

## The social and symbolic context of Neolithization

*Recently I have argued that the spread of Neolithic within the Iberian Peninsula, was a mixed result of a particular kind of demic spread and the acculturation of the Mesolithic substratum. This implies to accept some kind of regional variability in the way the farming lifestyle was spread, moving from Colonization to Acculturation. It is these late possibility that I will go to explore in the next pages, using ceramic and lithic variability as a way to understand how the interaction between Neolithic and Mesolithic groups took place.*

**Key Words:** Neolithic-Mesolithic. Interaction. Iberian Peninsula.

### 1. OVERVIEW

Recently (Bernabeu, 1996, 1999), I have argued that the spread of Neolithic within the Western Mediterranean, and particularly within the Iberian Peninsula, was a mixed result of a particular kind of demic spread and the acculturation of the Mesolithic substratum as a result of their mutual interaction. This implies to accept some kind of regional variability in the way the farming lifestyle was spread. In short, these variations are:

- Colonization, the result of the expansion and occupation of new lands by farming groups.

From the very beginning, interaction between agriculturalist and Mesolithic local hunter-gatherers would have different kind of processes. *Assimilation* would be, in some cases, the consequence of it. This implies the disappearance of Mesolithic groups and their traditions, but not their genes, when women, as wives, join the expanding farming groups.

- From a logical standpoint, a different kind of assimilation is probable: Mesolithic groups come to assimilate newcomers, becoming both farmers and stock breeders (Zilhão 1997:38).

- However, in other cases, Neolithization have occurred, that is Mesolithic groups adopting the farming way of life while maintaining their own identity as social groups. It is this possibility that I will go to explore next. I Consider two main scenarios:

- Direct Neolithization. When, in the agricultural borderland, the interaction processes between farmers and hunters-gatherers will lead to the neolithization of the latter. Regardless of their peculiarities (see Zvelebil and Uluu, 2000 for the description of different interaction processes), its importance lies in the fact that it will probably act as a filter, selecting information which will be disseminated among Mesolithic groups beyond the border.

- Indirect Neolithization. The spread of Neolithic techniques and economy through social networks within Mesolithic groups. This process develops beyond the agricultural border, and may be considered as a derivation of the previous one.

In these latter cases, the spread of agriculture was the result of adapting, by Mesolithic groups, the new technological and economic innovations introduced by the expanding Neolithic ones. We can assume acculturation as a process through which farming and herding come to change the economic foundations of hunting and gathering systems in the Late Mesolithic.

From this perspective, there are two crucial questions, which deserve an analytical, separate review, although they are presented as correlated at the end.

a. How to explain under what circumstances the latter are likely to adopt the farming and herding subsistence system and not to be assimilated or submitted to an

\* Departament de Prehistòria i d'Arqueologia. Universitat de València. Blasco Ibáñez, 28. 46010 València. E-mail: Joan.bernabeu@uv.es

increasing marginalization process. This requires an understanding of the logic of Neolithic and Mesolithic systems in each case. I discuss this aspect first (section II). My aim here is only to emphasize some social or economic aspects that I consider relevant for the problem under analysis.

- b. How to recognize the different possibilities described in the previous section in the record; i.e. how to distinguish between the different possible historical spreading processes of farming. Thus, an empirical model must be developed to assess the record. I discuss it in Sections III and IV.

The assumptions of the Dual Model, and the early results of its application to the Mediterranean Spain are discussed in Section III. I have already presented this part somewhere else (Bernabeu, 1996, 1997), so I will give a short account of it here deliberately.

Section IV is the longest, and discusses the ceramic variability and the rock art from the outlined perspective of the model. Expanding and qualifying my early views (Bernabeu, 1999), I suggest that the stylistic variability of ceramics and rock art are best understood if we consider that assimilation was not the only result of the interaction process between Neolithic and Mesolithic groups.

## 2. THEORETICAL CONSIDERATIONS ABOUT A COMPLEX PROCESS

One of the main criticism towards the migration models is that what is spread is not a system (the farming way of life) but some technical innovations (e.g. pottery, domestic animals and plants) that are introduced in local networks of the Mesolithic hunter-gatherers; this will be the case in the recent Lewthwhite's filter proposal or in Vicent's (1997) review of it. From this stand point, the first Neolithic in the Iberian Peninsula seems to lack some of the features of the so called "Neolithic Revolution", e.g. sedentariness, that are recorded some time after pottery and domestics appeared.

As I pointed out somewhere else (Bernabeu, 1996), the lack of these elements in the record is mainly the result of a certain research trend, which is directed particularly to caves. We must acknowledge, however, that a part of the previous arguments lies in a theoretical question: what should be understood as Neolithic, and more precisely, what its translation to the case of the Iberian Peninsula is.

Until now, supporters of the migrationist model, like myself, have avoided to define what kind of economic and social system has occurred in the Iberian Peninsula, and hence what kind of empirical evidences can be expected to be found in the archaeological record at the time when pottery and domestics are first found.

### 2.1. THE NEOLITHIC

To briefly sum up, from the proposals of other researchers (Testart, 1982; Vicent, 1990; Plog, 1990) one could say that the Neolithic Revolution is first of all a combination of economic and social changes that allows the development of increasing social inequalities reflected in the negative reciprocity in both intergroupal and intragroup interactions.

Negative reciprocity among groups seems to be related to an increasing territoriality. Territoriality, as an exclusive appropriation for one group of its production means in this case the farming land derives from the necessity to claim the right of an exclusive use of land as the only way to ensure the reproduction of the economic cycle. Just for that, the appearance of the first necropoli coincides with this moment and as such they are interpreted as an expression of the group claim of its vindication of the land over generations.

Nonetheless, territoriality is not only costly because of its maintenance, but it also has an economic risk as it reduces the intergroupal reciprocity. Just for that, it is possible to expect the creation and development of wider social networks, more structured than before: marriage or ceremonial interchange (Plog, 1990). Consequently, territoriality tends to build a stylistic variation combining the local identity and the dissemination of some other traits over wider regions.

One of the most outstanding consequences of agriculture might be a bigger concentration of the risk it implies, as opposed to hunter-gatherer systems. In absence of mobility, these systems face the risk by increasing the amount of storage, which, at the same time, produces a greater degree of sedentariness, which is reflected in bigger investments of no mobile social tasks. As it has been pointed out, storage itself breaks the rules of sharing and redistribution, which leads to link agricultural surpluses with the origin of social inequality (Vicent, 1990).

In short, it could be said that this process leads to the establishment of a corporative group that claims an exclusive use of land upon the ground, and in which the appropriation of the product seems to belong to the producer, while that of the means of production belongs to the group.

Indeed, all these developments are result from a long process. The migrationist hypothesis assumes that the Neolithic groups belonging to the "Impressed Mediterranean Wares" were Neolithic from their departure in the East.

There is two models which suggest an alternative account of the spreading of these features: the Wave of Advance Model (WA) (Ammerman & Cavalli Sforza, 1984) and the Maritime Pioneer Colonization (MPC) (Zilhão, 1993, 1997).

The first model understands this spreading movement within the common low scale migrationist parameters in primitive societies. This situation would result in a continuous displacement in time and space. The second model implies a faster spread, which is continuous in time and discontinuous

in space, requiring a different understanding from the arguments in the Wave of Advance model.

Following other researchers (Ozdogan, 1995), I guess that the explanation of this latter movement should be understood as a reaction/resistance facing an increasing concentration of social power reached by some groups in the Middle East, or facing the development of inequality, which is the same thing. Ozdogan suggests that the crisis of the PPNB was mainly a response to social conflicts derived from an excessive concentration of power, illustrated in the construction of temples, and in an increasing social inequality during the PPNB. Consequently, the movement of dispersion/expansion seems to have started during the PPNC (ca. 8200 BP). Whether or not this particular change is responsible for the Neolithic expansion through the Mediterranean, I think that this kind of social factors can better explain why the process developed so fast.

I agree with Bender (1990) regarding the possibilities that agriculture offers to resist, by means of migration, the development of the social inequality that an agricultural system implies. In this respect, we should point out the peculiarity of the Mediterranean Neolithic subsistence system, where the incorporation of domestic animals (sheep, goats, pigs and cattle) ensures a source of meat, which allows to face situations of agricultural crisis. This characteristic, the predictability of resources, fostered a successful expansion of the system, allowing a better adaptation to new locations.

Thus, we may reasonably assume that this expansion was a step back in terms of the development of social inequality, and, consequently, a change in the previously described characteristics, those that can be clearly related to the growth of the social inequality, as labor force mobilization or wealth concentration.

The previous analysis does not attempt to establish a list of specific characteristics of the Neolithic, but it permits to reach some conclusions about the traits that should be present in the archaeological record of the Iberian Early Neolithic:

- a) Sedentariness: long term villages, structured around households that control the stored product (storage, oven); they should present a series of facilities as a consequence of the deadlock of the social work needed to reproduce the occupation of a place, as a guarantee of the reproduction of the productive cycle (Vicent, 1990)
- b) Territoriality in the sense of an appropriation of the Means of Production by the local group: presence of necropoli (or formal disposal areas); ceremonial networks of exchange over long distances.

## 2.2. THE MESOLITHIC

The Late Mesolithic in Mediterranean Spain, is named Geometric Mesolithic, accordingly with the shape of their most characteristic lithics. Technological changes in its production have been used to define chronological stages (*vide infra*).

One decade ago most of the Mesolithic sites known in the Iberian Peninsula were either in the Portuguese coast or in the central Mediterranean Spain. To date, new research projects have allowed to identify this Geometric Mesolithic in the whole Iberian Peninsula (Utrilla et al., 1998) but the Cantabrian coast (where other kind of lithic assemblages are documented: Asturian, post-Azilian) and the Meseta (where Late Mesolithic sites haven't been documented yet).

Only a few open-air sites have been documented, some in the Northern area (e.g. Pareko Landa, Cantabrian Coast) and other in the South (e.g. El Collado, Valencia). Mostly there are either on the coast or close to inland waters.

Maybe the most interesting case is El Collado, this site shows an adaption process similar to Portuguese shell-midden. I want to remark that in here a necropoli of single burials have been excavated.

In opposition to what happens in Portugal, in the Spanish Mediterranean area, maritime oriented adaptations has no future: dates from El Collado, Tossal de la Roca, and La Falguera, all of them located in the northern part of Alacant, where later on time we assist to the development of the Cardial-Impressed Ware -Cendres group-, show that the system have collapsed by c. 7000 BP. Stratigraphical series show the same process, in the area there aren't levels dated on the recent pre-pottery phase. Why this occurred is still an open question.

Other inland groups (fig. 2) are part of a continental resources oriented system. These are the ones that seem to establish contact with Neolithic groups, in this way the hall of pottery phases it is based, in the Mediterranean coast of Iberia, in a forager system where is no evidence of delayed use of resources and where mobility (aggregation-dispersion cycles) is still high.

In these context, the product and the means of production are supposed to be part of a collective appropriation. Nevertheless, this statement should be qualified. Testart (1985: 65-73) defines a Mode of Production present among some hunting-gathering societies with no storage, and characterized by an individual appropriation: the worker appropriates the final product, while the Means of Production (the land) are owned by the group. While this fact could be further discussed given the widespread presence of sharing and redistribution rules, it is not less true that such rules do not apply to all kind of products, particularly among those that have a prior investment of work.

This is a very interesting point, as it permits to think that in the margins of some hunter-gatherer societies we can find some ways of production that clearly resemble the Neolithic ones, leaving aside the rules of sharing and redistribution. One could imagine that the interaction process between the Neolithic and the Mesolithic might foster those social relationships deriving from these marginal means of production, eventually bringing them closer to those of farming and herding groups.

### 2.3. THE INTERACTION

The above described characteristics, together with the higher capacity of the farming system to spread and the higher potential of its demographic growth, reduces the result of such interaction to three possible answers: Assimilation, Marginalization and Neolithization. Thinking in the possibility of each one of those options becoming real. Now, I would emphasize the Neolithization case, meaning as such the process involving Mesolithic groups that finally adopt the agriculturalist way of life without losing its social identity.

The possibility of avoiding assimilation or growing marginalization could only be faced if the response of the Mesolithic group included an imitation of some practices of the Neolithic groups, e.g. adopting domesticated resources and, consequently, transforming their mode of production.

This decision, however, means a highly dramatic change in the lifestyle and subsistence of Mesolithic groups in the Spanish Mediterranean as defined above. Consequently, it seems difficult to assume that actions aimed at modifying subsistence systems, if they appear, are selected in the beginning. It is more likely that those decisions are taken (or eventually certain practices are chosen) which tend to preserve, apparently at least, traditional lifestyles.

Contacts between groups could possibly have been cooperative at first, as Zvelebil (1996) suggests, but they had to be competitive earlier rather than later. An opportunist use of land, free access to sources of raw materials and a unidirectional movement of women - from Mesolithic to Neolithic groups - (Zvelebil, 1996; Cavalli-Sforza, 1996) would make initial co-operation a threat to the long-term subsistence of Mesolithic groups. Consequently, we may reasonably suppose that competitive behaviors will appear between these groups.

Assuming that, at first, this does not affect the economic domain, one may expect it to influence the social and symbolic one, promoting the development of material items as a means of avoiding disruptive tendencies (promoting social identity and rank). Decorated pottery and rock art could play this role. In other words, those changes resulting from interaction seem to move to the social and ideological context first. Their effects can be reduced to an increasing territoriality (group identity) and ceremonialism, which promotes changes in social relationships.

In this regard, it should be noted that a trend towards economic specialization should be observed along with the social changes, with a deferred use of some traditional resources. The role played by resources which previously were rare or undervalued in the archaeological record, e.g. honey, and whose potential for exchange with the other Neolithic groups has been pointed out in other similar circumstances (Mutundu, 1999), must not be undervalued.

On the other hand, honey has also another interesting characteristic: it needs some prior investment of work to ob-

tain results; besides, it could be stored. Consequently, it can be expected that honey escapes from the rules of sharing and redistribution, that the product will be owned by the producer and able to generate territorial behavior (appropriation of the territories where beehives are kept). The presence of scenes of people gathering honey in the Levantine Rock Art seems to suggest that honey supplies could play an important role in the transformation of the Mesolithic social relations.

To sum up, the first effect of the interaction process will be a period of deep changes, whose signs, while being clearly ideological (affecting mainly symbolism), reflect social changes whose long-term effects will facilitate a change in the subsistence system. The development of an specific system in ceramic decorations and the emerging of the Levantine Rock Art are the most evident signs of this process.

Assuming the explained historical process, our main problem now is to define the archaeological variables allowing us to predict and contrast the hypothesis. In other words, we should be able to differentiate traits left by both kind of communities in the archaeological record. Otherwise, it would mean to renounce to know the historical contingency that, in our region, can explain the forms of evolution and social change at the time of the farming spread.

### 3. THE DUAL MODEL

Most of the arguments used to evaluate the migrationist hypothesis are based on anthropological or DNA analysis, the results of which, however, are not without problems. The debate on the Portuguese case is highly illustrative (Zilhão 1997; Lubell et al., 1994; Jackes et al., 1997)

I do not share the pessimism of those who assume that the archaeological record is unable to decide properly between the assumptions above (Cavalli-Sforza, 1996: 52). Migrationist hypothesis is sound enough to assume that, given these conditions, archaeological record would keep stable. The settlement of farmers in a new area must be visible through archaeological variables, as the technology and style of material culture, or the subsistence and settlement patterns.

The dual model provides a definition of the record, which should be expected in a hypothetical area where an interaction between Neolithic farming groups and the remaining Late Mesolithic ones takes place. I have already discussed the model and its results at length somewhere else (Bernabeu, 1996, 1997), so I will give only a short account of it here.

#### 3.1. THE MODEL

Given that the spread of the Neolithic involved a joint dissemination of technical (pottery) and economic (domes-

ticated) features, first I use the emergence of pottery as the turning point in organizing the archaeological record in three phases:

#### MODEL PHASE 0

It includes the phases immediately prior to the emergence of pottery. Subsistence, technology and settlement will define a system (pre-ceramic Mesolithic) which will be taken as a point of reference when comparing these factors with those in phase 1.

#### MODEL PHASE 1

When the first pottery appears, we must find two groups of settlements showing: a) a different territorial pattern; b) a different subsistence system, measured as the level of dependency of domesticates and c) a different technological system.

One of them could be related to the pre-ceramic Mesolithic: they settled the same sites in nearly the same regions as earlier, in pre-ceramic times; their subsistence was based upon wild resources, and their technology and style could be related to the former. This is the Mesolithic Complex.

The other one will show a preference to settle new sites, in different regions from the earlier ones; their subsistence is based upon a mixed farming-herding system; and, finally, technology will show a break-off in relation to pre-ceramic sites. This is the Neolithic Complex.

#### MODEL PHASE 2

When the dual subsistence pattern such as the one described in phase 1 cannot be distinguished any longer. Probably, if assimilation was not the only result of the interaction processes between farmers and hunters, then we expect to find a territorial pattern very similar to that described earlier, but affecting only some cultural traits (stylistic variation).

Briefly, the model looks like Zilhão's proposal in Portugal (Zilhão, 1997, 2001): first arriving Neolithic groups installed themselves in no inhabited areas producing a territorial pattern characterized by exclusion. This exclusion will show up in stylistic and technological traditions as well as in subsistence models.

Interaction processes between both kind of groups would produce either assimilation or neolithization of the Mesolithic ones. Only in the latter we can expect a territorial pattern identical to the previous one in the same regions, but constraint to some stylistic and technological traditions. It is in this point where my model differs from Zilhão's.

### 3.2. FIRST EMPIRICAL EVALUATION: LITHICS AND DOMESTIC RESOURCES

Using the variables of lithic technology and subsistence economy (domestic resources) in a PCA analysis, the layers of the best known sites of Mediterranean Spain have been di-

vided into five groups (fig.1) representing only two archaeological entities (Bernabeu, 1996, 1999)

– Groups 1 to 4 represent the Geometric Complex.

It is the only with pre-ceramic phases, and thus it is considered to be the archaeological entity representing the evolution of the Mesolithic. G1 and G2 represent the Pre-ceramic Phase. The main features of their geometric tools are their trapezoidal (G1, the earlier phase) and triangular (G2, the later phase) shapes, with abrupt or hellwan retouch. The use of microburin technique seems very linked to the G2 when Cocina-type (with the two retouched concave sides) triangles are very common.

G3 represents the so-called Ceramic Mesolithic (Geometric), with no domestic resources. The lithics are similar to the G2. Finally, G4 represents the Geometric Neolithic. Its lithics are characterized by lunates with hellwan retouch and its subsistence system is based on domesticates. In both, G3 and G4, ceramics are found.

– Group 5 represents the Impresso-Cardial Complex.

From the beginning, its subsistence economy is based on domestic resources, and its lithic technology and typology show a break-off with regard to the Mesolithic Complex. I consider this as the result of the agrarian colonization.

The major traits described in the previous point as pertaining to the Neolithic should be recognized since the beginning of these complex. Until recently, evidence of the existence of stable villages and necropoli was scarce. On the other hand, the absence of analysis looking for the sources of raw material avoided to contrast the existence and scope of exchange networks. However, during the last decade we have witnessed a real empirical revolution, so today it is possible to offer a picture where villages are frequent (Bosch et al., 1994; Bordás et al., 1996; Mestres, 1987; Afonso et al., 1996), and the ceremonial exchange networks can be seen from the early Neolithic (Orozco, 2000).

Apparently, only necropoli are lacking. Recent reviews of the record in valentian area (Bernabeu & Molina, 2001), however, seem to suggest the existence of a burying pattern in natural caves as soon as the early Neolithic. This is the same process revealed by Caldeirao, Portugal (Zilhão, 1993) or Unag in France (Paccard, 1992).

Both entities (Geometric and Impresso-Cardial) show a differentiated territorial pattern since the model Phase 1 (that is, affecting G3 and G4 on one side, and the G5 on the other). Extrapolating the above outlined characteristics, it is possible to see some groups belonging to both complexes in the Iberian Peninsula (fig.2).

Initial dating for the groups of Chaves and Or-Cendres are similar and cannot be traced back beyond ca. 5600 cal BC (see below). The Portuguese sites of Cabranosa and Pedrao in the South, and Pena d'Água and Caldeirao in the North and center probably represent the Western limits of the spread of such movement. Their dates ca. 5500-5400 cal BC for the

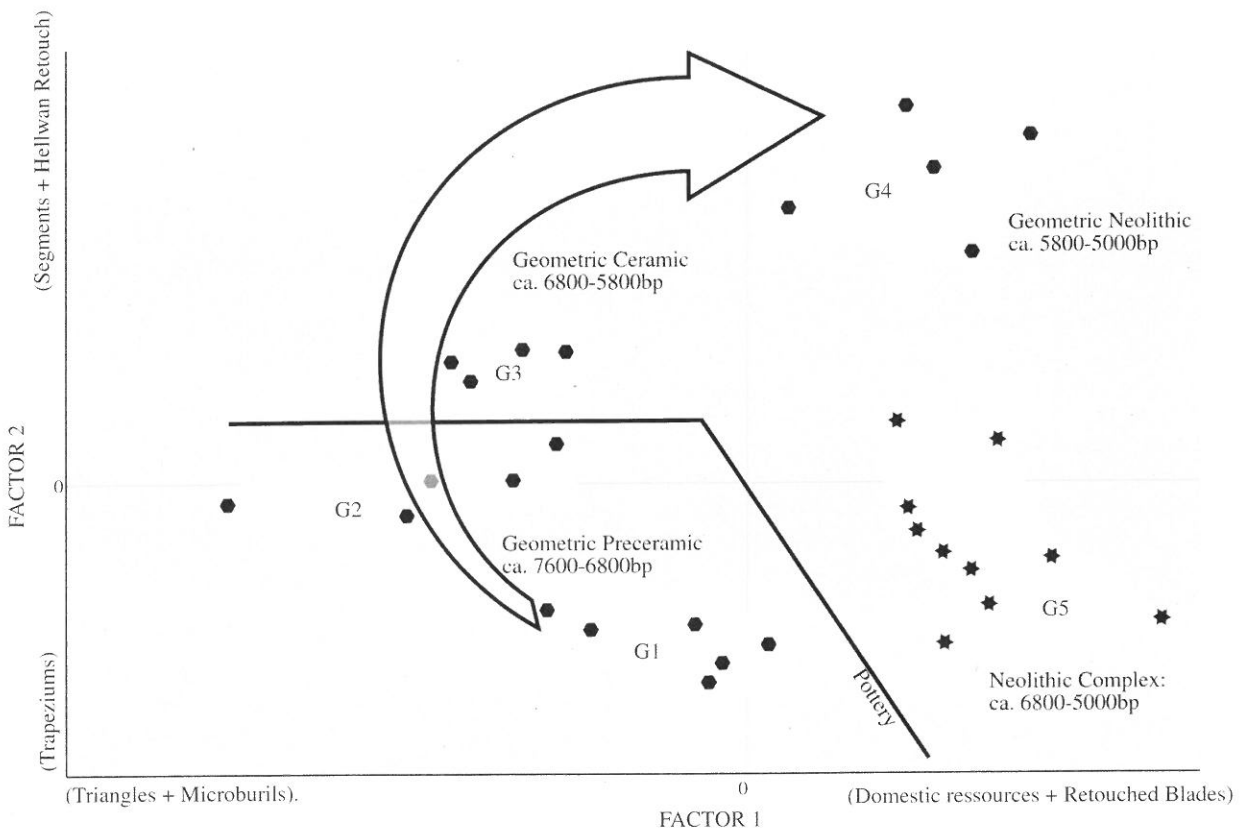


Figure 1 . The Dual Model. Results of the PCA análisis using domestic resources and lithics. Dots = sites and layers belonging to the Geometric Complex; Stars = sites and layers belonging to the Neolithic Complex  
The line represents the rise of pottery, leaving on the left all pre-ceramic sites. Arrowhead represent time: thus, Groups 1 to 4 are successive, and Group 5 is contemporaneous with Groups 3-4 (see text for explanations).

former, and ca. 5400-5300 cal BC for the latter necessarily imply an extremely fast spreading process of the Cardial Complex, more appropriate to the assumptions of the Maritime Pioneer Colonization model (Zilhão, 1993, 1997) than those of the Wave of Advance (Ammerman & Cavalli-Sforza, 1984). On the other hand, the final situation might result from a combination of these models: the initial colonization would resemble the MPC model, while the later spread would develop following the WA model.

#### 4. POTTERY STYLISTIC VARIATION

One of the most widely spread uses of pottery probably is its ability to run evolutionary stages through the relative significance of the different decorative techniques. Pottery decoration, however, shows a wide and rich range of motifs, some

of which have allowed dating the post-Paleolithic rock art (Martí & Hernández, 1988; Martí, 1989), thus opening many possible interpretations which have been only partially explored.

A covariation model, which correlates the technique and the shape of some lithic tools with the use of domestic resources, has been discussed above. This has a territorial component. Consequently, an ethnic interpretation (in a broad sense) has been suggested: one part of the archaeological record would be related to the Mesolithic groups, from its pre-ceramic phases to the full Neolithization (Groups 1 to 4 of the PCA) the other part would be related to the Neolithic (Group 5 of the PCA).

Given all the discussed developments, this model should also be seen in pottery, otherwise it would be highly surprising. Considering the outlined interpretation above, one might expect that the pottery styles and their development should show different traits in both complexes. These assumptions are qualified by two circumstances:

- given the colonization associated with the spread of the Impressed-Cardial Complex, one must assume that, at least during the initial phase, there will be a significant uniformity in vast territories.
- also, pottery is a new technology, whose emergence is associated with the farming spread. Thus, its dissemination within the Mesolithic Complex should be accompanied by an early stage of assimilation and learning of new technologies; that is, we can suppose an early stage where pottery style in mesolithic groups as a whole will correlate with the ones present in the Impressed-Cardial complex. But, as an effect of the filter, we expect a clear difference between pottery productions in the agricultural boundary and back.

Any appropriate approach to check these hypotheses to some extent must necessarily define the pottery styles that are present in the considered regions, establishing their chronological and spatial variation. Such approach, however, is beyond the possibilities of this essay and, in a great extent, beyond the present record, which is overwhelmingly made of pottery fragments where one can only gain access to the information provided by the basic motifs. Neither the approaches based on an application of the notion of *Chaîne Opératoire* (Gosselain, 1998), nor those which focus on an analysis of the form-decoration system (Constantin, 1998) are feasible. Consequently, I will suggest a partial approach to this issue, combining the information provided by decorative techniques and their evolution, with that provided by the

Site	Layer	Code Lab.	BP	S	Cal.2s+	Cal.2s-
Cendres	VIIIA	Beta-107405	6280	80	5470	5030
	VII	Beta-142228	6340	70	5480	5200
	VII	Beta-75220	6730	80	5750	5480
	H18	Beta-75219	6420	80	5540	5210
	H17	Beta-75218	6260	80	5380	4990
La Falaguera	2051b	Beta-142289	6510	80	5620	5320
Ampla		Ly-2850	6550	140	5750	5200
Or	III	Ganop-C13	6720	380		
		Ganop-C12	6630	290		
II		Ganop-C11	5980	260		
Or	Silo	KN-51	6510	160	5750	5050
	Silo	K-1754	6265	75	5380	5000
Frare	c.5c	I-13030	6380	310		
Chaves	IB	GrN-12685	6770	70	5800	5330
		GrN-12683	6650	80	5720	5470
		GrN-13604	6490	80	5620	5310
		CSIC-378	6460	70	5540	5300
		GrN-13605	6330	70	5480	5070
Font d. Ros		AA-16494	6561	56	5620	5380
		AA-16502	6370	57	5480	5230
		AA-16501	6307	68	5470	5060
		AA-16499	6243	56	5320	5040
		AA-16500	6058	79	5210	4770
La Draga		UBAR-312	6570	460	-	-
		UBAR-314	6410	70	5490	5250
		Hd-15451	6060	40	5060	4800
		UBAR-313	6010	70	5210	4710
		UBAR-311	5970	110	5250	4550
		UBAR-245	5920	140	5250	4450
		GaK-15223	5710	170	5000	4100

Table 1. Radiocarbon dates of the Impressed-Cardial Complex. Early Cardial Phase. The sites of Font del Ros and La Draga probably cover the Late Cardial Phase. Calibrations have been obtained from Oxcal 3 program.

Site	Layer	Code Lab.	C14 BP	S	Ca.l.2s+	Cal.2s-
<b>Cendres</b>	<b>H15a</b>	<b>Beta-75217</b>	<b>6150</b>	<b>80</b>	<b>5300</b>	<b>4850</b>
	H15	Beta-75216	6010	80	5210	4710
	H14	Beta-75215	5930	80	5000	4590
	Evc (H13)	Beta-75214	5790	70	4800	4460
		Ly-4303	5820	130	5000	4350
<b>Chaves</b>	<b>IA</b>	<b>GrN-13602</b>	<b>6330</b>	<b>90</b>	<b>5480</b>	<b>5060</b>
		<b>GrN-13602</b>	<b>6260</b>	<b>100</b>	<b>5500</b>	<b>4900</b>
		<b>CSIC-379</b>	<b>6230</b>	<b>70</b>	<b>5340</b>	<b>4960</b>
		<b>CSIC-381</b>	<b>6120</b>	<b>70</b>	<b>5280</b>	<b>4840</b>
<b>Plansallosa</b>	<b>I</b>	<b>Beta-74311</b>	<b>6180</b>	<b>60</b>	<b>5300</b>	<b>4950</b>
		<b>Beta-74313</b>	<b>6130</b>	<b>60</b>	<b>5260</b>	<b>4850</b>
	II	OXA-2592	5890	80	4950	4540
		Beta-74312	5870	60	4910	4550
		Beta-87965	5720	70	4720	4400
Frare	c.5b	MC-2298	5800	130	4950	4350
Avellaner		GAK-12933	5920	180	5300	4350
		UBAR-109	5830	100	4940	4450
<b>Can Sadurní</b>	<b>C17</b>	<b>Beta-127898</b>	<b>6050</b>	<b>110</b>	<b>5300</b>	<b>4700</b>
Can Sadurní	C11	I-11789	5700	110	4780	4330
	C10/11	I-11787	5800	160	5050	4300
		I-13314	5470	110	4550	4000
B. Fabra		Beta-61490	5880	110	5050	4450
<b>C. Vidre</b>		<b>Beta-58934</b>	<b>6180</b>	<b>90</b>	<b>5320</b>	<b>4850</b>

Table 2. Radiocarbon dates of the Impreso-Cardial Complex. Late Cardial (black) and Late Impreso.

organization of certain decorative motifs in containers.

In the next section I will use the information about the Mediterranean Spain, and specially of the next ceramic groups (fig 2):

Geometric Complex, with the groups of Upper and Lower Aragon. The Álava-Navarra group have been used only from the early pottery phase.

Impreso-Cardial Complex, with the groups of Llobregat, Or-Cendres and Granada.

Besides those mentioned above, I will include the group of sites from Córdoba, which are centered around Los Murciélagos cave (Vicent & Muñoz, 1973; Gavilán, 1989; Gavilán et al., 1996). Here there are a group of sites beginning at ca. 5200 cal. BC, and belonging to the Neolithic Complex in post-cardial phases.

We should make some remarks about radiocarbon dates and its use in here. Like have been shown by recent works (Bernabeu et al., 1999, 2001; Zilhão, 2001) there are two problems in the dates we are interested in.

The first one is the possibility of contamination of the sample. In some place else, I have remarked some post-de-

positional problems affecting interstratified cave deposit with superposed pottery and pre-pottery levels (Bernabeu et al., 1999; 2001). The consequence of this phenomena is that transition levels could be formed by mixed materials from both pre-pottery and pottery levels. Even if the causes of that are not clear and, evidently, I cannot sustain that is an universal phenomenon, would be wide enough to expand some doubts about the group 3 of the PCA (but see discussion at the end of these paper).

The second is related to the so called Old Wood effect, some charcoal samples, even the ones coming from neat contexts, are older than their contexts as consequence of the real date of sample. Zilhão, (2001) shows how Neolithic charcoal samples are systematically older than bone or seed samples.

This problem has a negative effect when comparing Mesolithic and Neolithic series from Mediterranean Spain: the former are mostly from charcoal, its chronology could become of no use when comparing with Neolithic samples done in seeds or bones (only a few ones, on the other hand). It is for that that I have used both kind of samples to try to



Site	Layer	Code Lab.	BP	S	Cal. 1s+	Cal.1s-
Cendres	Va(H10)	Beta-75213	5640	80	4520	4380
		UBAR-172	5990	80	4950	4790
	H7	UBAR-173	5330	110	4330	3990
		Beta-75212	5000	90	3940	3690
Bòbila		UBAR-6	4970	80	3850	3690
Mardurell		UBAR-84	5010	80	3940	3720
		MC-2142	4800	150	3760	3420
Grioterres		UBAR-119	5300	180	4350	3940
		UGRA-274	5280	90	4250	4010

Table 3. Selected radiocarbon dates of Post-Impresso Complex.

establish a chronological reference between to periods that otherwise would have no comparison (see Martí and Juan, these volume for a complete list of C-14 Mesolithic and Neolithic dates).

Taking into consideration radiocarbon samples realized upon domestics in Old Neolithic layers (Faluera, Cendres VII, Cova de l'Or), I can suppose a date around 5700-5600 cal. BC for the first Neolithic groups in the area. I will use this start point for the pottery phases. Older dates should be accompanied by taphonomic analysis allowing us to reject contamination.

#### 4.1. THE IMPRESSO-CARDIAL COMPLEX

Phase 1. Early Cardial (Neolithic IA). In this phase, the cardial technique represents between 30 and 60% of all decorations and, if relieves are added, the proportion increases to 60-90% (Bernabeu, 1989). Besides it, the set is completed with some other impressions (digitations, gradine.), incisions or painted pottery. The available dates (table 1) place this phase between ca. 5700-5300 cal. BC. To date, radiocarbon dates on seeds and bones don't allow to propose a date older than ca. 5600 cal. BC for the initial Phase.

Phase 2. Late Cardial (Neolithic IB). This phase is characterized by a sharp reduction of relieves and the cardial, which means between 10 and 30% of all decorations. Consequently, the incision and impression techniques amount to between 40 and 70%. According to the available dates, this phase runs between ca. 5300-4900 cal. BC (table 2).

The Neolithization of inner peninsular regions, from Western Andalusia (Gavilán et al. 1996) to the North of the Meseta, must have taken place in this period, as recent findings show (Kunst & Rojo, 1999; Estremera Portela, 1999). Cardial decoration is not present in these inner sites, where, on the contrary, the so-called "Almagra" style or red plastered pottery will develop, particularly in Andalusia. From this mo-

ment on, the regional variation within the Impresso-Cardial Complex begins to be obvious.

Phase 3. Late Impresso (Neolithic IC). It is characterized by the disappearance of the cardial-gradine techniques. Decorations represent only about 5% of the whole pottery, whilst in the ancient phases they increase to 14-18%. Incisions, among other techniques, clearly stand over impressions, while relieves go from representing between less than 20% to 45%. Other styles develop together with decorated productions: big-medium containers with medium or thick sides, whose surfaces are brushed, similar to the so-called Molinot Style in Catalonia and Valencia. This kind of ceramic productions can also be found from phase 2. Radiocarbon datings locate this phase between ca. 4900-4500 cal. BC (table 2).

Phase 4. After ca. 4500 cal. BC (table 3), the Post-Impresso (Neolithic IIA) develops, occupying the territory of Llobregat and Or-Cendres groups. Together with the brushed pottery, new techniques emerge, e.g. carved decorations, associated with a new Linear Style (fig. 3). Incisions and impressions tend to disappear.

The sequences of Los Murciélagos (Córdoba) and Carigüela (Granada) show a different development, with a predominance of "Almagra" style pottery and the incision techniques during the V millennium cal BC, and an absence of brushed and carved pottery. Seemingly, the significance of decorations (including the Almagra ones) was reduced during the second half of the V millennium, in comparison with the previous phases (Gavilán et al., 1996).

The outstanding characteristic of the Neolithic pottery in the peninsular Mediterranean is a strikingly wide variety of motifs and ornamental compositions, which range from the simplest motifs to the most complex compositions that are known as symbolic pottery. As I noted above, I do not attempt to develop a detailed approach to these issues here. My concern is mainly to show a recurrence of certain decorative sys-

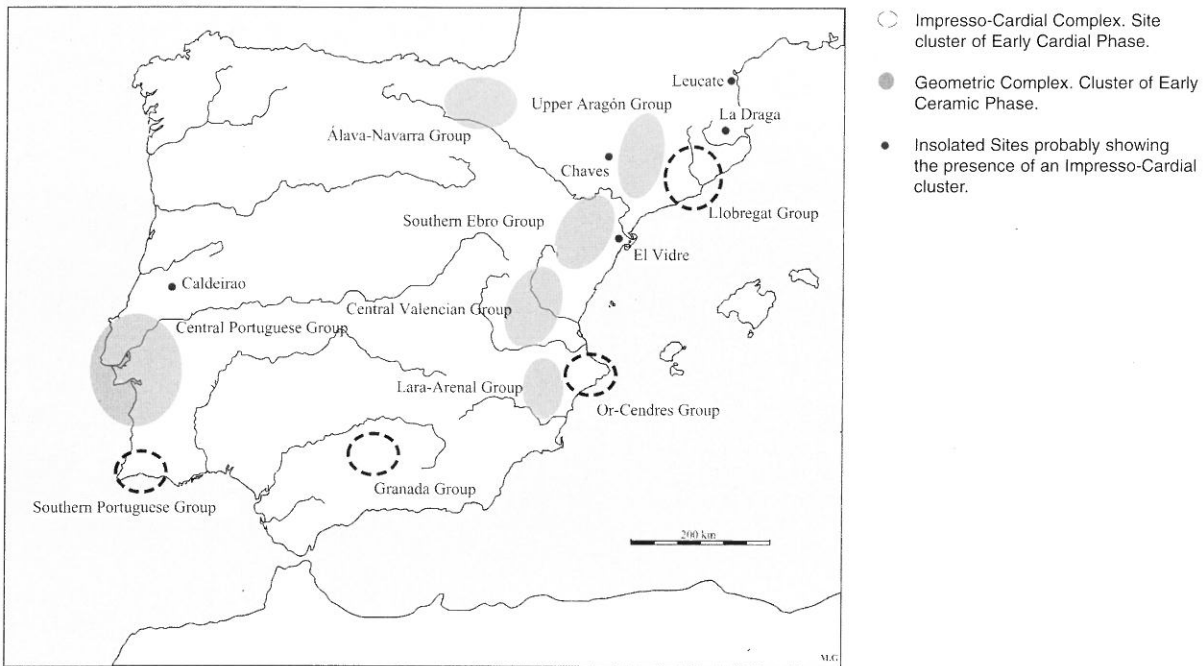


Figure 2. Groups and Territories. Spatial distribution of the Impresso-Cardial and Geometric Complexes in the Iberian Peninsula between ca. 6000 and 5300 cal BC.

**Geometric Complex Groups**

1. The Upper Aragón Group, where the Forcas II (Utrilla et al., 1998) and, according to the results of our analysis, the cave of El Moro (Baldellou & Utrilla, 1995) are outstanding. This group could also include the Balma Margineda (Guilaine & Martzluff, 1995).
2. The Southern Ebro Group. It is the best documented group, with sites through which the evolution from pre-ceramic phases to the full neolithization can be followed. Some of them have good reports of its excavations: Botiquería (Barandiarán, 1978), Costalena (Barandiarán & Cava, 1989) Alonso Norte (Benavente & Andrés, 1989) Secans (Rodanés et al., 1996) and Fosca (Olaria, 1988). Others as Pontet (Mazo & Montes, 1992), Riols (Gómez & Royo, 1991), Timba den Barenys (Vilardell, 1992) has only preliminary reports.
3. The Central Valencian Group, which includes the sites of Verdelino, Can Ballester (Gusi & Olaria, 1978), Cocina and Llatas (Forkea, 1973; Forkea et al., 1987)
4. The Lara-Arenal Group, with its outstanding sites of Falguera (mainly unpublished) Tossal de la Roca (Cacho et al., 1995) and Casa de Lara (López de Pablo, 1999).
5. The Álava-Navarra Group. Research carried out in this region during the last years has highlighted the importance of this group in analyzing the filter effect back to the agricultural border. Sites as Peña Larga (Fernandez Eraso, 1997), Mendiandia (Utrilla et al., 1998), Aizpea (Cava, 1997) and others could be related with this group (Alday, 1999; Utrilla et al., 1998).
6. The Central portuguese group. Located around the Tejo, Sado and Mondego estuaries (see Faustino, these volume).

**Impresso-Cardial Complex Groups.**

7. The Leucate-La Draga Group. Located in Northern Catalonia, this group is known by its open air sites of Leucate (Guilaine et al., 1984) and La Draga (Bosch et al., 1999), in the French and Spanish sides of Gulf of Lyon.
8. The Llobregat Group. Located in Central Catalonia, around the Llobregat river, this is one of the most important cardial groups in the Iberian peninsula as far as the number of sites is concerned. However, the available information about it is limited. Open air sites like Les Guixeres (Mestres, 1987) and Font del Ros (Bordás et al., 1996), together with caves (Montserrat Caves), provide an impressive collection of cardial pottery.
9. The Cova del Vidre is likely to represent another coastal group, which is located around the delta of the Ebro river. The information about this site, however, is rare. We include it here just as an hypothesis.
10. The Chaves Group is only represented by the Chaves cave (Baldellou et al., 1985) Other sites, like La Puyascada, could be related with this group, but the available information is inconclusive.
11. The Or-Cendres Group, located around the valley of the Serpis river, in the Valencian region, together with the Montserrat Group, exhibit the most impressive concentration of sites with cardial decoration, associated from the beginning with a fully stabilised farming and herding subsistence system: The caves of Or (Martí et al., 1982), Sarsa and Cendres (Bernabeu, 1989), and the recent of the open air site of Mas d'Is (unpublished),
12. The Granada Group, another inland cluster of cardial sites near Granada: Carigüela and Ventana caves, and the open air sites of La Majolicas and Montefrío. We have very little information about it, Carigüela and Las Mojalicas being the only ceramic sets which have been widely published (Navarrete, 1977).
13. The southern portuguese group with the open air sites of Cabranosa and Pedrao (see Faustino, these volume).
14. The northern portuguese group, represented by the caves of Pena d'Agua and Caldeirao (Zilhão, 1993; Faustino, these volume).

## THE SOCIAL AND SYMBOLIC CONTEXT OF NEOLITHIZATION

Site	Layer	Code Lab.	BP	S	Cal.1s+	Cal.1s-
Mendandia	III inf	GrN-22743	7620	50	6590	6380
Fuente Hoz	III.28	I-12895	8120	240		
		I-13496	7880	120	7100	6450
	III.23	I-12778	7140	120	6230	5740
	III.21	I-12083	7840	130	7100	6400
La Peña	D inf	BM-2363	7890	130	7150	6450
Kampanost	III	GrN-20289	6550	260		
		GrN-20214	6360	70	5480	5140
Aizpea	I inf.	GrN-16620	7790	70	7000	6450
	I sup.	GrN-16621	7160	70	6210	5840
	II	GrN-16622	6830	70	5850	5610
		GrA-779	6600	50	5630	5470
Forcas II	II	GrN-22686	7240	40	6220	6010
	IV	Beta-59995	7090	340		
Pontet	E	GrN-16313	7340	70	6390	6020
Botiquería	2	Ly-1198	7550	290		
El Collado		UBAR-281	7640	120	6850	6200
		UBAR-280	7570	160	6850	6080
Falaguera	Inf.	AA-2295	7410	70	6420	6080
T. Roca	I	Gif-6898	7660	80	6660	6370
		Gif-6897	7560	80	6570	6220
Costalena	c.3	GrN-14098	6420	250		
Mendandia	III sup.	GrN-19658	7210	80	6230	5890
		GrN-22742	7180	45	6170	5920
	II	GrN-22741	6540	70	5630	5360
	I	GrN-22473	6440	70	5540	5290
Atxoste	IIIb	GrA-9789	6260	60	5370	5040
Peña Larga	Inf	I-15150	6150	230		
	Sup	I-14909	5830	110	4950	4400
Aizpea	III	GrN-18421	6370	70	5480	5140
<b>Forcas</b>	<b>V</b>	<b>GrN-22687</b>	<b>6970</b>	<b>130</b>	<b>6200</b>	<b>5600</b>
	<b>b.medio</b>	<b>Beta-60773</b>	<b>6940</b>	<b>90</b>	<b>5990</b>	<b>5660</b>
	<b>VI</b>	<b>GrN-22668</b>	<b>6900</b>	<b>45</b>	<b>5880</b>	<b>5660</b>
<b>Pontet</b>	<b>c.inf</b>	<b>GrN-14241</b>	<b>6370</b>	<b>70</b>	<b>5480</b>	<b>5140</b>
<b>C. Ballester</b>		<b>I-10463</b>	<b>6950</b>	<b>120</b>	<b>6030</b>	<b>5620</b>
<b>Margineda</b>	<b>C3 b</b>	<b>Ly-2839</b>	<b>6670</b>	<b>120</b>	<b>5800</b>	<b>5370</b>
	<b>C3 b/f3)</b>	<b>Ly-3289</b>	<b>6850</b>	<b>160</b>	<b>6050</b>	<b>5450</b>
	<b>C3 a(f1)</b>	<b>Ly-3288</b>	<b>6640</b>	<b>160</b>	<b>5900</b>	<b>5250</b>

Table 4. Radiocarbon dates of Geometric Complex. Pre-ceramic (up) an Early Ceramic (down). Pericardial and Cardial (in black) styles.

tems and their distribution. The styles identified below must be read taking in mind this consideration.

The Old Style. It is so called from its similarity to the Mediterranean impressed decoration. Decoration techniques: Cardial and incision. Motifs: partial or total covering layers. Simple, medium and big sized forms. It is found in all the groups. Chronology: phases 1, 2 and 3.

- Disorganized. Decorations tend to cover a great part of the container. Very few motifs are used, and they are nearly reduced to irregular strokes. Handles and/or other similar elements, if there are any, break the decoration or are ignored (fig. 4:1).

- Organized. In this case, the ornamental motifs appear regularly organized on the container's surface, forming covering layers, which can both be limited to the upper part of the container or cover the whole surface. Motifs are a bit more varied: flames, bundles of regular lines, chevrons, wide horizontal superimposed zigzags (fig. 4:2)

Horizontal Bands Style. Bands decoration, either limited or not, simple or multiple, horizontally traced with a variable composition complexity. Different combinations may be identified according to the presence or absence of handles, their integration within the ornamental pattern, and their decorative complexity.

There is a wide range of techniques and motifs, including those series of horizontal lines delimited by punctuations, which are so often found in the Epicardial style (fig. 11). At the impresso-cardial groups the lined or reticulated bands,

chevrons, or filled angles/triangles (fig. 4:3-7), are more important motifs than the epicardial ones.

Geometric Style. Horizontal bands delimited by vertically traced motives, which break the horizontally shaped decoration. Decoration techniques: cardial, gradine, gradine+impression, incision, and incision+impression. Usually it is associated with necked containers. This style seems to be limited to phases 1 and 2, reaching phase 3 only in the groups of Granada and Córdoba (fig. 5). As in the previous case, there are a considerable variety of motifs and themes.

Simple Symbolic Style. Containers with developed handles, simple shapes o with a neck. They include a decoration with either simple or geometric bands, which are stopped when they reach the handles. Here, a stage (on the handle itself, under it and/or facing it) within vertical bands develops, where an only motif, usually symbolic (anthropomorphos, schematic) appears. Each vase may show only one of these motifs or as many as handles, but they are always isolated. Decoration techniques: cardial, gradine (fig. 6).

This is possibly one of the most characteristic styles of the Impresso-Cardial Complex and, although its chronology is imprecise, it seems to develop basically between phases 1 and 2. It is present in the groups of Or-Cendres and Granada.

Metoped Style. It is usually associated with compound containers with handles. They may have one or more bands below the edge, which surpass the handles. The composition fields (2 or 4) develop between the handles following their shapes which are framed by different motifs forming metopes.

Site	Layer	Code Lab.	BP	S	Cal. 1s+	Cal. 1s-
Forcas II	VIII	GrN-22689	6680	190	6000	5250
	b.sup.	Beta-59996	6090	180	5500	4550
Riols I	A2	GrN-13976	6040	100	5300	4700
Les Bruixes		Ly-4269	6460	140	5760	5050
Olvena	Ov.2	GrN-12119	6550	130	5730	5280
Fosca	Sup.	I-9867	5715	180	5050	4050
	IA	CSIC-357	7210	70	6230	5970
		CSIC-456	7100	70	6260	5800
	IB	CSIC-353	7640	110	6750	6200
<b>Olvena</b>	<b>c.5</b>	<b>GrN-12117</b>	<b>5160</b>	<b>70</b>	<b>4230</b>	<b>3780</b>
<b>Riols</b>	<b>A1</b>	<b>GrN-17280</b>	<b>5100</b>	<b>220</b>		
<b>T. Barenys</b>		<b>UBAR-299</b>	<b>5240</b>	<b>160</b>	<b>4450</b>	<b>3700</b>
<b>A. Norte</b>		<b>GaK-13877</b>	<b>4600</b>	<b>160</b>	<b>3700</b>	<b>2900</b>
<b>Verdelpino</b>	<b>III</b>		<b>5170</b>	<b>130</b>	<b>4350</b>	<b>3700</b>
			<b>5120</b>	<b>130</b>	<b>4250</b>	<b>3650</b>
<b>Verdelpino</b>	<b>II</b>		<b>4630</b>	<b>130</b>	<b>3700</b>	<b>2900</b>

Table 5. Radiocarbon dates of Geometric Complex. Late Ceramic Phase (Epicardial Styles).

Metopes may have no decoration within them (fig. 7:2). If they are decorated, motifs are usually symbolic (fig. 7:3). Decoration techniques: cardial, gradine, incision, gradine+impression by burin or scraper, incision+impression. Chronology: Phases 1 and 2; Groups: NE, Or-Cendres, Granada, Córdoba.

Scenic Style. As in the metoped one, the scenic field is situated between handles, but, in this case it is not framed. It may be associated with bands, above and below the handles. It is the only style where there are scenes (fig. 8:4), besides other symbolic elements or complex themes. Decoration techniques: cardial, gradine, incision, impression+incision, gradine+impression. Groups: Or-Cendres, Córdoba and Granada. Chronology: Phases 1, 2 and probably 3.

Plastic Vases. While strictly speaking only the so-called "Venus de Gavà" could be included in this section, there is a series of containers that could be understood as such. They belong to the group of Córdoba (Gavilán, 1993), and their ornamental organization is similar to the Metopic/Scenic styles with a difference: while different motifs are found within the scenic field, the whole of it is used to portrait only one human figure. Both series share some conventions, particularly the eyes, which are very accentuated and identified as soliforms (fig 9:1).

#### 4.2. THE GEOMETRIC COMPLEX

Phase 1. Pre-ceramic Geometric. It can be split into two phases related to the Groups 1 and 2 of the PCA. The available datings show a highly dispersed situation (table 4). The earliest phase tends to be concentrated between ca. 6800-6000. In some cases, however, it clearly goes beyond 6000 cal. BC. There are very few dates, which can be related to the recent phase (the group 2 of the PCA). Only those from Forcas II, level 4, Costalena c.3, Aizpea II and Kampanoste III (table 4) could be related to this moment through extrapolation and stratigraphic position. The two former ones show a high deviation, and so they cannot be used. Considering the dates of Aizpea and Kampanoste, this recent phase could be situated between ca. 6000-5400 cal. BC.

Phase 2. Early Ceramic. It is the group 3 of the PCA. The first pottery appears now. Geometrism in this phase is distinguished by triangles (Cocina style or with double sided retouch) together with trapezes and lunates, also made with helwan retouch. Domestic resources either do not exist or are not relevant.

While cardial pottery exists, the amounts of it vary a lot from one to another site, depending on the proximity to the centers where this pottery is produced. Cardial pottery, for example, does not get to the group of Álava-Navarra.

This is the most evident effect of the filter: cardial and gradine decorations and domestic resources do not pass in-

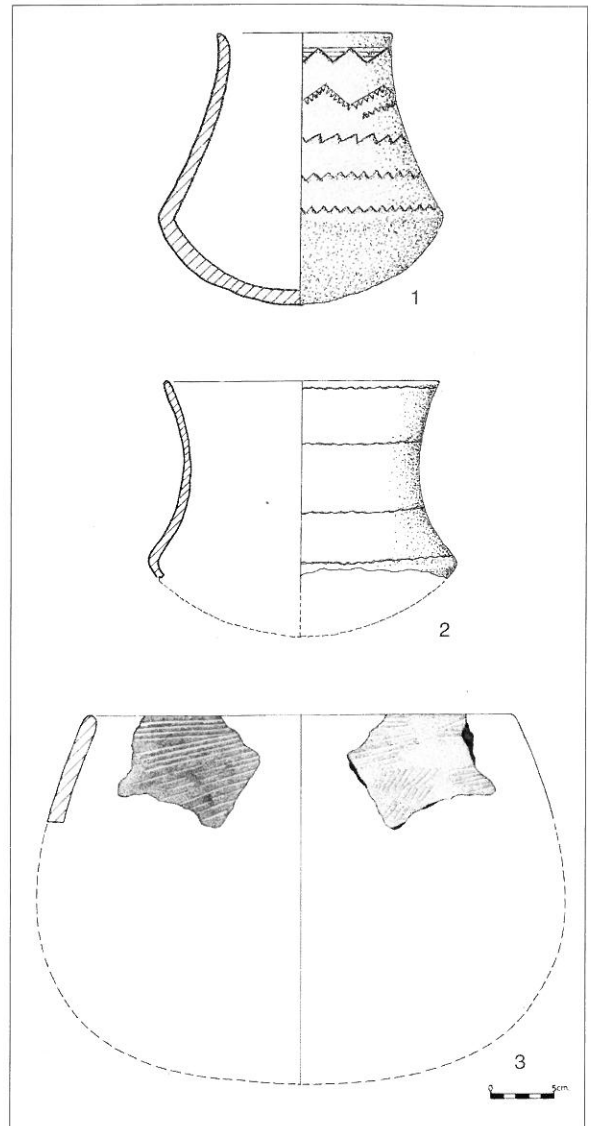


Figure 3. Molinot (3) and Linear Styles (1,2) from Or-Cendres group.

to the hinterland. The reason for this is that people were exchanging objects only between Neolithic and Mesolithic groups at the farming border, and did not become incorporated into the production of Mesolithic groups material culture. Interestingly enough, a petrologic analysis of pottery fragments from the Balma Margineda (Andorra) suggests that the only cardial vase found here was probably made outside the area (Barnett, 1995: 197).

In this phase, ceramics technology is disseminated, and decorative patterns show (in the farming border) obvious

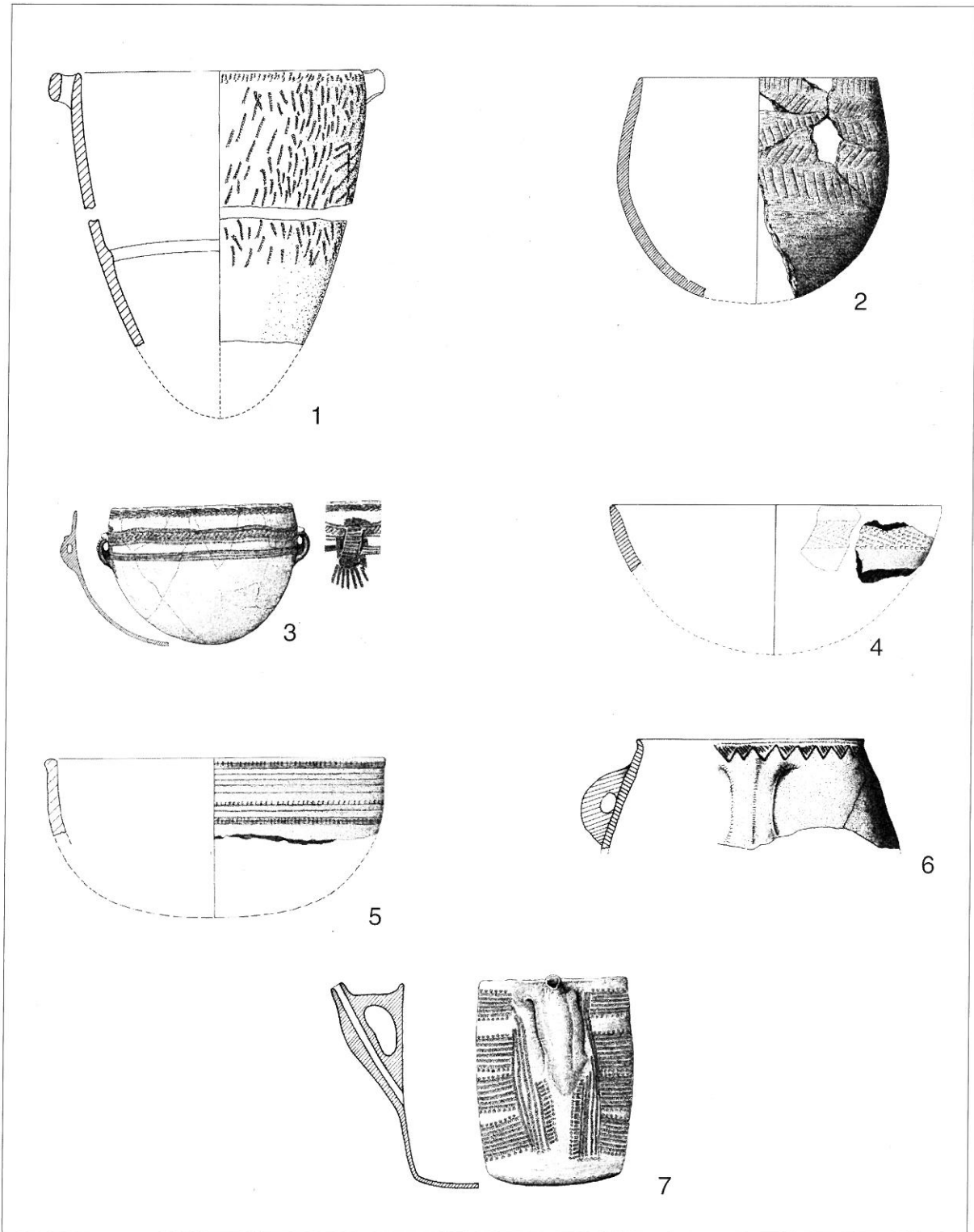


Figure 4. The Old Style (1,2) and the Horizontal Bands Style (3-6) from Granada (2) and Or-Cendres group (all the others). Cardial (1,3,7); Gradine (4); Incised (2,5,6).

similarities to those of the Cardial phase of the Neolithic Complex (fig. 10).

This situation is completely different back the farming border, where early pottery is similar to what has often been called Pericardial (Guilaine, 1986): smooth ceramic productions, or with few decorations and which can hardly be related to those of the Impresso-Cardial Complex or to those of the Geometric Complex in the farming border.

The available dates for this moment are rare. The existing ones are summarized in table 4, distinguishing those places with cardial-gradine pottery from those without it. The higher concentration of sites with cardial-gradine decorations is between 5900-5500 cal. BC (table 4); the Pericardial (except the older dates of Mendiandia: ca. 6150-5900 cal. BC), show a starting point between ca. 5500-5400 cal. BC. The older part of these datings conflict not only with the earliest ones of the Impresso-Cardial complex, but also with those found for the recent phases of the Pre-ceramic Geometric. These is the effect of the "taphonomic filter" described upper.

One of the effects of this phenomenon was the anomalous character of some radiocarbon dates, and the only way to avoid it should be to date known events such as: bone, charcoal or seeds from known species where there is no doubt about its relationship with the described context. This is not the case of the sites we are discussing. In fact, from all the dates on table 4, only those of El Pontet c.inf., Mendandia II & I, Atxoste IIIb and Aizpea III could be accepted without problems. The same is true for the old dates from Fosca cave, at the Late Ceramic phase (table 5).

Consequently, although i think there are some evidences (*vide* final discussion) to maintain the proposed interpretation of the group 3, Its chronology, however, doesn't go further than ca. 5500 cal. BC.

As ceramics became a part of the material production of these groups, decorative patterns tended to be different. Actually, epicardial decorative designs are documented, without distinction, in the same levels where the cardial one also exists (Bernabeu, 1999). If the few available datings are considered, the first Epicardial levels of the Geometric Complex might appear some time not very far from ca. 5400-5300 cal. BC (as in Olvena or Les Bruixes; both made on wood; table 5), although they would develop in the following phase.

Phase 3. Late Ceramic. After ca. 5200 cal. BC (datings are inconclusive), domestic resources are already fully established within the groups in the Geometric Complex. Geometric tool-kit patterns in this moment are still based on double beveled lunates, and ceramics still have an Epicardial style decoration. The datings of different sites suggest that this situation will continue until near 4000 cal. BC (table 5; Clearly the old dates of Fosca).

While the name Epicardial has been used to describe the ornamental styles that followed the cardial ones, in fact they

show very outstanding differences. Thus, the Epicardial style associated with the geometric context is clearly different from those non-cardial styles of the Impresso-Cardial Complex. Their only common trait is that decorations are made through incision and impression techniques which differ from the cardial and gradine ones. Further information, which permits to evaluate these aspects, is provided by the analysis of motifs and styles.

Indeed, what we could call Epicardial style consists of a decoration system with horizontal bands, whose basic elements are a series of points which are isolated or framing other motifs such as horizontal parallels, wide zigzags o meandiforms. (fig. 11).

This decorative pattern is different of the one documented in any of the phases of the Impressed-Cardial ware complex, where horizontal bands are frequently limited with alternated motives breaking the horizontality of the design.

From the limited perspective from which it has been defined above, I may agree that the Epicardial is the characteristic style of the Geometric Complex (Van Willingen, 1999; Mestres, 1991).

#### 4.3. DECORATIONS, STYLES AND TECHNOLOGICAL TRADITIONS

In short, some conclusions concerning the variability of styles and pottery decorative techniques can be drawn from previous considerations.

1. There is an obvious uniformity in all the groups of the Impresso-Cardial Complex during the Early Cardial phase. Judging by the literature about this theme, however, this uniformity is clearer in the groups of Llobregat, Or-Cendres and Granada, and it seems to blur towards the North (France) and Portugal. Most of the identified styles are already present now.

The ceramics found during the Early Ceramic of the Geometric Complex fit in with these styles well. May be as a filter effect, the Álava-Navarra group show a development of a style of its own, which we have called Pericardial here, and whose temporal situation cannot be easily specified.

2. After ca. 5300 cal. BC on, became a diversification process, which permits to distinguish two groups within the Impresso-Cardial Complex:

- First, the groups of Llobregat and Or-Cendres, which are defined by a presence of brushed ceramics and, later, of curved ones (Linear Style).
- Second, the groups of Granada and Córdoba, which are defined by the presence of "Almagra" style ceramics.

3. Finally, the Lower Aragón group, including the Olvena cave, represents the advanced ceramic phases of the Geometric Complex. The pottery of these groups is made on

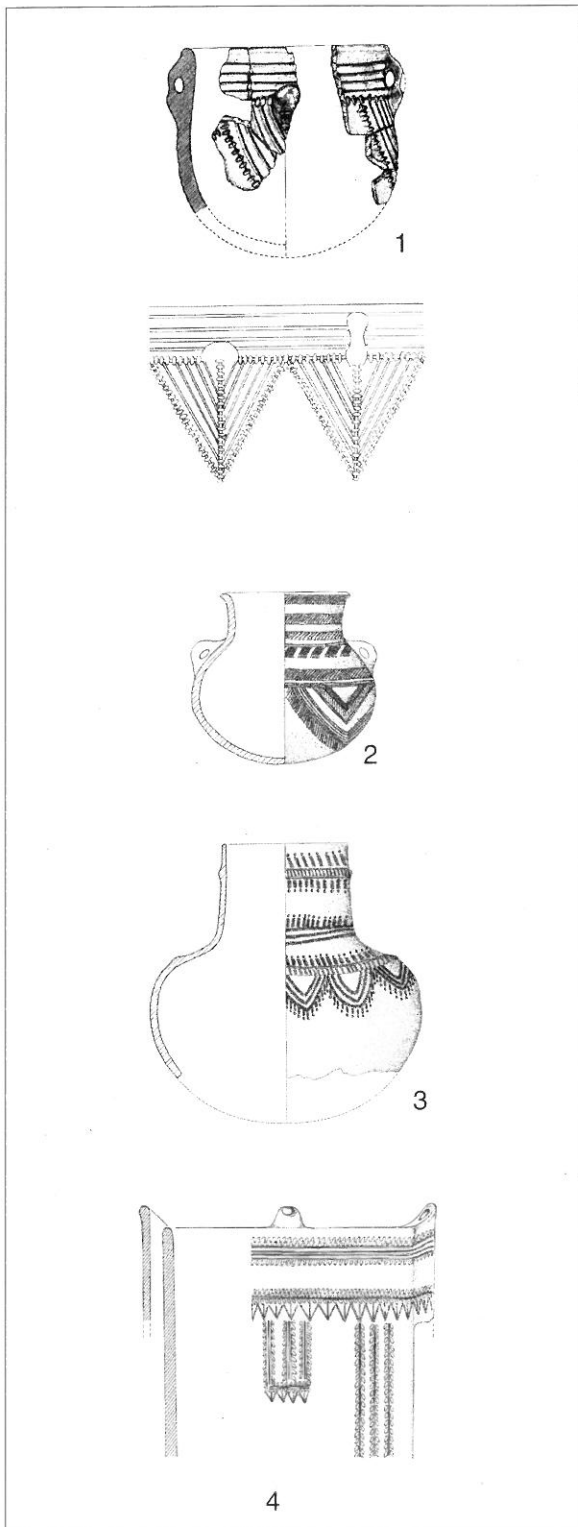


Figure 5. The Geometric Style from Or-Cendres (2-4) and Córdoba Group (1). Cardial (3); Gradine (2); Incised and Impressed (1, 4).

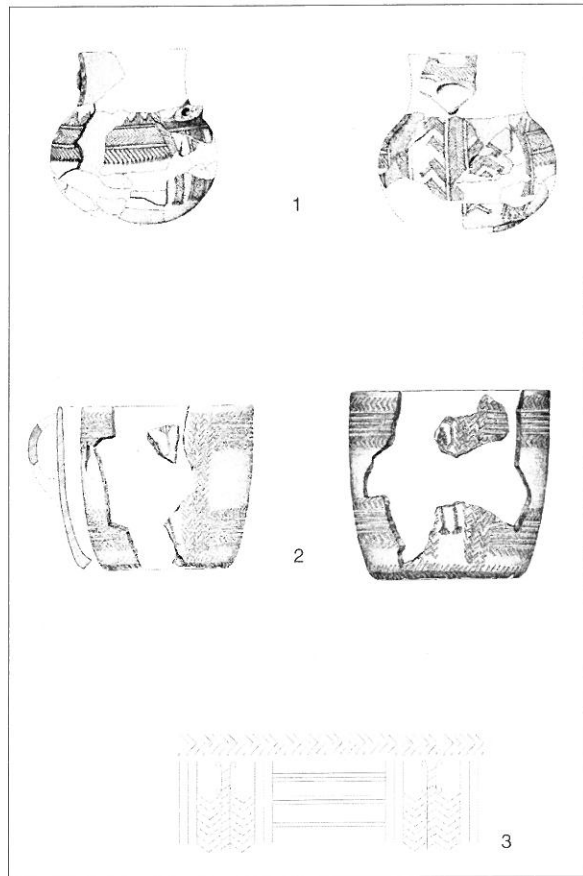


Figure 6. The Single Anthropomorphic Style from Or-Cendres (1,2) and Granada Group (3). Cardial (1-3).

the Epicardial Style as defined above, which does not happen in the Álava-Navarra group. Their chronology seems to extend, at least, from ca. 5300 to 4200 cal. BC covering the phases 2 to 4 of the Impreso-Cardial Complex.

A wider regional variety might result from a more detailed analysis, permitting to distinguish more local groups; yet, even with the existin documentary limitations, it is not as obvious as it might seem. Apparently at least, we can see that some motifs cross the above identified groups, while others suggest a more limited distribution. In short, it could easily happen that the final situation could document different overlapping spatial distributions.

In this respect, we should remember that, even if we assume that variations in material culture may reflect social groups, it is far from evident what should be understood as such. We often tend to understand "social group" in a strictly societal sense, i.e., as a rather discrete variable. In fact, however, societies might also be made up of multiple in-



tersecting and overlapping networks (Man, 1986, ch. 1). Maybe for this reason, the regularities observed in different studies (Hegmon, 1998) show a correlation with social status in some cases, sometimes with linguistic entities, and with highly defined local groups in other cases. Thus, they seem to suggest certain cosmogonies which tend to be shared within wide areas.

This latter development is probably related to the stylistic variety that Wiessner (1990: 107-108), following Sackett, identifies as iconologic. It is not clear to what extent pottery decoration in general can or cannot be related to this description. Nevertheless, it is interesting to observe how symbolic pottery varieties behave.

Symbolic styles widely cross the identified groups within the Impresso-Cardial Complex, and probably all their chronological phases. In fact, some of the symbolic ceramics identified in the Millares area (Martín & Camalich, 1982), as soon as in the Coper Age, may be rooted within Neolithic (particularly in plastic vases). Their composition and conception have allowed to identify clear similarities in post-Paleolithic rock art, particularly in those styles known as macro-schematic and schematic. From this perspective, we are facing an iconologic style, which, rather than defining social groups, must be related to other symbolic conceptions within the Neolithic world. That is why they are not found in the Geometric Complex. Interestingly, it will also be in these regions where we will find the greatest concentrations of another highly interesting phenomenon: the Levantine rock art.

#### 4.4. POTTERY DESIGNS AND ROCK ART

The post-Paleolithic rock art in Mediterranean Spain has been divided into three major styles: Macro-schematic, Schematic and Levantine. Differences between the first two are ambiguous, and probably based upon chronology. Both of them are centered on human figures and other abstract motifs; both of them exhibit a high degree of conceptualization and/or schematism, and they are rarely scenic (narrative). On the other hand, Levantine style is more naturalistic, and combines both human and animal representations, showing a clear scenic and narrative intention.

This description, of course, simplifies the variability of the recognized rock art styles. This variability itself reduces the possibilities of an analysis based on a distribution of painted shelters to any of the three identified styles; boundaries among them often become very blurred, mainly between macro-schematic and schematic styles. Drawing on these considerations, the available information emphasizes some points:

1. There are some Neolithic ceramic parallels in all the styles, although they are much more abundant for schemat-

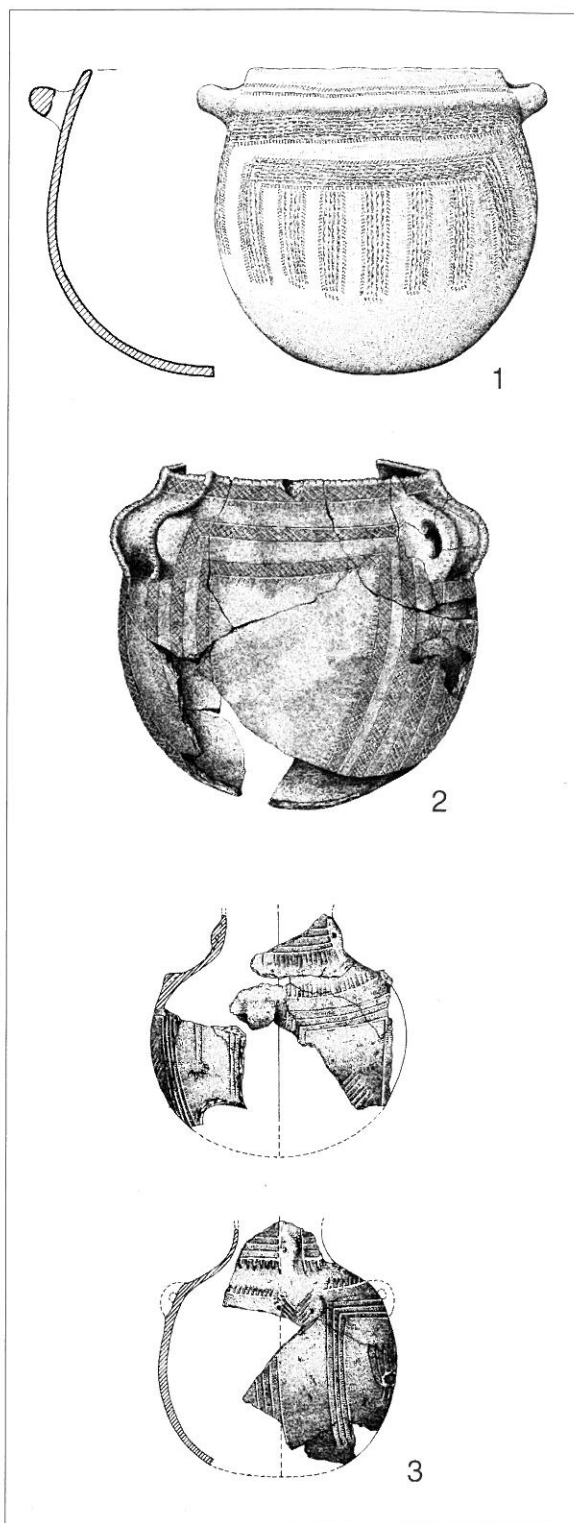


Figure 7. The Metopic Style from Or-Cendres (1) and Granada (2-3) groups. Cardial (1); incised and impressed (2,3).

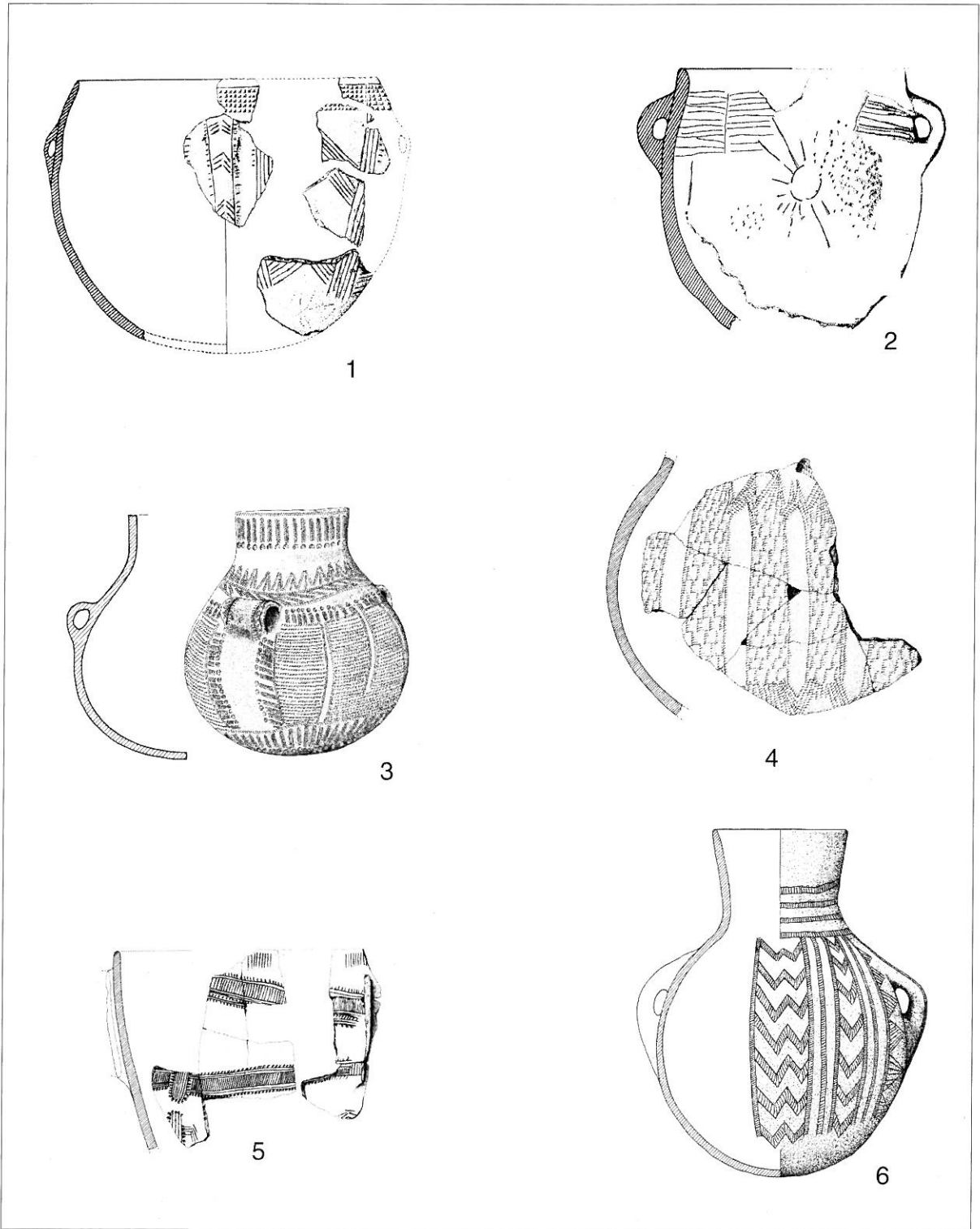


Figure 8. The Scenic Style from Córdoba (1,2) and Or-Cendres (3-5) Groups. The vase number 6 comes from the El Niño Cave (Albacete), located between Granada and Or-Cendres groups. Cardial (3,4); Gradine and impressed (5); incised (1,2,6).

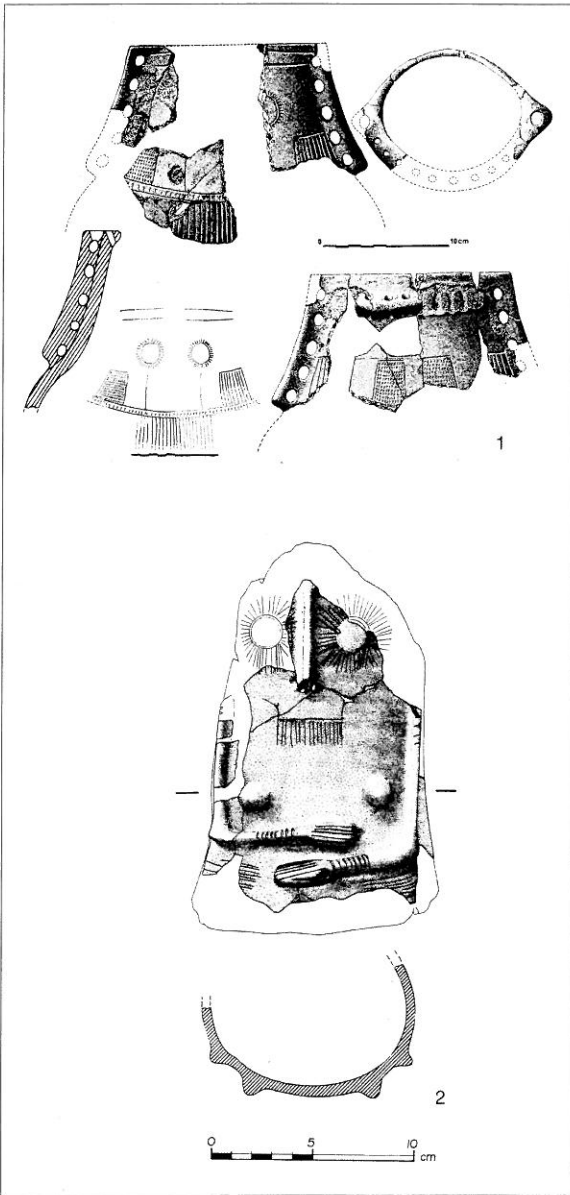


Figure 9. The Plastic Vases from Llobregat (2) and Córdoba (1) Groups. Incised (1); Curved (2).

ic and macro-schematic styles than for the Levantine style (Martí & Hernández, 1988). In fact, there is only one parallel for the Levantine style: two fragments with gradine decoration from the Or cave, which were found in a level that could belong to phase 2. According to them, the Levantine style would be slightly after some schematic motifs, and parallel or previous to other ones.

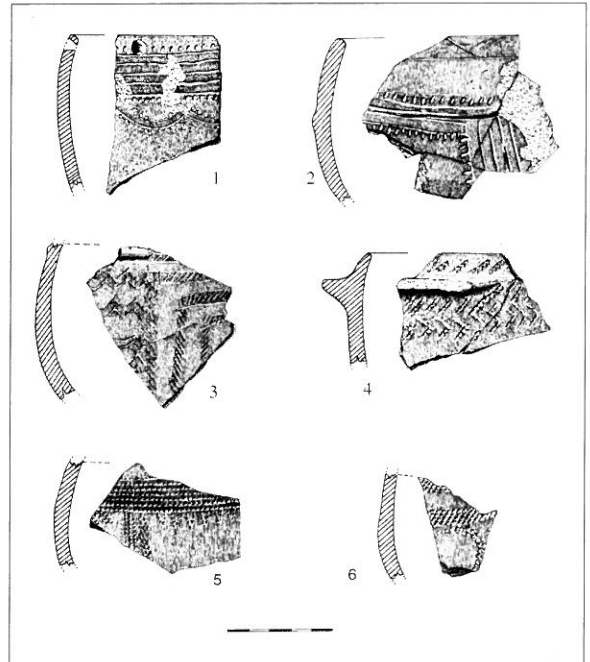


Figure 10. Cardial (4), gradine (3,5,6) and impressed-incised (1,2) pottery from Costalena Cave. Early Ceramic Phase. Geometric Complex.

2. These same ceramic parallels suggest evolution. The motifs in figure 14 appear from the beginning. Most probably, they are anthropomorphic, more or less schematic representations. Even the soliforms (fig. 12:13) are often part of human representations, as the above mentioned plastic vases suggest. Some of them seem to be limited to the oldest phases, particularly those where a human figure can be more easily identified; while others, including the ramiforms or dendriforms (fig. 12:8) and the soliform ones, have a clear subsequent continuity. Some time during this process, the schematic zoomorphic motifs are added, which, together with the oculated (similar to soliform motifs), appear in the symbolic pottery of the Coper Age culture of Los Millares (Martín & Camalich, 1982, fig. 4).

3. This is also suggested by chromatic superimposition. The Levantine representations seem to be both above and below the schematic representations, depending on the motifs.

4. The spatial variability of rock art styles as they are defined is not dichotomic. The Levantine style, however, shows a higher spatial correlation with the Mesolithic territory in the farming border. In fact, the most important concentration of Levantine shelters runs along the Mesolithic Complex of the Spanish Mediterranean showed in figure 2. No expressions similar to the Levantine style are known in the Álava-

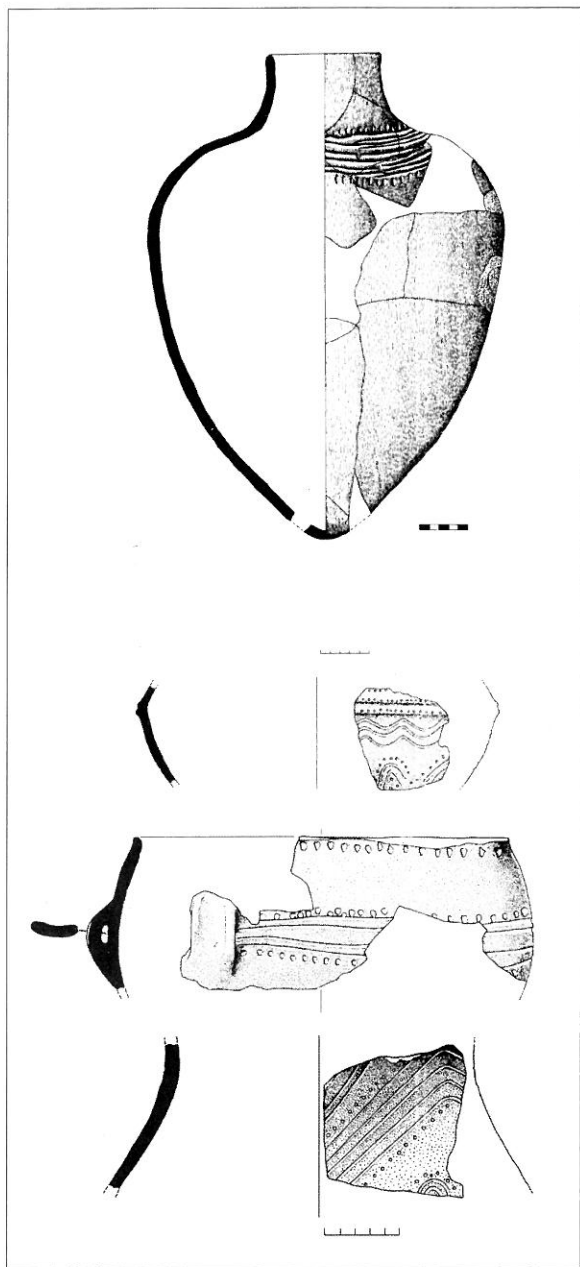


Figure 11. Epicardial Style from different sites. Geometric Complex. Late Ceramic Phase.

Navarra group, which seems to be a further effect of the filter hypothesis (vide supra).

5. There is another previous artistic expression, which is associated with the final phase of the Mesolithic Geometric: the geometric-linear art. It has only been found on small fully engraved slabs, forming more or less complex line bun-

dles. These expressions have no clear cave parallels. There are neither datings for the levels where these slabs were found, except for that found in Forcas II, level 4:  $7090 \pm 340$ bp (table 4), whose high indecisiveness does not exactly help establish its chronology. Consequently, there is not an apparent continuity for this artistic expression.

What does all this mean? I believe that some interesting conclusions may be drawn.

Differences between macro-schematic and schematic cave styles must be reconsidered. Both styles seem to be part of the same trend, and a great part of their differences must be understood as a consequence of a temporal evolution (we must take into account that it lasts more than 3 millennia) and the intergroupal differentiation patterns.

Both ceramic and cave representations of this style are not naturalistic, and they focus on human figure and are rarely narrative, with hardly any interest in movement. Such style belongs to the Impresso-Cardial Complex and is rooted in the Neolithic expansion. In fact, most of its findings come from its territory.

The Levantine style might have happened later, as other authors have noted (Martí & Hernández, 1988; Martí, 1999). Its relationship with the territory of the Geometric Complex suggests that it is a typical style in this world, its development coinciding with the Epicardial pottery style. Both phenomena (Levantine Art and Epicardial pottery) would, thus, result from the same process of change which develops among the Geometric Complex groups, and it could be explained in the same way: after a starting phase, where some patterns deriving from the Neolithic symbolism (Schematic styles in rock art; cardial pottery) are found, another phase follows, where an original style develops. In ceramics, a lack of cardial and gradine techniques would illustrate this break, and in rock art, it would be illustrated by a systematic superimposition of Levantine styles and the oldest schematic ones whenever they are found together in the same shelter (fig. 13).

I suggest that in both cases pottery and rock art the original symbolism which is associated with the Mesolithic world in its ceramic phases is, in a sense, a response to the threat of assimilation or marginalization. This response, in turn, is a way of resisting economic change and limiting transformations to the ideological domain. The result, however, will be just the opposite: it will facilitate the necessary social transformations to, eventually, cause a full Neolithization of the Mesolithic groups.

As I have put forward, there is a territorial and identity component in the origins of these symbolic expressions: they define both local groups and regional wider networks where information flows, mainly through an institutionalization of some kind of ceremonial exchange.

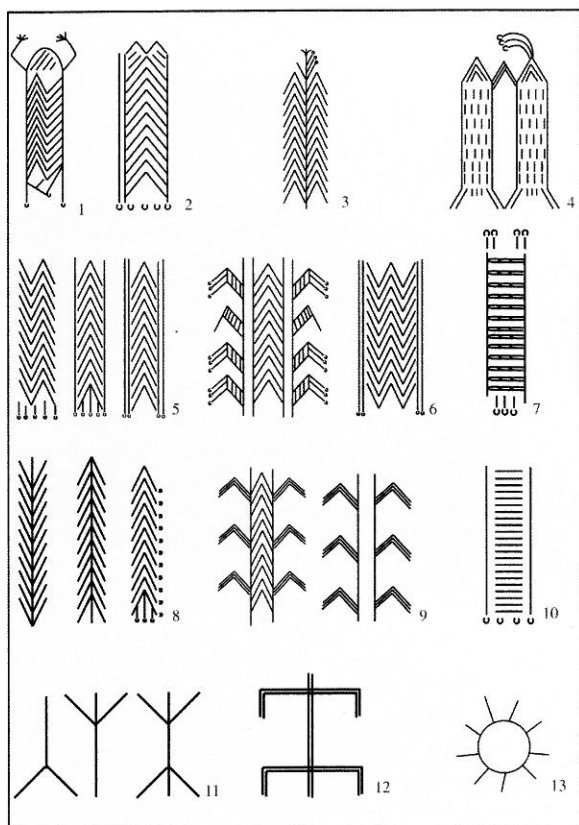


Figure 12. Pottery designs from the Impresso-Cardial Complex. Probably, most of them can be viewed as more or less schematic representations of the human figure.

## 5. DISCUSSION

In this paper, I suggest a lecture of the archaeological record belonging to the Neolithization that implicitly assumes some arguments that are not without risk. Some of them are theoretical, while others are empirical. They should be explained.

The model is obviously based on a previous assumption that certain components of material culture can be read as ethnic differentiators (broadly speaking, as different kinds of social groups). The great amount of literature about this topic (Conkey & Hastorf, 1990; Stark, 1998; Carr & Neizel, 1995) cannot be reviewed here. This assumption, however, must be clarified.

If anything can be concluded from research it is that there is not a clear correlation between Material Culture and Social Group. In a recent work, Hegmon (1998) agrees with Gosselain (1998) that certain variations of material culture can certainly be associated with social groups (i.e. they can be used as social markers in archaeological terms).

It is not clear, however, what circumstances or to what variables of material culture it affects. This question, furthermore, probably needs a previous theoretical discussion about the notion of social group (see discussion in section 4.1, in this paper).

Leaving this aspect aside, my argument is that the Neolithization context in the Iberian peninsula caused just the kind of historical situation which permits to read the variations of material culture in ethnic terms (in this case, the notion of "ethnic" is stricter, if the migrationist hypothesis is considered): the Neolithization of the Geometric Complex can only be understood if it eventually could bypass the disruptive tendency caused by the contact.

From an empirical perspective, the interpretation offered by the dual model depends on that attributed to the Groups 3 and 4 of PCA.

As the reader will remember, this group is a fully Neolithic one in subsistence terms, which showed a differentiated geometric component: lunates with hellwan retouch. Spatial patterning of Pottery Styles and Rock Art seems to show a good correlation with that of the Group 4.

Given that its territorial pattern is limited to those regions where pre-ceramic phases and the Early Ceramic phase of the Geometric Complex were recorded previously, we may think that group 4 actually is the final outcome of the Neolithization process of the Geometric Complex.

If this interpretation proved to be wrong, the dual hypothesis would have to be modified.

There is an alternative interpretation, equally possible, for this set of data. Historical context being similar to the one described at the beginning of the paper but with a different development: integration of Mesolithic groups into Neolithic social networks.

In this case, the differentiation in ceramic decorative patterns and lithics could then be understood as a result of a differentiation in local groups, which occurred after the initial cardial phases (see Martí and Juan Cavanilles these volume).

Diverse elements can be used to evaluate both hypothesis:

a. One will consist in eliminating the representativity problem affecting clustered layers in G3 (Pottery Mesolithic), from the PCA. Accordingly with our model, these layers represent the continuity from the pre-pottery phases into the whole Neolithization of this Geometric Complex, shown by G4. As I have remarked, layers included in this group could be affected by post-depositional processes challenging its real historical representativity. If so, why we should suppose that they are representing a Pottery Geometric and not a mix of pre-pottery (and pre-Neolithic) elements with other pottery and Neolithic elements coming from upper levels. I believe that there is a logic reason to sustain this interpretation.



Figure 13. Partial representation of the rock shelter of Chimiachas, showing the superimposition of Levantine-naturalistic motifs on human-schematic. Compare these latter motif with those of fig. 12 (6,9) and fig. 6(1).

If we suppose a co-habitation period more or less long (around 500 years in Portugal, Zilhão's view) it would be difficult to admit that there was no contact between them, or in case those contacts occurred they don't leave any material evidence in archaeological contexts, like pottery in "Mesolithic" contexts.

The known existence of problems in this kind of contexts (Bernabeu et al., 1999, 2001) remind us to be careful when using them, implementing taphonomic analysis in order to discriminate between archaeological fictitious contexts and the ones that should be maintained like pertaining to real (pre)historical processes.

But, even agreeing that group 3, taking into consideration these difficulties, would be a genuine example of Neolithic-Mesolithic interaction, the problem will persist in probing the relationship between group 4 (resulting of the Neolithization of geometric Mesolithic groups) and group 3.

Following that should be noted that all known assemblages ascribed to this group are new settled sites. Consequently, we still lack a clear relation of continuity between both.

b) to document clearly the continuity between the last pre-pottery times and the whole Neolithization of the geometric complex represented by the group 4. This continuity could be reflected accurately mainly in open air sites, the new where a change in organization and exploitation of the landscape had a less important incidence as consequence of the introduction of domestic animals. It is more unlikely its documentation based upon cave or rockshelters records more likely related to seasonal activities and, just for that, more sensitive to any minor modification of this kind.

c) Spatial variability of pottery styles, specially of symbolic ones. Consequently an in depth program aimed to clarify variability and territorial patterns of ceramic styles, following the lines defended in this paper, in this way the dual hypothesis will be better supported.

Finally, if in areas where the Impressed-cardium ware is documented in the V millennium cal. BC lithic assemblages close to the one described in the group 4 will be found, then the dual hypothesis should be revised.

The recent publication about Chaves (Cava, 2000) where helwan retouched segments are dominant among geometric lithics from recent Cardium-Impressed levels, when taken literally seems to contradict the Dual model predictions. Those data could be interpreted in two ways:

- Group 4 assemblages, those dominated by helwan retouched segments, as in Chaves, would be consequence of a secondary expansion from cardial original focus and the assimilation of the Mesolithic. The neolithization process will reflect the social networks of the Neolithic expanding groups. This is the option supported by Juan-Cavanilles and Martí in this volume.

- On the other hand, we can also suppose that the Neolithization of the Geometric Complex was consequence of a certain infiltration process, specifically, of individual or family movements using social networks already in place at the boundaries (kinship, marriage, or exchange networks). Following Zvelebil (2000:63), this scenario could produce a Neolithization process reflecting the previous Mesolithic social networks.

This situation is similar to the one described by Zilhão (1997:38): very small neolithic groups are assimilated by Mesolithic ones, starting in this way the neolithization among the latter. Being the case, the final image will be identical to the one described in the Dual Model.

Eventually, if the scenario is one or another will depend on ecological conditions and demographic factors affecting Mesolithic groups: that is, the possibility and interest of expanding agricultural systems and, the possibility of facing that by the mesolithics.

Both the left margining Ebro valley and Mediterranean inland around the Iberian sierras, are the Spanish regions where a higher number of Late Mesolithic (c. 6800-6400) sites occurred (*vide* Juan-Cavanilles and Martí this volume, map 3). Consequently, to think in a process like the one described being developed in the area, will not be a non-sense. Clearly, we need the support of new data, in the sense described earlier in these paper, to decide between both scenarios.

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