as it had done at the end of previous stadials, but by then man had multiplied considerably and had presumably developed a marked preference for its meat. By 8000 bc the mammoth was extinct.

With the onset of the Neothermal conditions, forest with its less gregarious faunas spread and Upper Palaeolithic subsistence patterns changed. Man was forced to turn to less productive, though in many cases more stable, food sources that hitherto had been of secondary importance. Of particular interest are those groups that exploited reindeer, since it is generally thought that Finland was first settled by peoples following northbound herds of reindeer at the end of the Ice Age (Luho 1956, 1967, 1976; Kivikoski 1967; Huurre 1979). Though to a certain extent correct, this idea is again a generalization of a much more complex process.

The ice sheet seems to have retreated at a mean rate of c. 100 m per year. This figure is compatible with the distances between Finnish "annual" moraines (*cf.* Donner 1965) and it agrees with deglaciation data for northern Europe. Obviously, the changes brought about by such retreat would have been neglegible in terms of human life span. The long term effects for a given culture group would have been at first longer seasonal trips. But as distances continued to increase and forest encroached upon the group's original territories, eventually a critical point would be reached. Nevertheless, since this situation would have developed very gradually, it is likely that some changes already had begun to take place earlier. That some members of the group would have learned to utilize the new food sources, while the rest continued to exploit their traditional marginal resources. Then when the pressure became too great the group would split. Part of it would keep their old lifeways, seeking a new homebase closer to marginal resources. The rest would remain in their original territory adapting their subsistence to the new environment. How long distances had to become for such splits to occur was probably determined by local topographic factors affect-

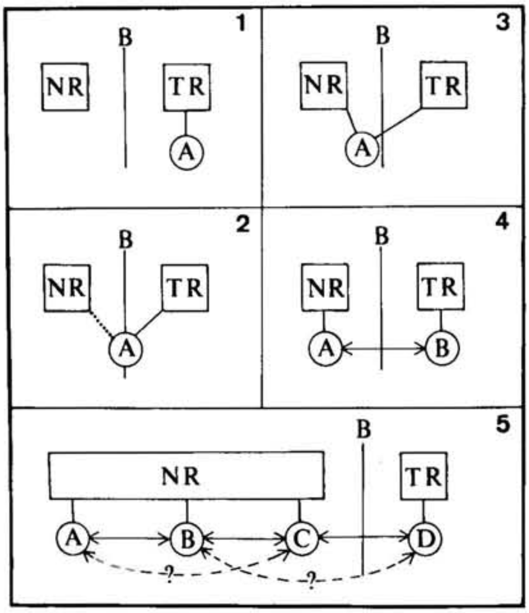

Fig. 3. Schematic representation of the suggested mecanism of human expansion into deglaciated territory at the end of the Ice Age:

1) Group A exploits its traditional marginal resources (TR) while Neothermal conditions cause the boundary of a new ecological zone (B) to gradually encroach upon their territory.
2) When new conditions have reached its territory, group A continues to exploit traditional resources (TR) despite increasing distances; but gradually some group members become aware of the economic potential of the new resources (NR).
3) As distances to traditional resources (TR) continue to increase, some members of the group begin to exploit the new resources (NR) regularly, while others keep to their traditional ways of life.
4) When distances to traditional resources (TR) become too long group A splits into subgroup A, which remains in original territory A exploiting new resources (NR), and subgroup B, which moves to a new homebase in territory B where traditional resources (TR) are more readily exploited. Contacts between subgroups A and B are maintained in the form of trade, and traditional marriage patterns and kinship ties.
5) The described process is successively repeated as the new environmental conditions continue to displace the marginal zone.

ing travelling time – seasonal migrations of hundreds of kilometres have been ethnographically reported in Fennoscandia.

In any event, one can visualize a long succession of these transitional splits as the marginal zone and fauna gradually shifted after the retreating ice border between 13000 and 7000 bc. Such processes would agree with the archaeological evidence suggesting that in most of the Russian Plain the Mesolithic developed from local Upper Palaeolithic predecessors, and with the indications of north and west bound population movements at the end of the Ice Age (Sulimirski 1970; Dolukhanov 1979). Moreover, this model provides the basis for long-term contact patterns. In other words, social interaction between the two portions of a splitted group would be maintained through trade and traditional marriage patterns and kinship ties.

A schematic representation of the proposed mechanism of human expansion into deglaciated territory is given in Figure 3. It may be added that the model supposes that the process repeated itself periodically after some generations; the frequency would have been dependant upon local rates of environmental change.

THE MARGINAL ZONE 10000–7500 bc

By 10000 bc the continental ice was practically gone from the Russian Plain and fed an extensive proglacial system formed by a series of major basins, including the Baltic. To the south and east of this proglacial belt there were culture groups subsisting primarily on reindeer and/or other herd animals (Sulimirski 1970; Clark 1975; Dolukhanov 1979).

The stadial conditions of the Younger Dryas period slowed down the retreating ice border, which stood nearly stationary between 9000 and 8000 bc (Fig. 4). During this time the colonizing forest spread into the southern Baltic region. Trapped between the advancing forest and the Baltic basin, reindeer suffered the fate of the mammoth. Although they managed to survive in southern Scandinavia and to the east of the Gulf of Finland, where it was possible to trek north, their habitat and numbers were considerably diminished. With the colonizing forest came elk and other forest species; and by 7500 bc ringed seals had penetrated the proglacial lake system. It was to these resources that man may have turned as the reindeer population dwindled. Consequently, the first settlers did not follow reindeer herds to Finland, a fact supported by faunal material. (Clark 1975; Indrelid 1975; Forstén & Alhonen 1975; Siiriäinen 1981a, 1981b, 1982; Nunez 1984).

By 8000 bc the ice had begun its final retreat and highlands within a thin strip of southern Finland were free from both ice and water (Fig. 4). The weakened periglacial front was closely followed by a pioneer vegetation belt. Advancing behind, there was a birch/pine-dominated forest zone, the home of a Mesolithic population that exploited forest game, mainly elk, and aquatic environments (Sulimirski 1970; Kozlowski 1973, 1975; Dolukhanov 1979, 1986; Nunez 1984).

At the time Finland was truly a changing world. The ameliorating climate liberated the country from ice in about 1000 years. Water, both from melt and the Baltic basin, inundated the lowland of the still ice-depressed earth crust, which in turn reacted with isostatic rebound. Colonizing plant communities soon invaded the dry land. During the ice standstill around 9000–8000 bc many species had migrated as far as their ecological requirements allowed, adapting and infiltrating the cold front as isolated stands in favourable niches. Now from these enclaves their spread was fast and efficient.

In the Preboreal period (c. 8000–7000 bc) a number of culture groups took over the areas recently liberated from the Scandinavian ice as soon as colonizing flora and fauna made them suitable for exploitation. These Preboreal cultures around the ice sheet may be classified as western and eastern. The western branch comprises the Maglemose culture of the western Baltic as well as the Norwegian Fosna of the Atlantic coast and, possibly, the Komsa of the Arctic coast. (Fig. 4; Kozlowski 1973, 1975; Helskog 1974; Clark 1975; Indrelid 1975; Meinander 1984).

The great majority of eastern manifestations could be placed within the Kunda complex. Outside this vast technocomplex there remains a series of relatively unknown sites in the northernmost portions of Carelia and Russia. Their possible relationship to neighbouring Komsa and/or Kunda manifestations will remain unclear until our knowledge of the chronology of cultural and deglaciation sequences in the area is improved. Nevertheless, sites by the Kem river have a *terminus post quem* of 8000 bc, and the lack of certain lithic forms (tanged points, curved backed blades, lancet and rhomboid microliths) suggests isolation from the Kunda complex and a more eastern origin. This would agree with a westwardly expansion of Final

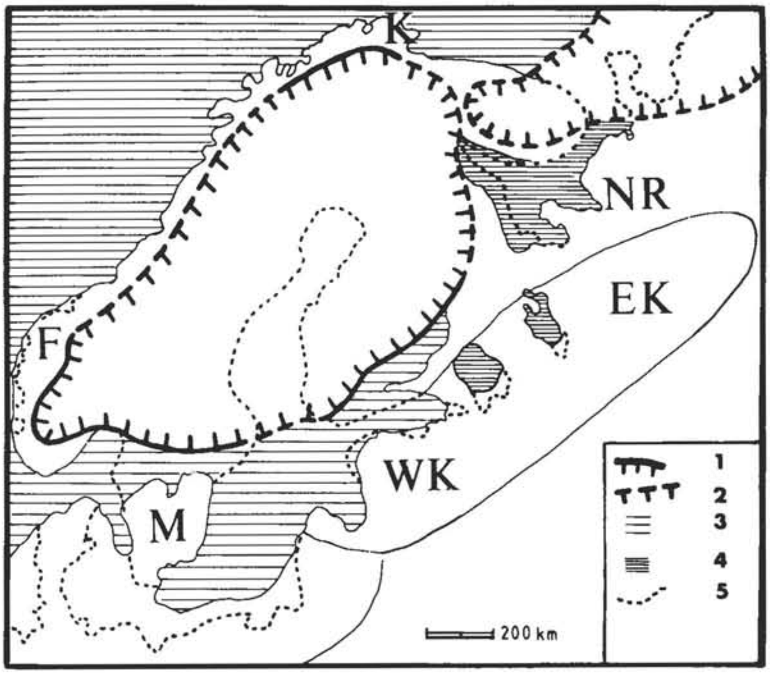

Fig. 4. Preboreal (c. 8000–7000 bc) culture complexes around the ice sheet: (EK) Eastern Kunda; (WK) western Kunda; (F) Fosna; (K) Komsa; (M) Maglemosian; (NR) North Russian; (1,2) position of the ice border around 8000 bc; (3) sea water; (4) fresh water; (5) present coast line. (Sulimirski 1970; Kozlowski 1973; Clark 1975; Hyvärinen 1975; Kvasov 1978; Grosswald 1980; Nunez 1984).

Palaeolithic/Mesolithic group(s) from the Petchora district, protected from southern influence by the North Dvina progracial lake (Fig. 2). (Indreko 1948, 1964; Sulimirski 1970, Kozlowski 1973, 1975; Donner *et al.* 1977; Pankrushev 1978; Siiriäinen 1981b; Jaanits *et al.* 1982; Meinander 1984; Nunez 1984).

THE KUNDA COMPLEX 8000–6500 bc

Kunda territory comprises the East Baltic and most of the Carelian Isthmus and adyacent areas of northwestern Russia (Fig. 4). The oldest Kunda sites are slightly earlier than the oldest Finnish finds and, since the culture is both geographically and typologically close, it is a likely anscestor for the Finnish Mesolithic. In fact, the earliest Finnish finds could well be placed within the Kunda complex.

Dwelling sites were situated near water (rivers, lakes, including the Baltic) where both forest and aquatic environments could be exploited. Faunal remains from the eastern Baltic show a shift from specialized elk hunting, when the area was covered by birch-pine forests, towards exploitation of diverse resources as Atlantic mixed-forest spread. (Dolukhanov 1979, 1986; Dolukhanov & Liiva 1979; Zvelebil 1979; Jaanits *et al.* 1982).

Lithic assemblages point to the use of various raw materials (flint, quartz, slate), represented by tanged points, short scrapers, end and side scrapers on blades, burins, microliths and core axes, as well as axe/adzes, gouges and chisels of Suomusjärvi type. Kunda sites have also yielded a most characteristic bone/antler industry consisting of axes, adzes, gouges, picks, unilaterally barbed and slotted points/knives, and various kinds of projectile points, including the so-called Shigir type. To these we may add fishnets and hooks. (Indreko 1948, 1964; Kozlowski 1973, 1975; Siiriäinen 1981b; Jaanits *et al.* 1982; Nunez 1984).

The earliest radiocarbon dates from Kunda sites fall within the 8th millennium bc. The complex presents a series of elements relatable to earlier and roughly contemporaneous cultures of surrounding territories. The flint industry bears Swiderian affinities. Bone/antler forms are relatable to both east and west, and there are certain analogies (*eg*. unislotted points, adze/hoe-like tools, art motifs) with the Palaeolithic of the Upper Dnieper and Don. Wood-working tools on the other hand connect the Kunda with the Finnish Mesolithic. (Indreko 1948, 1964; Kozlowski 1973, 1975; Clark 1975; Dolukhanov 1979, 1986; Dolukhanov & Liiva 1979; Zvelebil 1979; Jaanits *et al.* 1982; Nunez 1984, 1986a).

Two major provinces can be distinguished within the long strip of Kunda territory: a western of Baltic province and an eastern or Russian province. The first has more southern and western elements, whereas the latter shows stronger eastern connections. The Finnish Mesolithic shares certain elements with both provinces, some of them occurring together only in Finnish sites. On this basis it would be possible to include the early Finnish Mesolithic as a third province of the Kunda complex.

However, the possible relationship between the Finnish Mesolithic and the Kunda complex is difficult to evaluate. Finnish finds bear affinities to those of Russia and the East Baltic lands, but there are substancial ideological, linguistic and political barriers that hinder out study of these regions. The task is not eased by the variegated nature of the material in question. Finnish quartz artefacts, for instance, are not readily comparable to Russian flints, nor was the rich bone industry characteristic of the eastern Baltic readily preserved in the acidic Finnish soil. Furthermore, despite a recent surge of research activity, the chronology of neighbouring Soviet countries is known imperfectly. Hopefully future cooperation between Finnish and Soviet archaeologists will help to bridge this knowledge gap.

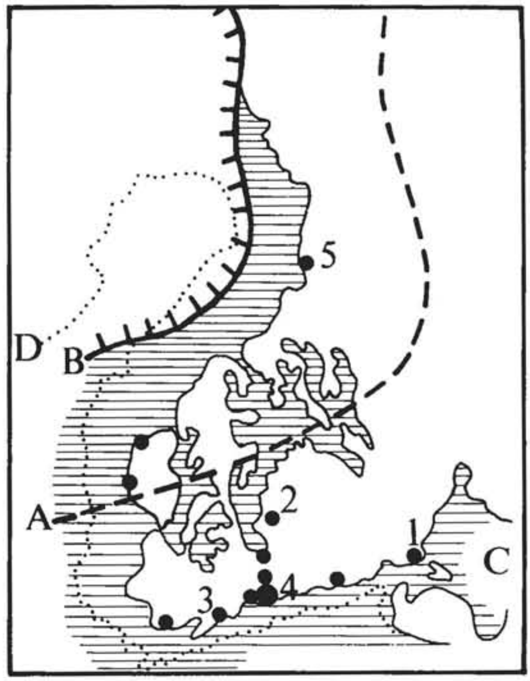

Fig. 5. Finland 7500–6500 bc and early preceramic sites: (A) Ice border c. 7500 bc; (B) Ice border c. 7000 bc; (C) coast line c. 6500 bc; (D) present coast line. The black circles represent early preceramic (>6500 bc) sites: (1) Antrea fishnet, c. 7300 bc; (2) Heinola-Viikinäinen sledge; (3) Kirkkonummi ice-pick; (4) Askola area with at least 12 early preceramic sites; (5) Paltamo, within the 7th millennium bc. (Nunez 1978b; 1984; Meinander 1984).

THE SETTLING OF FINLAND

Around 7500 bc updoming Scandinavia blocked the ocean connection, forming the Ancylus Lake. The continuously melting ice sheet caused Ancylus waters to transgress upon their shores. Apparently it was during this transgressive phase of the Ancylus Lake that Mesolithic man reached southern Finland. By 7000 bc melt from the shrunken ice sheet could no longer maintain high water levels. The drop of the Ancylus Lake combined with isostatic uplift resulted in high regression rates: from c. 3 m per century in southeastern Finland to c. 12 m per century in Ostrobotnia. During this regressive episode, the major Finnish lake systems were isolated from the baltic and Mesolithic man advanced further into the country (Fig. 5). Although the ocean connection was restablished by 6500 bc, great-lake conditions lingered some 500 years. (Berglund 1964; Saarnisto 1971, 1981; Eronen 1974, 1976; Nunez 1978a, 1978b, 1984; Eronen & Haila 1982; Hyvärinen 1984).

The only find unquestionably datable to the transgressive Ancylus phase is the Antrea fishnet, with two radiocarbon ages around 7300 bc. The Heinola sledge runner, the site of Ketturinmäki in Askola and the Kirkkonummi icepick date to c. 7000 bc or slightly later. (Fig. 5; Siiriäinen 1974; Nunez 1978a, 1978b; Jungner 1979; Jungner and Sonninen 1983).

The earliest finds from Finland suggest a population movement from surrounding Kunda territory. They reflect both Kunda ancestry and the inscipient Finnish Mesolithic. The bone artefacts from Antrea and Kirkkonummi have parallels in the East Baltic. Furthermore, similar fishing equipment (nets, floats, weights) have been recovered from Baltic Kunda sites, and a close duplicate of the Heinola sledge runner was dated to c. 6100 bc at the Wis I site in northern Russia. The Antrea axe/adze is of a type characteristic of the Finnish Mesolithic, but it occurs also in Carelia and the East Baltic. On the one hand the Antrea specimen is made of a rock with outcrops in the vicinity of Lake Onega and, on the other, the use of quartz microlith in slotted points indicates adaptation to Finland, where no flint deposits occur. (Pälsi 1920; Indreko 1948; Äyräpää 1950a; Luho 1967; Burow 1973, 1981; Siiriäinen 1974; Jaanits *et al.* 1982; Matiskainen 1986).

During the regressive phase of the Ancylus Lake (c. 7000–6500/6000 bc) toolkits consisted mainly of quartz scrapers and knives, characteristic wood-working implements (Suomusjärvi type axe/adzes, chisels and gouges) of various materials, leaf-shaped slate points/knives, and perforated spherical "maceheads". Suomusjärvi-type wood-working tools are common in Finland, but occur also in the East Baltic and the Carelian Isthmus. Leaf-shaped points are confined to Finland and the Carelian Isthmus, though they may have evolved from Kunda bone or flint prototypes. But there are no Kunda parallels for the "maceheads", which must be regarded as a Finnish innovation. (Indreko 1948; Luho 1948, 1956, 1967; Äyräpää 1950a, 1950b; Gurina 1961; Sulimirski 1970; Kozlowski 1973, 1975; Nunez 1978a, 1978b, 1984; Siiriäinen 1981a, Meinander 1984).

By 6000 bc the rapid shore regression (c. 3–12 m/cent.) was over and the shore assumed a certain degree of stability, at least in terms of human life spans. The Scandinavian ice sheet had disappeared, the Danish Straits were open, and the climate was probably milder than today. Finland was part of the Mesolithic world. (Donner 1976; Eronen & Haila 1982; Hyvärinen 1984; Nunez 1984, 1986b).

The Suomusjärvi culture appears to have undergone little change between 6000 and 5000 bc. Dwelling sites are somewhat larger – a likely consequence of more stable water levels – and there seems to be a trend towards selectivity of raw materials and more thoroughly polished tools. Otherwise assemblages seem to remain very much the same. (Luho 1948, 1967, 1976; Äyräpää 1950a; Meinander 1984; Nunez 1984).

The influx of salt water into the Baltic basin was a slow process and an intermediate slightly brackish, Mastogloia, phase (c. 6000–5500 bc) preceeded the Litorina Sea stage. The ocean connection brought a new wave of exploitable marine fauna (harp and grey seals, salmon) and mild Atlantic climates allowed certain edible thermophilous plants (waterchesnut, hazel, oak) to spread well beyond their present ecological limits. (Forstén & Alhonen 1975; Donner 1976; Hyvärinen 1984; Nunez 1984, 1986b).

By 5000 bc these favourable environmental developments had begun to influence Finnish Mesolithic lifeways. Although settlement along the shores of the Baltic and inland waterways did not differ from the pattern of previous millennia, finds indicate changes. During the 5th millennium traditional Suomusjärvi forms such as leaf-shaped points and spherical "maceheads" become obsolete, while oblique quartz arrowheads make their debut. Siiriäinen (1981a) has suggested that the disappearance of Suomusjärvi slate points may be due to a shift from a land-based elk-specialized economy to a more diversified one where seals played an important part. A parallel economic development may be reflected by the spherical "maceheads" if they were in fact digging-stick weights, as convincingly argued by Broadbent (1978). Clear evidence of a shift towards more maritime seal-based subsistence patterns is provided by the refuse faunas from Early Comb ceramic sites after 4200 bc. (Luho 1948, 1967; Äyräpää 1950a; Siiriäinen 1974, 1981a, 1982; Edgren 1982; Nunez 1984, 1986b; Matiskainen 1986).

The adoption of pottery some time in the second half of the 5th millennium may well have been a consequence of these environmental and cultural developments. Possibly the settlement had reached by then sufficient stability to make the use of pottery feasible. (Nunez 1984, 1986b).

By 4000 bc Comb ceramics had spread throughout Finland, and the distribution of pottery features 500 years later suggests the existence of some sort of social territories: Southwest, Middle and North Finland. A similar regionalty is reflected earlier by Mesolithic wood-working tools, but it is not clear if these differences are due to local materials. Although boundaries were not stable, this regional division seems to persist throughout prehistoric, and even historic, times. (Luho 1948; Meinander 1954a, 1954b, 1984; Edgren 1966, 1970; Siiriäinen 1974; Huurre 1979; Carpelan 1979; Nunez 1984).

This is not the place for a detailed presenta-

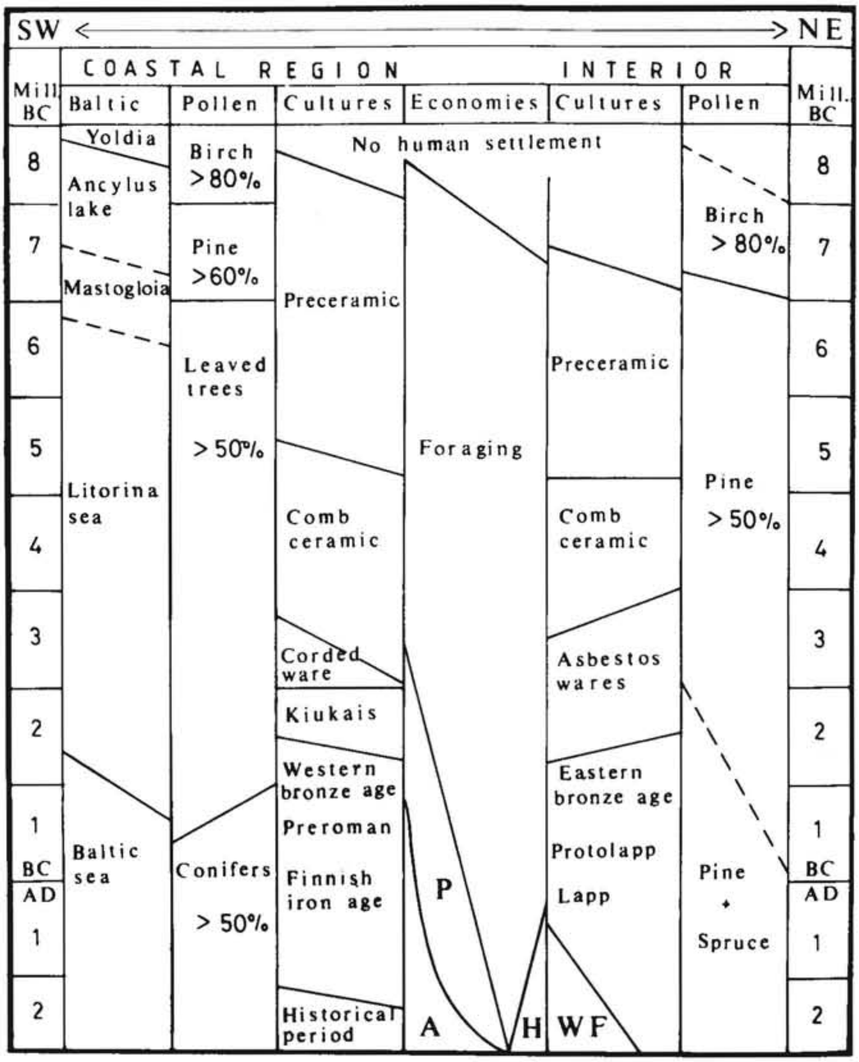

Fig. 6. Cultural and environmental development in Finland during the last 10000 years: (P) Primitive farming; (A) advanced farming; (H) reindeer herding; (WF) expanding western farmers.

tion of the cultural development of prehistoric Finland. Since the subject has been discussed by several authors (Kivikoski 1967; Luho 1976; Huurre 1979; Edgren 1984; Lehtosalo-Hilander 1984; Meinander 1984; Salo 1984) the schematic presentation of Figure 6 will suffice.

It should be added, however, that the archaeological record shows that Finland maintained a considerable degree of cultural interaction with areas east and south throughout the prehistoric period – precisely those areas whence, according to this model, she received her Mesolithic population.

CONTINUITY OF SETTLEMENT AND CULTURE

Finnish archaeological material radiates a clear message of settlement continuity. This has a bearing on the controversial question of the origins of the Finns. The former belief that Finland was depopulated during the Preroman period (c. 500–0 bc) is no longer tenable on archaeological and palaeobotanical grounds. Nor is there any concrete evidence for a major immigration of potential carriers of a Finnic language. With the exception of the Corded ware (c. 2500–2000 bc) and, possibly, the Scandinavian Bronze Age (c. 1500–500 bc) episodes, which were restricted to Southwest Finland, continuity seems to be the rule. No settlement interruption can be detected; and cultures appear to have evolved smoothly, each phase always inheriting a number of traits from preceding ones.

The possibility of early Finnish pottery being the result of a migration of ceramic groups into Finland has little archaeological support. One would then expect other innovations together with pottery, but this was not the case. Settlement patterns remain unchanged. Lithic forms are easily derived from local preceramic forms – any analogies to other cultures can be explained as the result of similar materials, manufacturing techniques and functions. Similarly, clay figurines may be seen as a continuation of an ancient tradition of bone/horn/wood figurines. The only obvious difference is the new seal-oriented economy, but again this was probably the result of the local environmental developments mentioned earlier – there were no seals in those Russian areas where likely prototypes for early Finnish pottery are found. The spread of pottery into the north forest zone was not confined to Finland. It was a widespread phenomenon, probably the result of Mesolithic groups reaching a certain degree of stability in their settlement and subsistence patterns through efficient specialization to their local habitats. (Nunez 1984, 1986a, 1986b).

Based on pottery analogies and flint imports, some have seen the Typical Comb ceramic phase (Ka2; c. 3300–2800 bc) as a possible eastern migration. But this applies to the East Baltic better than Finland. The occurrence of eastern flints in Finnish sites may be regarded as an intensification of trade activities, a fact corroborated by Baltic ambers in Finland and Finnish finds in neighbouring territories. Pottery similarities can be explained by ordinary diffusion processes resulting from increased interaction between these areas, particularly the Ladoga district. In my opinion the Typical Comb ceramic phase marks the peak of a long process of specialization to optimal Atlantic climates. Adequate adaptation would have led to prosperity and population increase, both supported by the the large number of Typical Comb ceramic sites and the nature of their finds. Obviously such developments would have continuously demanded increasingly efficient subsistence strategies, eventually reaching a limit set by the culture's capabilities. Possibly the Finnish Comb ceramic culture reached this threshold around 3000 bc; whether this was solely due to the culture exceeding its population/environmental limits or whether it was also related to the onset of Subboreal climates cannot be determined at this point. At any rate, archaeological data suggest some sort of decline after 3000 bc. (Luho 1976; Huurre 1979; Siiriäinen 1981a, 1982; Meinander 1984; Nunez 1984).

After 2500 bc a new cultural phenomenom characterized by different assemblages, settlement patterns and burial rites appeared intrusively in Southwest Finland. Distinct battle axes and cord-marked pottery relate their makers to the Neolithic Corded ware complex of the mixed forest zone. The Corded ware event has all the characteristics an immigration, possibly from the East Baltic. The strong impact that the Corded ware folk had on the local Late Comb ceramic culture within a fairly short time suggests that their numbers may have been considerable: possibly hundreds.

Archaeological finds indicate that the Late Comb ceramic people (Ka 3–4) continued to occupy the same region. Apparently the newcomers kept little contact with the areas whence they had come and were asimilated by their Comb ceramic neighbours within 500 years. By 2000 bc the area formerly occupied by the Late Comb ceramic and Corded ware cultures reflects hybridized traits from both: the Kiukais culture. Kiukais settlement patterns resemble those of the foraging Comb ceramic culture, but it is likely that the people kept some Neolithic lifeways inhererited from their Corded ware ancestors. (Meinander 1954b, 1984; Edgren 1970, 1984; Äyräpää 1973; Milisauskas 1978; Huurre 1979; Gimbutas 1980).

Despite similarities with the migration route of the traditional linguistic theories, the Corded ware event cannot be equated with the arrival of Finnic speakers. The complex is often connected to Indo-Europeans (*eg.* Gimbutas 1956, 1980) and, regardless of accuracy of this assumption, the home of the Corded ware complex is the mixed forest, not the taiga of the majority of Finnic speakers. Similarly, whether or not the manifestations of the Scandinavian Bronze Age complex in Southwest Finland reflect an actual migration, they can hardly be expected to represent the carriers of a Finnic language.

It seems logical to assume that major migrations should be reflected in the archaeological material. But there is no evidence for a major migration that could have brought a Finnic language to Finland other than that connected with the Mesolithic colonization of the country.

Minor migrations could be archaeologically ambiguous, but it is difficult to imagine how a minority could "osmotically" pass its language to a majority of the same cultural level. Interaction between different linguistic groups may lead to loans of words, even whole vocabularies, related to the goods or activities involved – but whole languages? I do not claim the impossibility of such event, but find it highly unlikely; particularly if the notion of Finnougrian being spoken in Finland by 2500 bc is correct. In my opinion a more feasible alternative is provided by the model presented below.

THE MODEL

The proposed model of population dispersion is a rather schematic generalization of the complex processes by which man may have spread into deglaciated areas. The ice border did not retreat evenly. Periglacial features and proglacial basins presented an uneven and everchanging landscape which continuously affected the distribution of exploitable resources. Locally the direction of movement would have varied according to these factors and, consequently, the arrows of Figure 2 represent only a general trend. The same applies to the reason given for the successive division of marginal population groups as they spread into empty deglaciated territories. The suggestion that some group members would chose to leave their home areas in order to keep their traditional lifeways seems to be a most likely general motive, but it goes without saying there certainly were other incentives for bands to invade the empty land: ambition, war, exploration, etc. Probably some groups never split, remaining or leaving their original home areas as a single band. In either case, empty territories would have been eventually occupied by neighbouring groups.

In any event, it is immaterial whether or not the general reasons and directions of proposed are representative in local terms. More important is the idea that human groups may have successively splitted to occupy adyacent deglaciated territories. And above all, that the departing members would have kept links to their respective mother groups through trade, and traditional marriage and kinship ties, thus laying the foundations for later interaction patterns. Let us bear in mind that the separated portions of a group would have a common cultural and linguistic background.

Such interaction patterns would be a relict feature from the process of human expansion into deglaciated territory. Although direct contacts need not have gone beyond immediately neighbouring groups, the combined effect of the interaction network may have had rather long range. Moreover, the region's excellent waterways made possible long distance trips by boat or sledge (Fig. 7). A good ethnographic analogy is found in eastern Canada, where most of the spouses taken by the Mistassini came from neighbouring groups, but c. 20 % were from further points, some as far as 500 km away (Rogers 1969). Stone Age objects of cembra pine found in Finland appear to be even farther from their source. Needless to say that with such long distance networks both innovations and loanwords could have been transmitted over great distances without actual migrations. Furthermore, that such long-distance interactive processes would have taken place preferentially in those directions favoured by waterways and relict interaction patterns. (Koskinen 1960; Meinander 1961; Nunez 1984).

The described model was developed in 1980 on the basis of archaeological and palaeoenvironmental data alone. Modifications were made in 1981 after the semipopular articles on in *Tiede 2000*. The more recent version presented below has been checked against the more detailed information in the proceedings of the "Roots" symposium published in 1984:

1) Towards the end of the last glacial maximum, speakers of Proto-Uralian had managed to occupy an area of the marginal zone in eastern Europe, possibly not far from the ancestral homeland of linguistic theories (Fig. 1).
2) This marginal population may have included both European and Asiatic elements that had been "trapped" together in Eastern Europe by the formation of ice and water barriers (Fig. 1).
3) The marginal groups spread north and west through the mechanism suggested earlier, reaching Finland by 7000 bc. Contacts in the form of trade, marriage and other kinship ties were nevertheless maintained between the members of splitting groups (Fig. 2–3).
4) As ice/water barriers faded some group(s) gradually spread on the eastern side of the Urals some time between 10000 and 6000 bc. The Samoyed and then the Ob-Ugrian branches eventually became linguistically

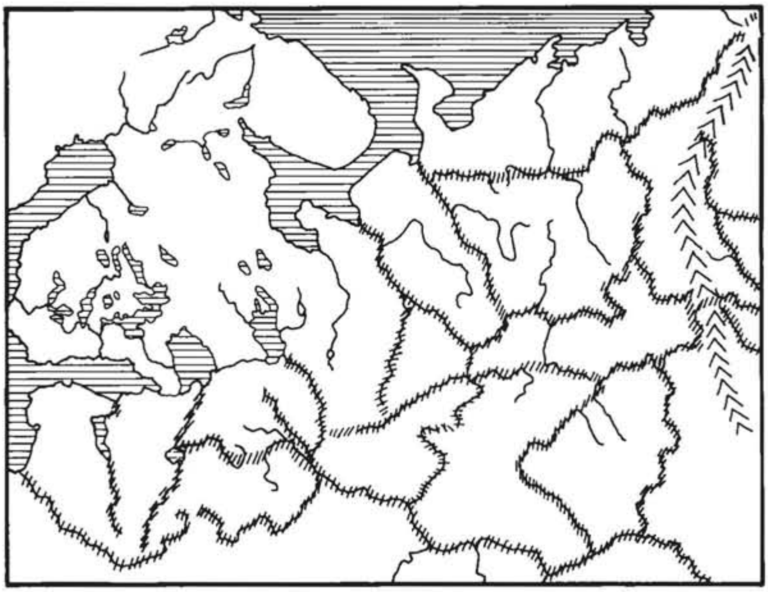

Fig. 7. Network of waterways (shaded) which could have provided the basis for long-distance interaction in northwestern Eurasia (Koskinen 1960).

isolated, though trans-uralic contacts continued for millennia (Fig. 7).

5) If eastern and western racial elements had not mixed during the glacial maximum, they probably did so by 7000 bc as marginal groups gradually converged in their north and westwards expansion across the Russian Plain (Fig. 2).
6) By 6000 bc Proto-Finnougrian was spoken by the majority of human groups between Finland and the Urals. Long distances, local environments and lifeways and, in some cases, influence from non-Finnougrian groups gave rise to different dialects – eventually languages. Yet related linguistic and cultural background, similar environments, excellent waterways, trade, marriage patterns and kinship ties preserved interaction and a certain intelligibility of speech over extensive areas for thousands of years.
7) Although interaction continued, the active range of linguistic intelligibility, exogamy and other kinship ties gradually decreased with time (Fig. 8). It is possible that these processes were precipitated by the activity of non-Finnougrian Neolithic groups around the northern mixed forest boundary in the 3rd millennium bc but, on the other hand, a declining divided population may have invited foreign intrusion.
8) After 2500 bc the Corded ware folk introduced new genes, the Baltic loans found in Finnish and Lapp, and possibly Neolithic lifeways to Southwest Finland.
9) After 1500 bc increasing Scandinavian influence in the coastal area resulted in adoption of Germanic/Nordic loans. Inland, however, eastern interaction continued. The demographic situation in Finland then was probably similar to that in early historic times: farmers in the Southwest and foragers inland. If there was a migration of Finnish speakers from Estonia to southern Finland during this period (c. 1500 bc–300 ad), they would have met speakers of Finnic language(s), with the possible exception of the coastal strip.

FUTURE TESTING

Models need testing and modification before they can be accepted or discarded. The best and most rigorous check for the present one would be evaluation against data of the related disciplines. Since such testing should be done by experts, I will limit myself to a brief review.

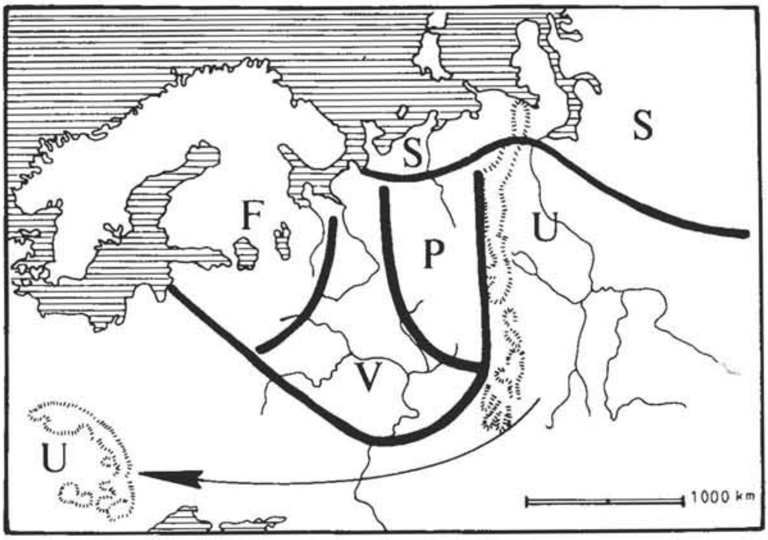

Fig. 8. Geographical distribution of the various branches of Uralian languages: (S) Samoyed branch; (U) Ugrian branch; (P) Permian branch; (V) Volgan branch; (F) Finnic branch.

Anthropological data

Although there are no physical anthropological data from Finland, osteologically rich Mesolithic and Subneolithic cemeteries from northwestern Russia and the East Baltic area indicate a mixture of europoid and lapponoid/mongoloid racial types (Gurina 1956; Mark 1958, 1970; Denisova 1973; Kajanoja 1984). This points to the presence of both eastern and western racial elements in areas adyacent and culturally related to Finland by the 6th millennium bc. Needless to say that this agrees with the population expansion model proposed here.

Genetic data

The genetic research carried out on Finns and other Finnougrian-speaking groups provides little information about when or in what order marker genes became part of the present genetic composition of the Finns. But the results presented by Nevanlinna (1973, 1984) suggest the following: (1) The roots of the Finns are 65–75 % European and 25–35 % Asiatic; (2) the dominance and even distribution of European genetic markers in Finland suggests that they were already part of the genetical composition of the Finns before their arrival in the country; (3) The concentration of certain rare markers in Southwest Finland suggests that their carriers occupied that part of the country first.

The first two points are in accordance with the proposed model: converging human groups gradually taking over deglaciated territories (Fig. 2). Mixing of eastern and western populations could have taken place during this process (c. 13000–7000 bc); or even earlier if the possibility of both being "trapped" together by glaciers and proglacial basins is accepted. Although the third point does not challenge the proposed model, it also supports the traditional theory of Finns migrating to Southwest Finland from the East Baltic some time in the early Metal Age (Hackman 1905; Toivonen 1953; Itkonen 1966; Kivikoski 1967; Korhonen 1984). However, it is difficult to tell if and how the mentioned interpretation of the present distribution of rare markers has been influenced by the traditional theories of Finnish origins. It would be interesting to know whether the phenomenom could be explained in other ways; for example as the result of the Corded Ware migration from the East baltic around 2500–2000 bc; or as the partial isolation of the population of Southwest Finland, where evidence of cultural differentiation existed as early as the 4th millennium bc.

Linguistic data

The concepts of a Finnougrian language family and ancient homeland go back to the nineteenth century (*eg*. Kokkonen 1984). The speakers of the protolanguage had supposedly spread from a homeland in eastern Europe, undergoing through millennia a series of divisions and eventually ending up in the various areas where Finnougrian languages were spoken in historic times. Finnougrists seem to be univocal in this, but opinions are divided with respect to chronology and exact location of the ancestral homeland. (Table 1; Toivonen 1953; Collinder 1965; Itkonen 1966; Hajdu 1975; Korhonen 1984).

Does the new model diverge much from the linguistic model? Can their differences be reconciled? These questions are not so easily answered. First of all, as an archaeologist without linguistic expertise, I find the apparently(?) divergent views amongst finnougrists difficult to evaluate. In my opinion the proposed model does not challenge the basic elements of the linguistic theory: the evolutionary stages of the Finnougrian family and the existence of an ancestral homeland. Discrepancies may exist, but in subjects often controversial among finnogrists themselves – namely chronology and homeland location.

It is not my unqualified appraisal that is needed, however, but critical scrutiny by experts in Finnougrian languages. Hopefully, the present paper will promote feedback, be it positive or negative. This applies to archaeologists as well.

CONCLUDING REMARKS

In the creation of this model I have strived to see prehistoric Finland as an interesting but small portion of the much larger scenario of the boreal forest zone. I have regarded the Finnish archaeological records as a local version of more general cultural processes and searched for general phenomena beneath the local obvious traits. In some ways my approach has been very similar to that of Cohen's (1977). I have assumed that the underlying parallelism shown by the cultural development of various parts of the boreal forest zone demands common underlying force(s) operating in conjunction with local variables.

I am well aware of having played the part of *advocatus diabolis*, but perhaps there is a need for that. The participants of the "Roots" symposium presented independently the results of their respective disciplines. Their agreement was only partial, and a common excuse was repeated again and again: race, culture and language do not necessarily coincide. The truth of this statement was proved by Franz Boas (1940) long ago. But let us not forget that often they do show positive correlation too. Take for example the distribution of racial types and languages in Finland. It seems to me that the dialog started in with "Roots" six years ago must continue. Models should be built and tested interdisciplinarily, and that is what the present paper is all about.

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