UDK 903'12/'15(495)"634"
Documenta Praehistorica XXX

Who did it? Perspectives on the beginning of the Neolithic in Greece

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ABSTRACT – *The beginning of the Neolithic in Greece has been the focus of study by many scholars for many years, and a strong argument about it is still active. DNA analysis has shed new light on a wide spectrum of questions related to the population history of Europe and the Middle East, the beginning of the Neolithic, and the adoption of agriculture in these areas. This paper will try to chart the various theories for the beginning of the Neolithic in Greece, and the contribution of archaeogenetics to the same discussion. Subsequently, there will be an effort to give some theoretical implications for future research.*

IZVLEČEK – *Začetek neolitika v Grčiji je že mnogo let v središču raziskovanja mnogih znanstvenikov in je še vedno predmet živahnih razprav. Analize DNA so na novo osvetlile številna vprašanja, ki se nanašajo na populacijsko zgodovino Evrope in Bližnjega vzhoda, začetek neolitika in prevzem kmetijstva na teh območjih. V članku bomo poskusili orisati različne teorije o začetkih neolitika v Grčiji in prispevek arheogenetikov k tej razpravi. Razen tega bomo nakazali nekaj teoretičnih možnosti za nadaljnje raziskovanje.*

KEY WORDS – *Mesolithic; Neolithic; Greece; DNA; agriculture*

PAST AND PRESENT TRENDS

There has been a long discussion about the beginning of the Neolithic in Greece and a lot of ideas and theories will come to light in the near and distant future in the archaeological discipline. The truth is that the beginning of the Neolithic in Greece is not very well known to many archaeologists who are engaged in the study of this period in Europe or the Middle East. But, it is true that these two areas have close, but problematic, relations with the Greek mainland. The developments or changes and new introductions which for the first time appeared in the Middle East affected them in several ways and with a particular chronological sequence. The questions are always very simple: 'who', 'when', and 'why', but the answers are anything but simple. In this paper there will be an effort towards the direction that the explanation of the establishment of Neolithic societies in Greece is a very complicated process that moves beyond a single rapid event or the mere acceptance of only one explanation, such as migration or cultural diffusion. In addition, the pre-existing social and economic background of each region, in particular Greece, must be examined separately from Europe or the Near East in order for us to understand better the process of change. In this sense, archaeogenetic analysis – meaning mostly DNA analysis in archaeology – even if it is still at the beginning of its development, makes a very strong contribution towards this direction.

A close look at the evidence shows that around 7000 BC many changes happened to the Mesolithic terrain of Greece; permanent or at least semi-permanent villages, domesticated plants and animals, are things that point to the beginning of agriculture and the introduction of new habits, such as the use of pottery.

In the case not only of Greece, but also for a great part of Europe, the theoretical constructions used for the explanation of these processes and shifts moved between three major trends: firstly, an indigenous approach that excluded any kind of human migration or direct and decisive external influence, at least in the field of physical, meaning human, migration or significant population movements (*Higgs and Jarman 1969; 1972*). In the case of Greece, it was proposed that the introduction of some domesticated plants and animals or some exchanges supported by local processes could have happened (*Theocharis 1981*). Secondly, the 'wave of advance' model, which proposed migration as the major mean for the introduction of these new habits to Greece and the rest of Europe (*Ammerman and Cavalli-Sforza 1984*). And finally, a process that engaged local hunter-gatherers and 'newcomers' from the Middle East (*Dennell 1992*), where the model introduced by Perlès (*2001; this volume*) can be placed.

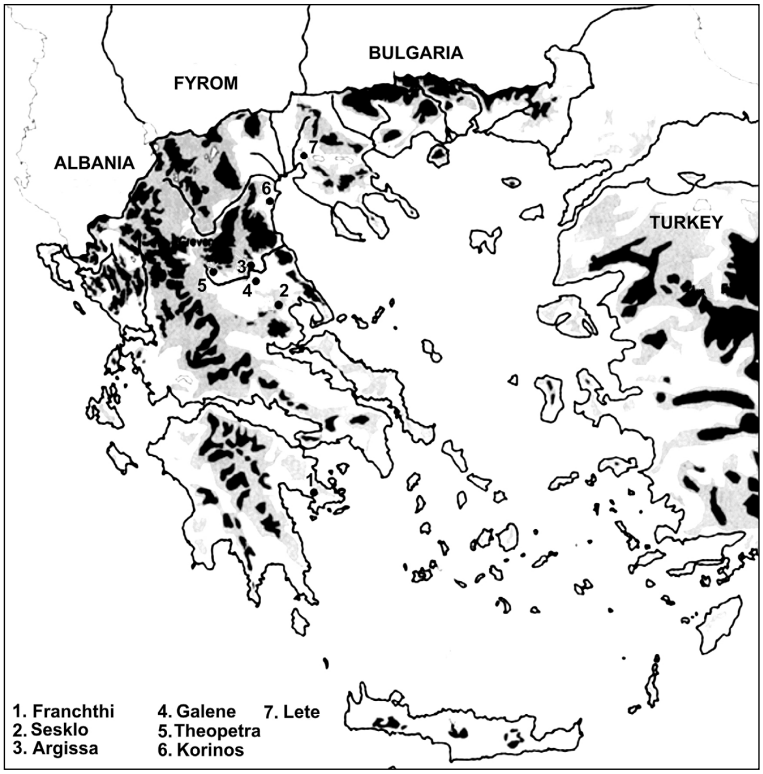

Fig. 1. Map of Greece showing sites mentioned in the text (after Kotsakis 2001).

If we want to discuss the 'indigenist' or autochthonous model for the beginning of Neolithic in Greece and Europe, an approach developed from Higgs and his colleagues in the late 60's and early 70's and strongly supported by Dimitrios Theocharis in Greece, we have to bear in mind that human migrations, meaning the populations of Middle and Near East, had little or no affect on the start of Neolithic. The main theoretical acceptance of this view was that the beginning of Neolithic was an independent development, where acknowledging the exogenous origin of some domestic plants and animals is more a sign of exchange or natural spread than proof of migration. In particular, Higgs and Jarman (*1969; 1972*) supported the view that the domestication of plants and animals in the Near East was uncertain or even non-existent for some of them. In general, except for those positions, cultural diffusion and frontier contacts (*Zvelebil 2000*) are the key points of the indigenous model, where small-scale movements of population through kinship lines and marriages or acquisition of knowledge through trade and exchange networks between foragers and early farmers served as channels of communication. In this sense, the absence of archaeological evidence for the wild progenitors of certain plants and animals in these areas can be explained.

The 'wave of advance' model introduced by Ammerman and Cavalli-Sforza, where migration is the principal factor of social and economic change, was the first attempt at reconstructing past population and human evolution assisted from 'classical' genetic data from living populations. Principal components analysis was used, where each of the seven principal components represents a unique historical episode. The main idea of this 'wave of advance' model, described at the first principal component, is the 'demic fusion' of culture through sequential migrations of populations to the whole of Europe, including of course Greece, from the Middle East, (the Levantine area), which was responsible for the introduction of Indo-European languages to the continent (*Renfrew 1987*). According to this view, the displacement of old populations is not rapid, but happens over many generations. The population growth that occurred in the Neolithic was considered as one proof of this view. This approach, even if its aim is to interpret a cultural and economical phenomenon as the beginning of the Neolithic economy in Europe, takes no account of the various factors that led to this result. Instead, it underestimates the whole process to an abstract and schematic type of cultural process in

which the biological counterpart has the main and important role for change.

Finally, the third, and more moderate, perspective on the introduction of the Neolithic way of life in Greece attempts to interpret the phenomenon on the basis of admixture and finally absorption, on the one hand of the pre-existing Mesolithic populations, and on the other, of adventurous colonists from the Near East. This approach presupposes that the Mesolithic population in Greece were very small and that this was the decisive factor for the replacement, or to be more accurate, the displacement of these populations by newcomers from the east, who came full of potential and the experience of the Neolithic way of doing things, socially and economically, and they managed to change dramatically the pre-existing, Mesolithic way of life.

DNA ANALYSIS IN ARCHAEOLOGY

A series of questions are posed. Are these theoretical structures adequate to interpret the beginning of the Neolithic in Europe, and Greece in particular? And what's new with DNA analysis? Has something changed with the introduction and development of archaeogenetics in archaeology and the way we see, understand and interpret the archaeological evidence concerning the beginning of the Neolithic in Greece?

We will first examine developments in the field of DNA analysis. During the last twenty years a great number of DNA studies have been engaged with the problem of the agricultural transition in Europe and the origins of the Neolithic, and have tried to offer valuable explanations concerning these subjects. A lot of researchers, from the famous Ammerman and Cavalli-Sforza, and Renfrew in the 1980's, to the most recent in the 1990's, such as Richards, Barbujani, Pinhasi, Sokal, Torroni, Allaby, Bradley and many others, all these attempts associated with DNA analysis included human, animal, or plant DNA analysis, involving mostly modern, but also ancient samples, and with sometimes contrasting or, at least, different results.

From all these studies it is clearly understood that until now most of the genetic information based on living populations is used to strengthen or weaken the various explanations about the introduction of agriculture and the domestication of plants and animals through migration, 'demic' fusion, or indigenous explanations. But, there are some limitations to this approach, like the fact that the sampled living populations relate to survivors, and that all the extinct lineages are no longer present in our sample (*Sykes and Renfrew 2000*). Furthermore, most of the studies based on ancient human DNA, besides all the inherent technical problems such as degradation through time or the contamination of the samples from modern DNA, including the DNA of those working in the laboratory, have been more of a genetic interest than of archaeological interest. It is now obvious that a more archaeologically driven approach is needed to extract possible explanations concerning genetic evidence, and not the other way around. It is necessary to examine the past and present trends in DNA analysis for the transition to agriculture and the beginning of the Neolithic in Europe, and Greece in particular, in order to understand better the contribution of DNA studies to this end.

The study by Ammerman and Cavalli-Sforza in 1984, based on classic genetic markers and many other assumptions, has seven principal components. The first principal component, and the most interesting to us, describes a quarter of the genetic variation of Europe as a gradual distribution of populations from the Middle East to the north-western Europe through migration, the already well-known 'wave of advance' model. A number of mitochondrial DNA analyses seem to strengthen this theory (*Barbujani and Chikhi 2000*), but for Richards et al. (*1996*) this is not true, because this explanation takes into account only 9–14 per cent of mitochondrial sequences. Richards et al. (*1996*) argue for a more diversified and complex view of the population history of Europe during this period and in their study they did not identify geographical patterns in their sample, and suggested a largely Palaeolithic or Mesolithic origin for the European gene pool.

In Y-chromosomal analysis things are more or less the same. This recent (but debatable, for many biologists) method of analysis sometimes confirms the mitochondrial evidence of the migrationist or 'demic' fusion model and, in contrast, some other studies weaken it. For Semino et al. (*1996*), the frequency of the Y-chromosome haplotypes originating in the Near East average fifteen (15) per cent, and simultaneously, the same is true for twenty-five per cent in the Balkans and less than ten per cent for Western Europe. For Malaspina et al. (*2000*) the image of 'demic' fusion expanding within the entire European continent from the Levant, which is associated with the spread of agriculture, must be confronted with a sharp genetic discontinuity in Cen-

tral Europe, as is evident in their sample of 1801 Caucasian males. In their view what is most likely to have happened is that a primary phase of a major spread of farmers to Eastern Europe from the Near East preceded an episode of a further cultural spread of farming towards Western Europe, with little or no population movements.

However, the most interesting evidence arises from the genetic analysis of plants and animals. Until recently, the domestication of plants and animals was seen as a single event, unique for each crop and animal species, and the genetic information appeared to support this assumption. Nowadays, new genetic evidence shows that a more diffuse, less revolutionary perspective should not be ignored, and parallel origins, or a motif of dual, or multiple domestication must be counted for an effective interpretation of the Neolithic phenomenon (*Allaby 2000; Bradley 2000*). The focus is moving away from the innovative Neolithic centres of the Fertile Crescent and new possible domestication events have to be examined.

So, we can see that DNA analysis, like any other scientific analysis in archaeology, has offered more arguments and more disagreements in relation to discussions about the beginning of the Neolithic in Greece. But simultaneously, DNA analysis in archaeology has opened new paths to expand our way of thinking concerning old, present, and possible future explanations. DNA analysis in archaeology is new, and as Renfrew (*2000.9*) has stated: "These are early days in the archaeogenetics of Europe". And if we consider the very few archaeogenetics studie done in Greece, based on a very small sample, which is not representative of the whole of Greece, such as the sample used for the study of Richards et al., a lot of work needs to be done in order to use DNA analysis as a useful tool for the interpretation and explanation of the beginning of the Neolithic in Greece.

WHAT IS THE RIGHT ANSWER: A, B, OR C? IS THERE A D?

In this light we will try to re-think and re-negotiate the theoretical structures for the beginning of the Neolithic in Greece. First of all, we have to make things clear about each of these theoretical structures. Beginning from the indigenist model, there are some inherent limitations to this approach. Nowadays, there can be little doubt about the chronological sequence of the Neolithic economy, meaning that the domestication of plants and animals happened sometime around 8000 BC, and originated in the Near East or Levant or, thinking of the data from Allaby and Bradley, somewhere else. So, the theoretical position of Higgs and his scholars who favoured the total rejection of the domestication process in the Near East is no longer valid, at least in terms of the chronological sequence of the phenomenon. Until recently, archaeological evidence from Francthi Cave and the other Early Neolithic settlements of Greece, where domesticated plants and animals appear all together in the form of a 'package', supported this argument. The wild seeds found in the cave do not match genetically with the domesticated species (*Hansen 1991; 1992*). In addition, there is also negative evidence, like the presence at Mesolithic Francthi of wild oats, a plant not present in the Near East. This plant was no longer cultivated during the Neolithic as might be expected if there was continuity from the same population at the cave. But this exclusion is not a confirmation of an exogenous explanation, like Ammerman and Cavalli-Sforza has favoured, because it underestimates various other factors which could be involved in the process and accepts only one: the migration of populations from distant areas.

Unlike this approach, the cultural diffusion model presupposes that the domesticated plants and animals, as well as all other goods introduced to the region, have nothing to do with gene replacement and that genetic continuity prevails. Instead of this, it was suggested that through exchange networks local hunter-gatherers acquired, adopted and, ultimately, used this new way of living. But this approach treats the Mesolithic inhabitant in Greece as a passive receiver and user of economic developments happening elsewhere. The same is true of frontier contacts, where a limited number of 'strangers' coming from the east through trading partnerships, kinship, or marriage alliances, managed to change completely the habits of a pre-existing and functional way of life. Beside this, the indigenous senario seems weak, because too many traits of the material and symbolical culture are introduced in the region of Greece and Europe as a whole.

Equally, the 'demic' fusion or migration hypothesis does not find a lot of support in either the archaeological, ecological or demographic evidence (*Zvelebil 2000*). No archaeological data confirms the view of population pressure which would have led the first farmers to migrate far to the west, or an extent of woodland clearance that would be expected if extensive agriculture was the norm for this period.

But the main negative aspect of this approach was cited above: the total absence of the social aspect of the phenomenon and the overestimation of the biological factor.

The third theoretical structure was based on two arguments: the first related to the material culture, lithic analysis in particular (*Perlès 1990; 2001*), and the second related to the absence of any formative stage, and the Mesolithic 'gap' in Greece reflected in the absence of a considerable number of Mesolithic sites. According to Perlès, the different technological or operational sequences observed between the Mesolithic Francthi Cave and Early Neolithic Thessalian open sites, such as Argissa and Sesklo, show a completely new lithic technology, not completely similar to the Near East, but a sign of retaining a part of the symbolism and technical knowledge from the colonists. Kotsakis (*2001.65*) argues that we are talking about two distinct habitational environments, something that could explain the differences in technological choices.

Moreover, evidence from the cave of Theopetra in Eastern Thessaly changed the way we think about Mesolithic/Neolithic discontinuity in Greece. Being a small cave, the limited potential in supporting a large number of individuals leads to the assumption of a 'station' point where the semi-mountainous plateau of the adjacent region of Grevena is the most likely candidate for foraging activities. In addition, the archaeobotanical and faunal record from the cave of Theopetra with the identification of wild einkorn (*triticum boeticum*), wild barley (*hoerdeum vulgare*), wild goat and possibly bovids (*Kyparissi-Apostolika 1999*) further supports the argument about a re-thinking of a local pre-adaptation of domesticated cereals in Greece (*Halstead 1996.299*).

At this point we have to make some observations on the argument concerning the number and nature of known – or unknown – Mesolithic sites, because the limited number of Mesolithic sites in Greece, which are less than a dozen, has been used to explain the rejection of an indigenous model and favours an exogenous one. It has been suggested that, with the exception of Francthi, Sidari and Theopetra, Early Neolithic sites are all founded on virgin soils in large alluvial basins devoid of Mesolithic occupation, in contrast with Mesolithic sites that were restricted to specific environments, presumably coastal or near-coastal locations (*Perlès 2001*). So, according to this approach, the Mesolithic background could not support or explain the population growth of the Neolithic. This admission could be more or less misleading and seems circular. The absence of Mesolithic sites is used to explain a phenomenon, and the phenomenon is being explained by the absence of Mesolithic sites.

But is this absence real or merely the result of the history of research, as many researchers have suspected? Many examples and recent discoveries in the Macedonia region, in northern Greece, and Thessaly are signs that the latter could be true. The excavation at an Early Neolithic site in Korinos has changed the view we had of this period in Macedonia (*Besios et al. 2001*). No Early Neolithic sites were known from this area, which was considered 'empty' space during this time period, but the discovery of a settlement that was buried 8 metres under the present surface has opened a whole new chapter to our thinking about the Early Neolithic in Greece. Furthermore, at Galene, in Thessaly, a Late Neolithic site was found under a sedimentation layer, 0.80 metres thick (*Kotsakis 2001.66*), while at Lete, near Thessaloniki in central Macedonia, a Middle Neolithic site was also found under a sedimentation layer (*Tzanavari and Filis 2003*).

Thus it is now evident that other factors, like alluvial deposits could be responsible for the limited number of discovered Mesolithic sites in Greece, and that more attention should be paid to surveys covering the gaps in our knowledge of the Mesolithic and Early Neolithic. These examples confirm the previous suspicion of van Andel and his colleagues about the extent of sedimentation of the surface of the Thessalian Plain and, possibly, other parts of Greece (*van Andel, Zangger and Demitrack 1990; van Andel, Gallis and Toufexis 1995.131*). This means that the smallest or short-term settlements, where one could detect intermediate changes in the material and symbolic culture, meaning the replacement of various elements for social and economic production and reproduction, could be still unnoticed, unlike the prominent long-lived tells that represent successful settlements and received all the attention during the 50's and 60's (*Kotsakis 2001.67*).

CONCLUSIONS

Through all this evidence there has been an effort to negotiate the view that we do not need to think primarily about migrations or indigenous approaches where we, willingly, limit ourselves to a form of automatic explanation. Moreover, we could not de-

scribe the transition solely as an economic process. Of course, by this proposition we do not have to deny the possibility of minor population movements or interactions, frontier or direct contacts, or any other form of contact, but we need to emphasise the role of the Mesolithic individual to accept, understand and ultimately change the way he or she produced and organised his/her life, and this is different from the traditional indigenous model, where the Mesolithic populations were considered as passive recipients of developments happening somewhere else.

In addition, the present archeological data should be treated carefully, as it is very well known that research is ongoing and new evidence is coming to light every day. What is needed is a theoretical framework to cover possible future explanations and interpretations. The discussion is moving beyond a mere description of an event or a simple comparison of data between Greece and Near East, to a whole process of interaction between people, Mesolithic inhabitants in particular, and possible 'newcomers' – from where, if something like that is true, we do not yet know – in which each of them has something to offer. A notion of a pure replacement action by a possibly foreign population in the form of 'command and conquer' should be considered as misleading. It is to the historical and social context that archaeological observation should draw attention, and not to generalisations, norms, and necessities.

ACKNOWLEDGEMENTS

I warmly thank Professor Mihael Budja for inviting me to the seminar. Professor K. Kotsakis and my supervisor P. Halstead strongly encouraged me to participate and offered valuable suggestions and corrections to the text. I am grateful to Sofia Agatzioti for her valuable help on corrections to the text.

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