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Did Anatolia contribute to the Neolithization of Southeast Europe?*

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In the Near East, the process of "Neolithization" highlighted by sedentarization or semi-sedentarization could be defined as a slow socio-economic course that evolved parallel to the climatic amelioration with milder temperatures and increased humidity during the early Holocene. Climatic changes having a certain impact on the local flora would have affected the composition of the local fauna. Shifting migration patterns and feeding zones of animal species hunted for their meat due to environmental changes no doubt necessitated certain economic adaptations requiring lesser or more selective mobility on the part of hunter-gatherer communities. Recognizing the archaeological implications of social changes during the process of sedentarization is a difficult task, in most instances attainable only by way of an interdisciplinary approach. In Anatolia, the chronological sequence of this process indicates an early start in the southeast, gradually spreading to areas of grassland vegetation in the southern Anatolian plateau. It subsequently reached the Aegean coast and slightly later spread to the more northerly regions of western Anatolia.

The question is did the spread of this so-called "Neolithization" involve human agents from a specific geographic source area? Most scholars answer this question in the affirmative despite the fact that ethno-culturally the Neolithic society of Anatolia was not a homogenous entity. The society in this sub-continent characterized by its geographical diversity was equally divers ethno-culturally; in certain peripheral habitats having more in common with the prehistoric inhabitants of neighboring lands (e.g. Balkans, northern Syria, and Iraq).

The path and pace of the Neolithization process seem to have slightly differed from one region to another. This was not a synchronized process; having

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a late start in certain habitats, could have also suffered temporary setbacks due to socio-economic, demographic, health related and environmental problems.

The economic beginnings of Neolithization in Anatolia that eventually led to broad-spectrum farming is rather well recorded in most regions, and particularly in the south-central plateau (Asouti and Fairbairn 2003; Buitenhuis 2003). From the start, agricultural villages were preferably established on or close to hydromorphic soils. Having the capacity to retain water, such soils would have been particularly suitable for cereal agriculture, and not only in environments exposed to the Mediterranean climate of warm, wet winters and hot, dry summers (Harris 1996: 558). In many parts of the Balkans too, archaeological investigations corroborate the preferential concentration of early Neolithic sites on floodplains, river and lake margins[1].

Opinions differ on the question of whether farmers from Anatolia were responsible for the start of the Neolithic period in southeastern Europe. With few exceptions, the start of this process is dated to the early sixth millennium BC. In view of the relatively late appearance of full-fledged farming in northwest Anatolia, it is doubtful that the area extending from the eastern Marmara basin to the Troad could have been a parent or staging area that initiated the Neolithization of the Balkans. As for the basically hunter-gatherer communities of the early Fikirtepe culture that inhabited the Marmara littoral, it is rather questionable that they could have taken part in the diffusion of agriculture in a westerly direction[2]. Their fishing, mollusk collecting, hunting and foraging activities, as well as their settlement pattern, do not indicate a society in an advance stage of cultivation[3]. As for the part played by farming communities in the Marmara hinterland, for instance in the Iznik and Yenişehir basins, their input in the Neolithization process of the Balkans, if there was one, could not have been in the initial stages. The foundation of the farming villages such as Ilıpınar near the Iznik Lake or Menteşe Höyük in Yenişehir[4], roughly coincide with the beginnings of the Middle

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1 For more discussion on Early Neolithic site locations, see also van Andel and Runnels1995; Sherratt 1980.

2 The presence of an Aceramic phase of the Neolithic in western Anatolia is confirmed by some meager evidence from sites such as Çalca in the mountainous region of Çan east of Çanakkale, and Muslu Çeşme and Tepetarla in the Bandırma plain (Özdoğan and Gatsov 1998). Additional sites such as Keçiçayır and Kabaklı are believed to represent the Aceramic phase of the Neolithic period in the Eskişehir province (Efe 1995; 1996: 217). The location of most of these sites in high terrain away from alluvial plains indicates that their inhabitants were more involved in hunting and gathering rather than cultivation of food plants or animals (Özdoğan 1997: 18; Özdoğan and Gatsov 1998).

3 For the Fikirtepe culture and related sites, see Özdoğan 1983; 1997: 19-23; Thissen 1999.

4 It is small mound ca 100 m in diameter with a height of 4 m and was occupied during the Late Neolithic/ Early Chalcolithic period (Roodenberg 1999a).

Neolithic Sesklo culture which was based on two centuries long village life in Thessaly, and Anza and Vršnik Neolithic farming settlements in eastern Macedonia. In the Giannitsa plain of Greek Macedonia too, farmers were already cultivating their land for a number of generations.

Colonization of the southern Balkans by west-central Anatolian farmers may be presumed if it can be demonstrated that the dissemination of agriculture was in conjunction with overriding influence of spiritually significant new artistic expressions, pottery, architecture, and burial traditions from that region.

Parallel to these observations, it is important to emphasize the fact that not all Neolithic villages in Anatolia show long or uninterrupted sequences of occupation. This is indicative of recurring mobility among sedentary communities as in other parts of the Near East. Naturally, among the groups who subsisted mainly from foraging and hunting, random mobility would have been a phenomenon with little socio-economic repercussions, if at all. On the other hand, one would expect communities subsisting mainly from farming to be less eager or prone to mobility, except perhaps for those pursuing a broad-spectrum surplus yielding subsistence economies that required some form of mobility between the main village and seasonal campsites. A survey report published not long ago by Erdoğu further supports this view at least for certain areas of eastern Thrace. The preliminary results of a field survey, which studied the settlement pattern, and mobility of prehistoric settlements in the Edirne province suggest that the prehistoric villages in the region were not long-term permanent (Erdoğu 1999). According to Erdoğu, abandonment and reoccupation of settlements indicate two kinds of mobility; extensive mobility as in the Tunca valley or restricted mobility in smaller landscapes. At the sites of Ortakçı-Kavaklı and Yumurta Tepe she observed signs of this second kind of mobility[5].

The ongoing debate on the gradual spread of farming from Anatolia to southeast Europe cannot be entirely detached from entrenched diffusionist or indigenist views[6]. The main players in this unending debate, which is no longer in the monopoly of archaeology, are recruited from various fields of science, among them those investigating human and plant DNA's, diseases and deficiencies in past environments.

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5 For reasons of mobility among Neolithic communities, see Whittle 1997.

6 On current views on the subject, see also Budja 1999: 119.

Naturally, archaeologist preferring not to deviate from traditional concepts and theories can always claim that given the ever-increasing specialization and information explosion in each of these fields of research, it is becoming increasingly difficult to stay abreast of all the inconclusive developments. Of the two main models of the Neolithization process in Southeast Europe, which strongly dominate the current debate, the first is the demic-diffusion theory. This is based on the genetic mapping of present-day Europe. In the opinion of its followers, genetic mapping supports the theory of demic-diffusion as responsible for the spread of the so-called "Neolithic package" from East to West. This would have been a quick and smooth process in the form of a mass population migration. The promoters of this model argue that if agriculture spread by means of cultural diffusion, it would not have affected the gene distribution in Europe. However, if it spread entirely because of a demic-diffusion, then within several centuries the European gene pools would not only contain but be dominated by genes deriving from Southwestern Asia. In view of the fact that neighboring populations in most cases share similar gene values, substantiating the demic-diffusion theory by identifying the intrusive genes is rather problematical. A milder version of this model surmises that what really happened was a combination cultural and demic diffusions. In the patterning of human gene replacement, this version would have probably generated a gradient pointing in the direction of migratory movement. In other words, the genes of original farmers would decrease proportionally as one proceeds from Southwestern Asia toward Europe (Ammerman and Cavalli-Sforza 1984: 85)[7].

The results of another study on genes, this time dealing with the female side of the picture suggest that the ancestors of the great majority of modern lineages in Europe would have migrated from the Middle East much earlier than the estimated 7500 BP, most likely in the Upper Paleolithic or Epipaleolithic period[8].

The second model, defined as the "availability" model, does not entirely contradict the demic-diffusion theory. This model presupposes a combination

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7 The genetic pattern records produced by DNA from the Y(male) chromosomes (Cavalli-Sforza and Minch 1997) leads to the conviction, as pointed out by Budja (1999: 121), that the major component of the European gene pool might have derived from Near Eastern Neolithic farmers rather than indigenous Mesolithic foragers. These studies based on the Y-chromosome and mitochondrial DNA variations in human populations propose two demic-diffusion events separated in time.

8 The investigations concentrated on the mitochondrial DNA genetic gradients based on five major lineage groups with different internal diversities and divergence times (Mitochondria is a term in biology referring to a structure found in large numbers in most cells, in which respiration and energy production occur). In other words, this gene pool is based on the results of phylogenetic and diversity analysis of the mitochondrial DNA sequence variation in the control region of Europe ad the Middle East (Richards et al 1996).

of limited colonization in Southeast Europe and the active participation of foragers interacting with farmers in the process of Neolithization. The formation of new source or parent areas for the continuous spread of agriculture would have been the outcome of such a process (Zvelebil 1986; 1995: 116-120; Borić 1999:46)[9].

It is important to note that the rate at which genetic differentiation proceeds is inversely proportional to the size of populations and on the migration rate between neighboring regions perceived at 4% per generation. Under these conditions, it would have taken between 120 to 150 generations, or ca. 3000 years for the variation between gene frequencies to reach the necessary level for statistical patterning.

As for the "wave of advance" mechanism, which is an integral component of both models, it assumes a physical expansion of the agricultural frontier towards Europe through the colonization of Neolithic farmers from the Near East, at an average annual rate of 1 km. Such a continuous expansion too would have resulted in a dramatic change in the European gene pool (Ammerman and Cavalli-Sforza 1984: 60-84, Cavalli-Sforza 1996). However, referring to this model simply in terms of annual distance that could or would have been covered by prehistoric farmers runs the risk of misleading, or creating a misconception concerning natural demographic growth. After all, with an average growth rate of 1% a year, a community would have only doubled its size in about three generations. Among hunter-gatherers, this rate would have perhaps been even lower. So, with a hypothetical 0.30 % growth rate a year, such a community would have required over two centuries to double itself in numbers. Obviously, offshoots of demographically fast expanding exogenous agro-pastoral communities would have felt on occasions the need to form new villages, preferably in areas not too distant from the original settlement, and in a familiar environment.

Some scholars consider diseases as one of the plausible triggers that caused hunter and gatherers to adopt agriculture (Groube 1996). According to this theory, warming temperatures that activated many dormant parasites would have created new diseases among the hunter and gatherer groups forcing them to move out from their infectious habitats. Indeed, swamp formations in coastal areas due to rising sea levels would have created ideal breading grounds for anophelene mosquitoes, the vector of *vivax* malaria. After

[9] According to Borić this model is not necessarily applicable to Southeast Europe (1999: 46).

Africa, Southwest Asia and the Mediterranean region too would have witnessed increasingly frequent epidemics of malaria. Stable endemic malaria (the least destructive form) would have taken longer to develop, requiring not only relatively high host densities near the saline swamps but also uniform temperatures (Groube 1996: 123). In addition, it is assumed that perhaps less fatal but more numerous and fast spreading viral and bacterial diseases could have caused demographic crisis in certain locations unrelated to resource limitations. Presumably, the remedy would have been to move to healthier locations and switching to farming. The natural outcome of settling down would have been an increase in reproduction by new conditions that reduced the time of birth intervals.

The "indigenist" model, which I support not exclusively but as an additional plausibility, allows us to presume that local hunter-gatherer groups, particularly those already in the early stages of sedentarization, would have been quite capable of experimenting with the cultivation of endogenous food plants in or near their natural habitats. The need to increase or at least control the supply levels of food plants would have been a choice dictated by various considerations, and not necessarily by shortages in wild food plants or games, also due to population increase. Population growth rates for farmers and hunter-gatherers would have differed according to their respective socio-economic parameters: nature of community, level of endogamy and economic saturation point as non-sedentary and semi-sedentary hunter-gatherers. For farmers the growth rate is believed to be higher. The transition from hunting and foraging to experimentations with selective cultivation may have been a long one. It is logical to assume that experimentations with cultivation started when communities felt the need to expand their subsistence related activities to include various modes of food production in order to increase/supplement their undomesticated food plant stocks. Considering the differences in the chronological and spatial setting of village communities involved in the incipient stages of agriculture in the "Fertile Crescent", the entrenched concept of an "isochronic line of agricultural expansion" from the East, proposed over two decades ago by Ammerman and Cavalli-Sforza (1984: 58-62, fig. 4.5), should be reassessed with regard to southeastern Europe.

The results of genetic studies do not really explain independently the reasons that bands of hunter-gatherers from the Middle East, some perhaps experimenting with the cultivation of certain wild food plants, found necessary or appealing in the 13th millennium BP to cross the Mediterranean at length in order to reach the Iberian Peninsula!

Since models of farming that existed in Anatolia, in Greece, Macedonia or eastern Thrace in the sixth millennium BC varied in organizational and production complexity, the nature of farming villages that emerged in the southern Balkans should provide some material culture indications as to the nature and geographical scope of contacts between hunter-gatherers and agro-pastoral communities. Unfortunately, such interaction rarely surface in archaeological records. Therefore, Neolithic and Mesolithic artifact assemblages are often treated as culturally and chronologically unbridgeable separate entities. On the other hand, it could be postulated that through mutually beneficial contacts with farmers, hunter-gatherers could have become familiarized with the advantages and disadvantages of this food production strategy that required a different mode of settlement and social organization.

In the Danube Gorges, the Lepenski-Vir Late Mesolithic/Epipaleolithic village provides one of the best-documented examples of the nature of long-term forager-farmer interaction. Hunter-gatherer groups continued to reside in the region for several hundred years after the appearance of a local Early Neolithic in the region. They did not adopt farming practices they encountered during their short as well as long distance expeditions (Budja 1999: 134). However, it is very likely that the outcome of these expeditions was the adoption of pottery use long before they undertook cultivation[10].

The continued interaction between the two groups may have convinced the local hunter-gatherers to adopt certain social and eventually dietary practices of the farming communities inhabiting areas outside their immediate territory (Chapman 1993: 115; Budja 1999: 135-136). Stable isotopic (carbon and nitrogen isotopes) and dental evidence collected from Lepenski Vir, Vlasac and Schela Caldovei burials suggest that Mesolithic people in the Iron Gates region had high protein diets mainly derived from riverine food sources (Bonsall, et al. 1997: 85-87). This diet based largely on fish appears to have contributed to the healthy physical nature of the Mesolithic communities. Osteological data indicate that Mesolithic people were tall, physically robust and generally in good health. Nevertheless, there are significant differences between the isotopic signals of Mesolithic males and females buried at Vlasac and Lepenski Vir, indicating differences in overall diet. These differences could indicate, among other reasons, that in such small groups women for the formation of new families may have been acquired from other communities, perhaps also from farmers (Bonsall, et al. 1997: 85). It should

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10 For the modes of exchange, see Voytek and Tringham 1990, Radovanović and Voytek 1997: 21.

be stressed that farmers suffer from tooth decay more than most known hunter-gatherers. This diet related health factor too could help establish the time and cultural context of the significant shift to cereals in the diet of the prehistoric Balkan society.

At Lepenski Vir, the shift from the traditional dietary regime seems to have occurred in the second half of the seventh millennium BC. This is particularly indicated by collagen samples from burials that confirm the intake of significantly higher proportions of terrestrial foods at this time. This change may reflect the introduction of stock raising and/or cultivation in the Iron Gates. If this was the case, then one may presume that the transition from Late Mesolithic to Neolithic at Lepenski Vir was not characterized by a wholesale shift in subsistence from foraging to farming. In fact, the earliest Neolithic inhabitants of the site continued to obtain a variable proportion of their dietary protein from riverine resources. Unlike the earlier Mesolithic burials, dietary related pathologies among the Neolithic inhabitants of Lepenski Vir do not show gender differences.

This development was not exclusive to southeastern Europe. Central and western Mediterranean islands, such as Sardinia and Corsica, provide a relatively similar picture of a slow transition to farming. In these island habitats, the Neolithization process started with the piecemeal introduction of pottery and some domesticates, particularly sheep, before the transition to farming. Initially, such items could have been considered prestige goods (Budja 1999: 126-127; Halstead 1989), obtainable only through participation in one of the long distance exchange network linking land-based suppliers to consumers of farm products, including livestock, among the island communities.

On Sicily, the aceramic occupation phase in Grotta dell'Uzzo (7910 BP) produced a "faunal and floral" assemblage pointing to farming. The Franchthi cave in Peloponnes revealed a rather similar assemblage dated to 7980 BP. The only difference documented in both assemblages is in the type of wheat cultivated: "*Triticum monococcum*" in Uzzo and "*Triticum dicoccum*" in Franchthi. The remainder of the "Neolithic package" including: wild barley (*Hordeum vulgare*) and lentil(*Lens culinaris*), sheep and goat (*Ovis/Capra*), cattle (*Bos Taurus*) and pig (Sus *domesticus*) was the same (Budja 1999: 127; Constantini 1989). The transition to farming at Uzzo cave seems to have also been a gradual process, with no clearly marked changes in the subsistence mode. In fact, during the Neolithic occupation marine resource exploitation as well as Mesolithic modes of terrestrial foraging continued unchanged. The only exception however was the introduction of wild olive and fig into the diet (Constantini 1989: 202-203). Obsidian does not appear on Sicily, Sardinia and Corsica

before the expansion of village based farming. It was procured from the islands of Lipari, Palmarola, Pantelleria and Sardinia (Tykot 1996: 46, 65). The lack of obsidian artifacts at these three islands prior to the local Neolithic horizon does not lend much support to the hypothesis of long-distance colonization from the East. Surprisingly 40% of the obsidian artifacts found in the Uzzo cave come from the Pantelleria Island, which is close to the African mainland, almost 60 nautical miles away. Moreover, it is claimed that cattle and pig in Sicily were locally domesticated (Budja 1999: 127). Could it be that Bökönyi was not entirely wrong when he claimed some years ago that Neolithic domestic fauna consisting of all five domesticated species appeared in southeast Europe around 8500 years ago (1994: 393).

In Greece, the occupation sequence recorded at the Theopetra cave also indicates a continuity of occupation from the Mesolithic to the Neolithic periods, similar to that observed at the cave site of Franchthi.

In the Balkans, the start of the Neolithization process is generally explained, with few exceptions, as the direct outcome of a presumed westerly expansion/migration of Anatolian farmers. Nikolov is persuaded that the origin of the Early Neolithic painted pottery cultures in the central Balkans should be sought in the south and especially in southwest Anatolia (2003: 40). In his view, the valleys of the Mesta and Struma were used for the introduction/distribution of Anatolian elements into the central parts of the Balkans (Nikolov 1989). In referring to the question of interruptions in the development of the Neolithic and later periods in Thrace, he believes that there is a large degree of internal continuity (2003). According to him, the Neolithic pottery repertory from Tell Karanovo (Nikolov 1998) reflects continuous dynamic development of artifactual assemblages in northeastern Thrace, with continuity and innovations co-existing. At the transition between the Karanovo I and II periods, the change in the paste of wares or the disappearance of the red slipped and painted pottery alone could only warrant an "external contacts" explanation, especially since all other cultural elements seem to continue unchanged. Therefore, one may reasonably assume that external contacts did not bring about demonstrable cultural or demographic changes throughout the Neolithic sequence[11]. Nikolov further emphasizes the typological

[11] At least four transformations of the Neolithic assemblages could be differentiated in Northern Thrace: The Karanovo variant with six stages of development is characteristic in the northeastern parts of the Thrace. The Kazanlik variant has four stages of development. The Kapitan Dimitrievo variant has four stages of development and covers the western part of Northern Thrace. Although there is not enough evidence to demonstrate, a variant with three stages of transformation may have existed in the Eastern Rhodope area (Nikolov 2003:40).

correlation that exists between the regional ceramic assemblages within the wide geographical arch extending from the southeastern Aegean islands to the Carpathian basin as corroborating his point of view.

In addition to Nikolov and others before him, Nikolova also investigated the possible origins of the KaranovoI culture in Thrace[12]. She came up with a number of possible explanations. Her first is in favor of an "autochthonous development from the monochromic pottery along with synchronous cultural contacts." The second, similar to her first assumption, does not exclude the possibility of "the appearance in the Balkans of migrating groups from western Anatolia." Then comes the possibility of "a mass migration of Anatolian people into the Balkans and the occupation of the areas that remained free after the initial monochromic stage of migration" (1998: 107). The problem in my view is that none of the migration hypotheses can be fully substantiated by currently available archaeological evidence. In fact, even Nikolova admits that her hypotheses "are based mainly on a lack of archaeological evidence of the earliest Neolithic in Bulgarian Thrace" (1998: 113).

This theory brings us to the prehistoric site of Hoca Çeşme situated on the Meriç/ Maritsa estuary (Özdoğan 1998; 1999). This Neolithic settlement is often referred to as the undisputable proof demonstrating that farming in Thrace in particular, and southeast Europe in general, would have been introduced by migrating groups from western or west-central Anatolia. Certain cultural and subsistence related records of the initial settlers at this site give the impression that this small community knew about farming when they first settled prior to the emergence of the Karanovo I cultural horizon in southern Thrace. The first two occupation levels at this site (Phases 4-3) revealed the existence of a fortified village with small round houses of stone/stone and timber construction. The village layout or the construction of the domestic units, including the massive stone enclosure wall, does not point in the direction of Anatolia as the sole source of architectural inspiration. On the other hand, the monochrome ceramic vessels with their particular typology and technology of surface treatment, the lithic and bone tool assemblages share certain typological characteristics with their counterparts in the Lakes District in Anatolia. The fact that from the start, the villagers felt the need to surround their village with massive wall suggests that they did not feel secure. Is it possible that the enclosure was a protection against the archaeologically invisible hunter-gatherer groups that may have inhabited/visited the Aegean littoral of

12 She investigated the Neolithic sites in the upper Stryama valley in western Thrace (1998:107-113).

Thrace? Perhaps the enclosure wall was against the intrusion of small seafaring groups. Anthropological models indicate that in some migrations, the migrating split-off groups eventually fuse with local communities (Yakar 2003: 12). In such cases, the speed and rate of acculturation would have depended on the social structure and size of the split-off intrusive elements. A minimum of 25 kin related persons could be sufficient to form a short-term viable nucleus for an endogamous community. Eventually, small communities numbering less than 100 persons would have faced difficulties in maintaining endogamy. A shortage of potential marriage partners within an endogamous group naturally necessitates marital exchange with other communities (Fix 1999: 210-211).

In Phase 2, the layout and cultural affinities of the village assumed a character encountered in the Thracian inland. But regardless the cultural changes the enclosure wall was not dismantled. In other words, the reasons for its construction did not dissipate with the arrival of farmers from the north/northeast. Houses were now rectangular in plan with walls made of wattle-and-daub. Together with this new style in architecture, a red slipped and white painted ware typical of the Thracian inland appeared (Özdoğan 1998)[13] A clay figurine fragment presumably modeled in Anatolian style recovered at Makri on the Greek side of the Aegean coast of Thrace, and dated to late Karanovo I (Efstratiou 1993: fig. 10 C) could also point to some sort of physical contact with communities in the eastern Aegean.

The distribution pattern of certain types of Balkan pottery could provide some indications of population movements following the emergence of the early farming communities in the Balkans. The painted Early Neolithic pottery in Thrace spread from west to east and reached the Tundca (Tunca) and Maritsa (Meriç) valleys with a certain delay in comparison to the Balkan zone. Unlike in northeast Bulgaria, this ware group lasted longer in the western provinces. It disappeared gradually this time starting from the west. As for the dark Neolithic pottery, whose origins is sought in the Circumpontic zone (Nikolov 1998), it appears first in the northeastern parts of northern Thrace where it outlived its western counterparts. Nikolov has construed the gradual expansion of this ware group in northern Thrace as being indicative of ethnic and demographic changes (2003: 42).

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13 The nearest sites of Karanovo I culture to Hoca Çeşme are Krumovgrad and Kardjali in the East Rhodope area. According to Stefanova two sherds similar to the ones from the Hoca Çeşme phases I-II were found at Krumovgrad (1998:2:2-3).

In addressing farming related socio-economic changes in southeastern Europe in the second half of the seventh millennium BC, it is necessary to refer to different and sometimes contemporary trends in domestic architecture such as pit-huts and surface-level structures (Bailey 1999). Such trends may reflect the simultaneous existence of two different types of subsistence economy and their respective social organization. The round and oval pit-huts exposed in the late seventh and early sixth millennia campsite like villages such as Divostin in Serbia, Useo in northeastern Bulgaria show no particular planning. It is stipulated that those who inhabited such campsites that lacked a clear pattern of spatial relationship, maintained a pre-farming subsistence economy. They were probably kin-related members of small and rather mobile communities lacking in social complexity. On the other hand, the internally divided surface-level rectilinear structures, at Divostin in Serbia and Ovcharovogorata in northeastern Bulgaria, are indicative of a socio-economic development towards a more complex system found among sedentary farming communities (Bailey 1999: 157-160).

In the Carpathian basin, traces of Early Neolithic occupation have been found at very different locations, ranging from marshes that have been occasionally flooded in the lowlands (Borić 1999, fig. 25) to cave occupations in the central Balkan region. Continuity with the past is often reflected in the mortuary practices of Neolithic communities, as at Lepenski Vir, Padina, Vlasac, and Topole-Bać. Moreover, the variety of rituals practiced indicates localized beliefs maintained from earlier times. In other words, the lack of uniformity in the expression of beliefs suggests that rituals were not transplanted as a result of demic-diffusions. One of the double burials at Topole-Bać in Vojvodina, dated to a time segment of 7300-6800 cal BC, seems to connect the first users of pottery at this site with their local forebears (Borić 1999: 65, n. 6, fig. 28). The context and antiquity of this skeleton is taken to be an irrefutable indication of relating to Mesolithic ancestors; the sort of practice observed also at Lepenski Vir, Padina and Vlaslac[14].

Based on well-recorded Near Eastern models, I am convinced that hunter-gatherer groups in the Balkans too having to cope with demographic or environment related economic crises, would have been quite capable of switching to a food production subsistence mode often requiring organizational restructuring and changes in the settlement pattern. Ethnographic studies show that in comparison to farmers reproduction among hunter-gatherers is rather

[14] Some dated graves from Padina give results that put the absolute age of the human remains associated with the stone construction at the end of the 10th millennium cal BC (Borić 1999:57).

low. Typically, hunter-gatherers have a spacing of four years on average between successive births and a completed fertility of five children. With the mortality rates that are prevalent among hunter-gatherers, births and death tend to balance one another so that such mobile populations are stationary from demographic point of view (Howell 1979; Lee 1972). The shift to sedentism with agriculture removes this constraint and makes it possible to shorten the spacing between births to about an interval of 2.5 years and thus have a larger number of offspring (Ammerman and Cavalli-Sforza 1984: 65-66).

Regarding migratory movements of hunter-gatherers, one may assume that those occupying favorable locations for broad-spectrum subsistence activities, including foraging for wild pulses and cereals would not have moved out so readily even under certain demographic or socio-economic stress situations. As suggested by Hillman, an obvious solution would have been to try to increase yields from local sources of key staples (1996: 192-193). Acquiring such staples through barter with communities already pursuing farming would have been an economically attractive option to both parties.

For hunter-gatherer groups, environmental and demographic changes requiring the restructuring the traditional economic strategies would have offered the following options: a) a temporary shift from broad to narrow spectrum exploitation, and if necessary in a different ecological niche, b) shifting from narrow to broad-spectrum exploitation, c) decreasing mobility and thus preferring permanent settlement to seasonal ones. The first two options could have resulted in the establishment of dispersed and seasonally inhabited villages, with some perhaps occupied for most part of the year. We may reasonably assume that the first option too could have eventually led to a population stabilization sometimes followed by an accelerated increase among the exogenous communities. A population increase could have resulted in one of the following economic strategies: a) broad-spectrum exploitation in an optimal zone, b) a shift to a marginal zone. Such a move would have required a larger measure of mobility. Consequently, increased mobility would have allowed for a variety of economic activities; from selective exploitation of animal and plant resources to trading in specialized commodities, c) sedentism in an optimal zone would have stabilized the subsistence economy at least for a few generations without recourse to cultivation on condition that the wildlife and vegetation cover were not over-exploited. Decreasing wild food resources reaching critically low levels would have promoted cultivation and domestication as the most logical alternative for most sedentarized hunter-gatherers. Naturally, the choice and success of this economic strategy would have depended on a number of interlinked preconditions

namely, the choice of settlement location, the measure of social complexity, demography with a majority of healthy youngsters, and eventually an economic organization with emphasis on resource management and surplus production.

For the Balkans, one aspect of the spread of early farming that requires further attention is the interaction between hunter-gatherer and farming populations. In a sufficiently large area two populations occupying slightly different ecological niches could have co-existed, and inevitably interacted (Ammerman and Cavalli-Sforza 1984: 16-17). Such interaction could have resulted in a number of developments such as acculturation, mutualism, and so on. The process of acculturation involves the transition from one type of economy and set of customs to another, eventually resulting in hunter-gatherers becoming farmers. On the negative side of interaction, one cannot rule out ethno-cultural friction, social isolation, or additional decrease in the traditionally low rate of population growth among hunter-gatherers further aggravated by the spread of endemic diseases that must have existed among farmers.

The mechanisms responsible for the spread of agriculture can hardly be explained in terms of its origins alone. To understand this process other issues should be tackled, including the socio-economic structures that emerged from its continuing spread. Until rather recently, agricultural spread was discernible only indirectly, through various components of material culture in conjunction with pertinent plant and animal remains. Palaeobotanists are seeking ways to trace the spread of plants and animals directly through their molecular composition (Jones, et al. 1996: 96). It seems that surviving ancient DNA can be isolated in the plant tissues, more or less the same way they are in humans. However, scientists also agree that for the time being wheat DNA results are more reliable in specimens that are no older than 3300 BP.

Finally, it is difficult to construe a situation for the Balkans that hunter-gatherer groups were separated from farming communities by clear-cut territorial and social boundaries. Among hunter-gatherers, those who mainly subsisted on food sources derived from rivers, lakes and sea would not have been very envious of farmers working hard cultivating the land to grow cereals and pulses. On the other hand, they would not have hesitated to do so under hypothetical circumstances described above. Similar to the dissemination of raw materials, or locally developed specialized technologies (Balkan *et al.* 1999; Binder 2002; Caneva *et al.* 2001), the appearance of certain domesticated food plant and animal species too could have been simply the outcome of interaction between ethno-culturally diverse groups. Therefore, except for archaeologically substantiated examples, as in the case of Hoca Çeşme in

Thrace, the colonization theory may be applicable in cases of socio-economic changes with a clear cultural impact on the existing population.

The early Neolithic site distribution in Anatolia and southeastern Europe demonstrate that seed-crop agriculture began in both regions as a small-scale activity that focused on hydromorphic soils, and would have involved the cultivation of not continuous but small patches of fields. Moreover, the Neolithic site of Pinarbaşı in the Konya plain suggest a pattern of plant resource exploitation during the Early Neolithic, characterized by a tradition of diversification and mobility (Asouti and Fairbairn 2002: 190). The dispersion of resources and their seasonal exploitations must have been at the core of this mobility, which in central Anatolia seems to have persisted into later periods. Dispersion of resources, not always of food plants, was also a subsistence strategy maintained by hunter-gatherers.

This model would not have been exclusive to Anatolia. In fact, it can be postulated that it existed in the neighboring regions that enjoyed rather similar environmental conditions, perhaps slightly later than in Anatolia. The floodplain in Thessaly could have been a primary or even a secondary parent area in the Neolithization process, which took place in the Balkans. The slow increase in the number and size of settlement sites in the Larissa Basin during the Early Neolithic, is indicative of a low population density. In the later phases of this period, however, the number of settlements increased rapidly expanding beyond the floodplain. According to van Andel and Runnels, this expansive development may have been responsible for the agricultural colonization of the southern Balkans north of Thessaly(1995: 497). Despite the attractiveness of this explanation, chronologically it provides a very late start for the south Balkan Neolithic, which does not seem to have been the case. Therefore, the model perceiving contact and interaction between contemporary hunter-gatherers and farmers would be one of the mechanisms in the dissemination of agriculture towards the Balkans. This does not exclude the possibility that small-scale and space-out migratory movements may have taken place from Anatolia and Thessaly. However, to presume that such movements would have had a major cultural impact changing the entire character of the local cultures they encountered could lead to misconceptions in evaluating the process that led to the start of farming in the Balkans and the rest of southeastern Europe. There is no irrefutable archaeological evidence that migrations could have been carried out only by farmers. Neither are indications that migrations followed a single directional path, in other words from socio-culturally more advanced east to less advanced west.

Postscript

In this article, I could not comment on views expressed by participants R., eds. 2005. *How did Farming Reach Europe?* Anatolian-European Relations from the second half of the 7th through the first half of the 6th millennium BC. Proceedings of the International Workshop, Istanbul 20-22 May 2004. Istanbul.

Having come to my possession shortly before the article was submitted, I nevertheless took the liberty of remarking that views expressed by Thissen 2005; Sampson 2005, Schoop 2005 on the subject are not fundamentally different from those elaborated in this paper. Current evidence from on going archaeological projects, although far from sufficient, does not rule out the possibility that agriculture as the principle economic strategy could have taken roots independently in eastern Greece and western Anatolia as early as in the later part of the seventh millennium cal BC. This impression still requiring further corroboration does not exclude the possibility that within the dynamics of interaction involving trade, social and cultural contacts in the Aegean basin, migratory movements of Neolithic farmers could have taken place in both directions.

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Anadolu Güneydoğu Avrupa'nın Neolitikleşmesine Katkıda Bulundu mu?

Anadolu kökenli Neolitik toplumların Güneydoğu Avrupa'daki tarımın başlamasına katkıları (ve bu katkının niteliği) arkeologların ve ilişkili uzmanların tartışma gündeminde yer almaya devam ediyor. Bu konuyla ilgili Mayıs 2004'te İstanbul'da yer alan toplantıda sunulan yeni arkeolojik gözlemler, tarihlemeler ve tartışılan faraziyeler, Şubat ayında İstanbul'da verdiğim konferanstan sonra yayınlandığı için makalemde değerlendirilemedi (Krş. Postscript).

Konferansımda başlıca birkaç noktaya değindim:

1. Balkanlar'da ve Yunanistan'da tarımın yerel toplumlar tarafından da başlatılma olasılığının var olabileceği,
2. Tarıma başlamış toplumların yanında, avcılık ve toplayıcıkla geçinen grupların geleneksel yaşamlarını sürdürmeye devam edebilecekleri veya ettikleri (ör. Lepenski Vir),
3. Sosyo-ekonomik organizasyon ve kültürel seviye bakımından birbirlerinden oldukça farklı toplumların ticari ve belki de sosyal nitelikte ilişkiler sürdürmüş olabilecekleri,
4. Tarıma geçişte demografik ve çevresel koşulların da etkisi olabileceği,
5. Anadolu'dan kaynaklanan ve batıya (Trakya ve Balkanlar'a) yönelik göçlerin, belki birkaç istisna hariç (ör. Hoca Çeşme), M.Ö. 6 binden önce veya Yunanistan'ın ziraate elverişli bazı doğu kesimlerinde tarımın başlamasından önce gerçekleşmediği,
6. Küçük çapta göçler gerçekleştiren Neolitik çiftçilerin yerel toplumlara olan kültürel etkinliklerinin henüz tam olarak belirlenemediği,
7. İnsan toplulukları ve tahıl ürünleri üzerinde yapılan DNA araştırmaları doğu batı istikâmetinde prehistorik göçler faraziyelerini destekleyici nitelikte görünmekle beraber, ön sonuçlar henüz arkeolojik bulgularla tam kanıtlanamayan bu göçleri çok erken bir döneme tarihleyememektedir.

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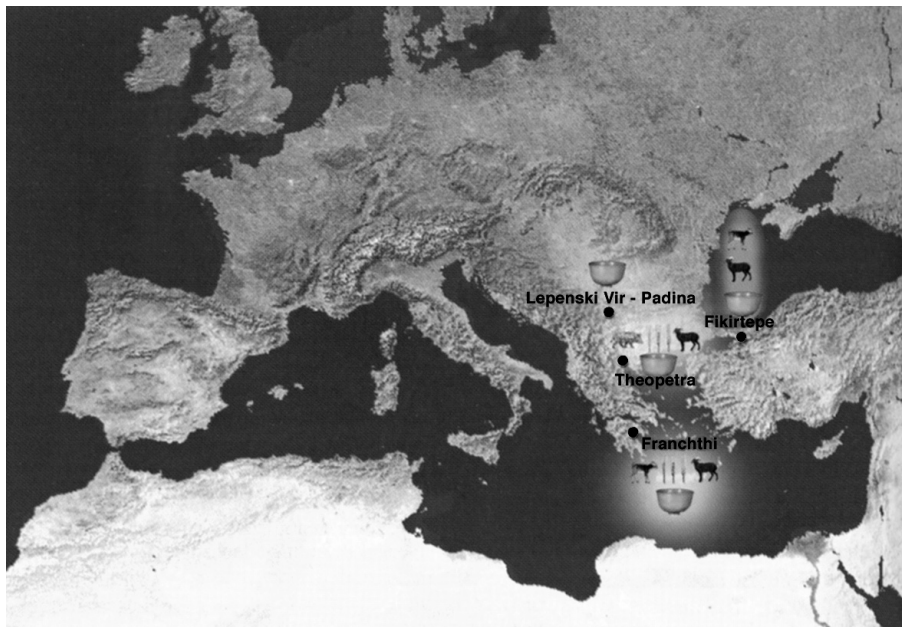

Fig.1 Some of the principal sites of hunter-gatherers that interacted with communities already pursuing farming based subsistence economy (after Budja 1996).

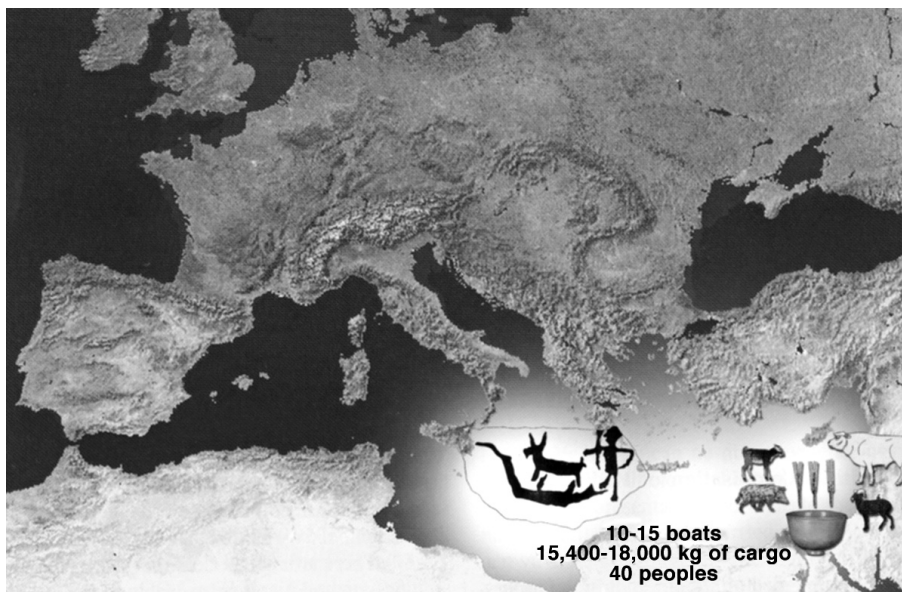

Fig. 2 Hypothetical paths of the two consecutive migrations assumed to have taken place; the Epipaleolithic one from the Levant and the Neolithic one from Anatolia (after Budja 1996).

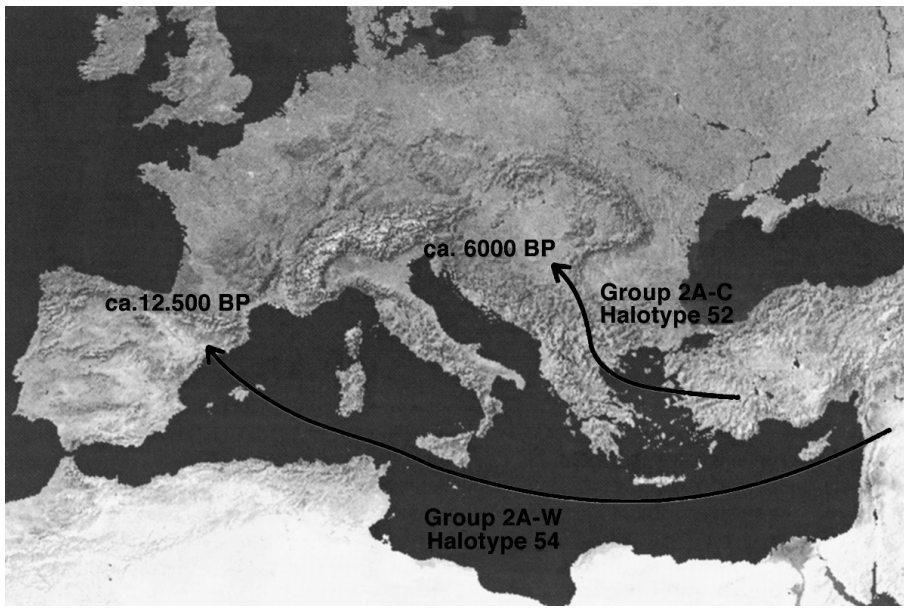

Fig. 3 A study on human genes concentrating on females proposes that the ancestors of the great majority of modern lineages in Europe could have migrated from the Levant during the Epipaleolithic period (after Budja 1996).