

The chalcolithic fortified site of Leceia (Oeiras, Portugal)

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ABSTRACT

At the main Chalcolithic settlements of Estremadura, the agricultural potential enhanced through successive improvement of production technologies created an economic surplus that needed to be defended. This situation originated the construction of complex defensive systems in the Estremadura and in other regions of the country, during the third millennium BC particularly well preserved at Leceia, Vila Nova de São Pedro and Zambujal.

KEY-WORDS

Chalcolithic, agriculture, fortification, Leceia, Portugal.

RÉSUMÉ

Le développement agricole et des technologies de production observées pendant le 3ème millénaire a. C. dans les principaux sites fortifiés de l'Estremadura portugaise, ont conduit à un surplus économique qui nécessitait d'être défendu. Ce contexte socio-économique a été à l'origine des puissantes fortifications rencontrées à l'Estremadura et particulièrement bien préservées à Leceia, Vila Nova de São Pedro et Zambujal.

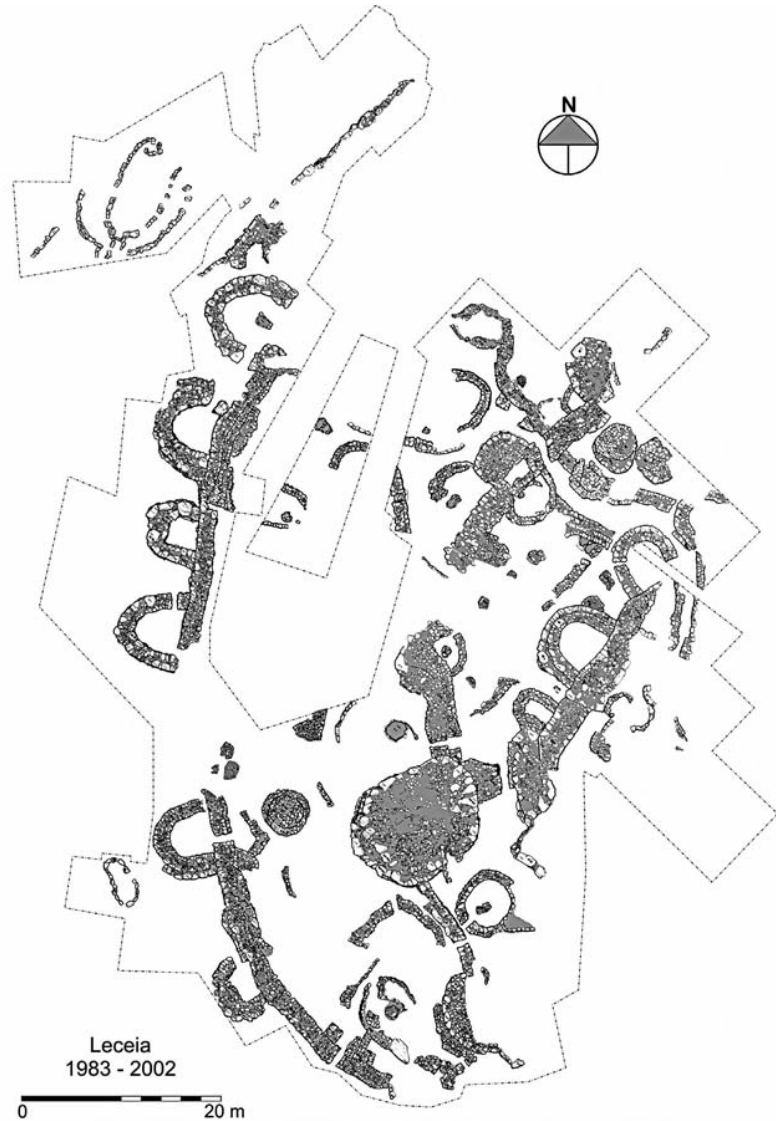
MOTS-CLES

Chalcolithique, agriculture, fortification, Leceia, Portugal.

1. INTRODUCTION

Twenty annual seasons of excavations conducted at the prehistoric settlement of Leceia between 1983 and 2002, have produced a large assemblage of stratified materials, as well as numerous field observations (fig. 1). In fact, the record obtained there shows an evolution, over more than one thousand years, of a dynamic and complex society, exploring in increasingly more exhaustive ways the available natural resources.

Figura 1. Leceia (1983-2002),
General simplified plan of the
excavated area.



On the other hand, there exists a relationship between the architectural complexity and the existence of semi-specialized intramural areas, of production and storage. Leceia constituted, in this way, the centre of a stable and sedentary population grouping, linked together with other settlements, of smaller size with whom it was united.

What is the explanatory model for the genesis and evolution of this society, between the middle of the 4th and the end of the 3rd. millennium BC? It appears, above all, to have been characterized by a social process influenced by exogenous contributions, conditioned by economic conditions and available natural resources, whose interaction (Parreira, 1990, p. 29) resulted in a society with marked specificities, precociously evolved, articulated with other human groups, in a transregional perspective.

Based on the available data, it is usual to consider, for the Chalcolithic of the Estremadura, three principal cultural phases. Such phases can be found stratified at Leceia in a paradigmatic form, corresponding clearly to archaeological levels with different characteristics and contents. Among these stand out the ceramics, of which some types can be understood as true chronological and cultural markers (fig. 2), as in other settlements of the same cultural area. We will now take a look at the principal characteristics of these three cultural phases.

2. THE LATE NEOLITHIC

Throughout the second half of the 4th millennium BC, there occurred, in the Estremadura, the progressive occupation of high altitude sites, with good natural conditions for defence (Cardoso, 2004a). At Leceia, at that time, a vast open-air settlement was established, on top of the rocky outcrops that exist there, and in the space in between them. The nine radiocarbon dates obtained situate this occupation in this period (Cardoso, Soares, 1996). Making use of the program CALIB, graphics have been produced showing the cumulative probability of the group of dates obtained and calculating diverse intervals of confidence. Thus, for a probability of 50%, the chronology obtained for the occupation of the Late Neolithic corresponds to the interval 3350-3040 cal BC and, for a probability of 95%, to 3510-2900 cal BC.

There have not yet been identified until now, in any of these settlements, defensive structures of that period; the selection of these sites, which were naturally defended, suggest, however, the existence of potential situations of conflict, which have not been detected archaeologically up to now. What goods could these have been, that made these communities seek refuge in the heights of the region? Certainly the results of the accumulation of surplus agricultural production, increased by the improvement of technologies of production, specifically the introduction of the animal traction, as is suggested by the *bucrania* in the rock art sanctuary at Escoural (Gomes *et alii*, 1983). This evidence is also supported by the abundance of domestic cattle remains recovered in the level of the Late Neolithic at Leceia.. One perceives, thus, in the existence of goods, probably for the first time produced in surplus, one of the reasons for the instability and social tension created between groups, so well documented at Leceia, as in the two others main fortified sites of the first half of the 3rd. millennium BC in the region of Estremadura: Zambujal and Vila Nova de S. Pedro (fig. 3).

Figura 2. Ceramics from each of the cultural phases represented at Leceia. Below, from the Late Neolithic; in centre from the Early Chalcolithic; above, to the right, from the Full Chalcolithic; and, to the left, from the Bell-Beaker phase (Full and Late Chalcolithic).

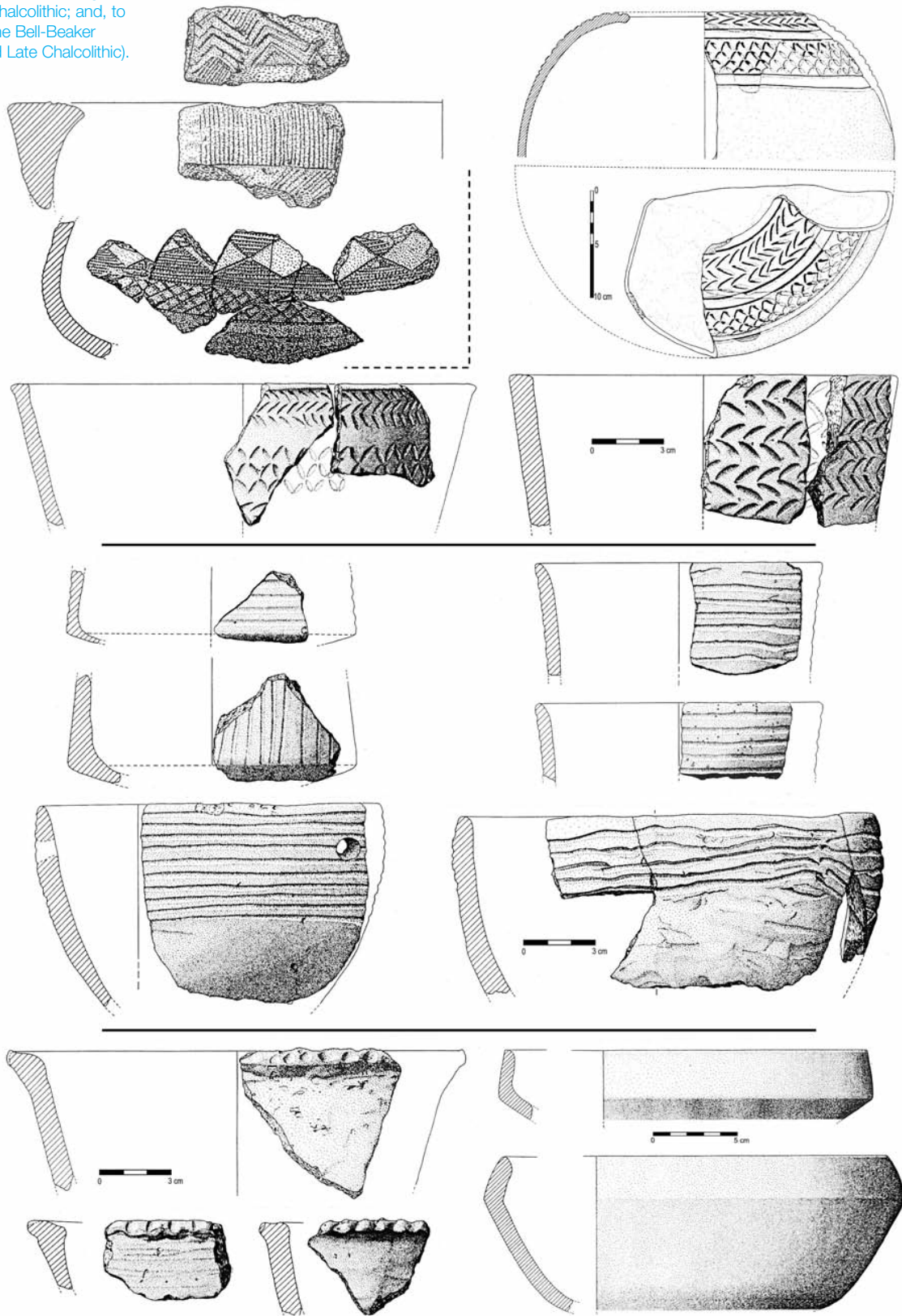




Figura 3. Location of the three most important fortified chalcolithic settlements of the Portuguese Estremadura: Vila Nova de São Pedro, Zambujal and Leceia.

“Walls do not only reflect the economy. They reflect the economy and society. They were constructed to protect someone and something (...). This being the case, the definition of this something is fundamental. This is how we know what type of society we are faced with. And the economic context is that which allows this” (Gonçalves, 1991, p. 405). These pertinent observations are what we seek to provide in this contribution.

3. THE EARLY CHALCOLITHIC

At Leceia, after a period of abandonment, which might have lasted between 30 and 150 years, but probably several decades (Cardoso, Soares, 1996), there occurred in the beginning of the Early Chalcolithic, situated around 2900/2800 cal BC, the construction of an imposing fortification, built on the geological substrate, as well as on the level corresponding to the occupation of the Late Neolithic (Cardoso, 1989; *id.*, 1994; *id.*, 2000a). Such a defensive disposition

respected a plan previously defined and methodically brought to practice. The discordance which one can observe between this occupation and the Neolithic settlement, at the level of the material culture, does not necessarily mean, however, the arrival of new foreign peoples to the region. On the contrary, one can perceive in this fortification the logical consequence of a period of instability generated in the Late Neolithic and the preference for sites naturally defended, as is now verified.

As was seen for the Late Neolithic, the Early Chalcolithic can also be dated with high precision. The nine available radiocarbon dates permit the construction of a graph of cumulative probability (based on the CALIB program) and, from this, the calculation of diverse intervals of confidence. In this way, for a probability of 50%, the duration of the Early Chalcolithic can be situated between 2770 and 2550 cal BC and, for a probability of 95% between 2870 and 2400 cal BC (Cardoso, Soares, 1996). It is appropriate to remember, however, that the interval of 50% represents the *floruit* of the assemblage (see a discussion of this concept in Soares, Cabral, 1993, p. 220). In this way, one can affirm that the Early Chalcolithic would have had a shorter duration than the Late Neolithic, corresponding to the interval of 2900/2800-2600/2500 cal BC. The first fortification at Leceia, built immediately after the beginning of the Early Chalcolithic, would extend to around 2800 cal BC, or perhaps some decades earlier.

Leceia illustrates the more evident characteristics of the settlement of the Estremadura region, in addition to Vila Nova de São Pedro (Azambuja) (fig. 4), where hundreds of flint arrowheads have been recovered in veritable caches, perhaps constituting ballistic arsenals, in the *stratum* Vila Nova 1 (Paço, 1964, p. 145), and to Zambujal (Torres Vedras), where a significant number of these points have been found incomplete, near the most exterior wall of the fortification (fig. 5) (oral information of M. Kunst). The two dominant aspects for determining the location of such fortified sites are i) large fortified proto-urban centres, whose location was determined by a conjunction of natural conditions for defence, in conjunction with agricultural valleys of high fertility, dominating the main natural routes to the adjacent region; ii) geomorphologic conditions, providing visibility and defense, and high agricultural potentials of the soils.

The agricultural activities in fields or circumscribed plots, well-suited to the cultivation of wheat and barley, known at Vila Nova de S. Pedro (Paço, 1954), were determinative in the economy and the subsistence base of these populations. In Leceia, the artefacts recovered document the importance of agricultural activities: axes, frequently exhausted, with the edge worn from use, and destined for tree-cutting: adzes; numerous elements of manual mills of siliceous sandstone, obtained at a distance of 5-10 km away; and

Figura 5. Zambujal. Enclosure of the internal defensive system (above) and general plan of the fortified settlement. After J. L. Cardoso and E. Sangmeister & H. Schubart, respectively.

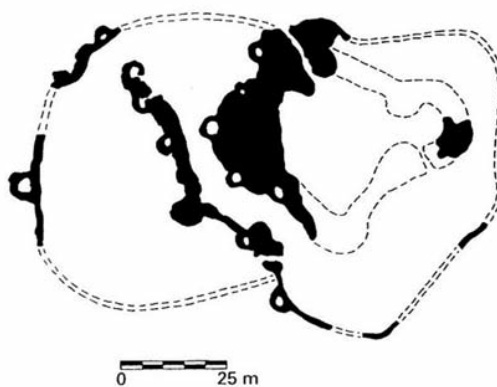


Lámina 1. Leceia. Flint bifacial leaves, used as sickle blades. Early and Late Chalcolithic. After J. L. Cardoso.



At Leceia, the practice of agriculture is also suggested by the existence of three large stone slabs (lám. 2) of a circular plan, considered to be the base of threshing floors (Cardoso, 1989, fig. 73 and 74. Cardoso, 1994, fig. 15). There are unique examples, in the Chalcolithic of Portugal, which give testimony to the vigour of the agricultural economy at Leceia, completed by a small hut, situated intramural and specialized in producing flour, as can be concluded by the abundance of grinding stones that were found within it (Cardoso, 2004a, fig. 106).

This system of production was complemented by the herding of sheep, goats, and cattle, from which most of the protein was acquired, as well as by the raising of domestic pig, which betrays the marl sedentarization of these communities and the full manipulation of all the domestic species (Cardoso, Detry, 2001/2002) which then, as now, are so importantly a part of our diet.



Lámina 2. Leceia. Structure of circular plan (paved), attributed to a threshing floor. Early Chalcolithic. After J. L. Cardoso.

The hunting of deer and boar documents the existence of forests punctuated by open spaces, occupied by natural pasture, favourable for the movement of aurochs and wild horses, also present in the faunal inventory. The gathering of molluscs and fish, on the neighbouring coast, at that time more easily accessible owing to the earlier Flandrian transgression and the non-silting of the openings of the waterways, find similar documentation in the majority of the settlements of the region, completing the subsistence base of these populations. The presence of various copper fishhooks (lám. 3), in addition to numerous remains of ciprinids (catfish and snapper) demonstrates the practice of coastal fishing (Antunes, Cardoso, 1995).

There is evidence for a community methodically and exhaustively exploring the available resources in the diverse adjacent biota, from the estuary and the oceanic coast, to the forests or prairies which extended into the interior of the territory, along the Barcarena valley.

Lámina 3. Leceia. Fish hooks in copper, an example of a specialized metallurgic output. Full Chalcolithic. After J. L. Cardoso.



The successive phases of construction, reinforcement and addition of the structures, observed at Leceia throughout the Early Chalcolithic, as at Zambujal and at Vila Nova de S. Pedro, respected, as did the initial construction, a global plan and planned readjustments; they reveal, as well, the maintenance and, perhaps, the worsening of social instability throughout the Early Chalcolithic, a period of around 300 years, during the 1st. half of the 3rd Millennium. The imposing quality of these constructions reveals a complex society in formation, clearly established in a defined territory, whose openness to exogenous stimuli would have encouraged and favoured the arrivals of outsiders and the establishment of circuits of exchange of goods. The most expressive evidence of this reality is the occurrence of amphibolitic rocks in the Chalcolithic settlements of the Estremadura, where this type of rock is unknown. It illustrates, even more clearly than copper does (as we will see in the next chapter), the transregional trade of a raw material considered at that time to be strategic. At Leceia, amphibolitic rocks constituted about 70% of the total of hard rocks used (Cardoso, 2004b) and the intensification of the importation of this raw material, from the Late Neolithic to the Full Chalcolithic emphasizes the power of acquisition of the successive inhabitants of the site. One is impressed by the generalisation of the importation of this rock, in the form of true lithic blanks, coming from the Ossa-Morena Zone, more than 120 km away, presupposing the existence of stable routes of commerce and of the circulation of products, permanent and enduring. These rocks could only be obtained through exchange of surplus products, which could be agricultural (grain, dried fruits) or geological (silex), or both. In fact, the possibility has already been noted (Cardoso, 1997b) that amphibolite rocks were exchanged for silex, which was quarried close to Leceia (lám. 4) (Cardoso, Costa, 1992), during the chalcolithic times: in fact, after the publication of this article, some nuclei, similar to those from Barotas, were found in the excavations carried out in Leceia. It is one of the most interesting examples, considering the distances involved, for the specialized supply of a raw material in European prehistory.



Lámina 4. Leceia. Cores and bladelets of grey flint, explored locally. Final Neolithic/Late Chalcolithic. After J. L. Cardoso.

The presence of imported goods, included prestige items, like ivory, from the North Africa (Schuhmacher, Cardoso, 2007) can be interpreted as an evidence of the growing intra-community social differentiation, also accompanied by inter-community competition, as suggests the reinforcements observed in the defensive structures such as entrances and bastions. This explanation is also supported by the existence of diverse residential structures of differing construction quality and size, depending on the greater or lesser privilege that they had in the intramural area, eventually proportional to the social ranking that its respective inhabitants attained. Such is the case of a large hut of circular plan (lám. 5) situated in the best defended area, while all the others, of smaller size and poorer quality construction were situated in zones that were more exposed to eventual enemy attacks.



Lámina 5. Leceia. Large house of a circular plan, with an interior hearth. Early Chalcolithic. After J. L. Cardoso.

On the other hand, in the construction of this notable fortification –whose area approximates that of Vila Nova de S Pedro (ca. 1,5 ha) but smaller than that of Zambujal (more than 2,5 ha, if we consider the third defensive wall)– one finds implied the existence of subsistence surpluses making possible the support of productive activities of the most active segment of the population, for a determinate period of time.

At last, there is evidence not only for the division of labour, but also the actual hierarchization of their function. The Early Chalcolithic corresponds unquestionably, in the Estremadura region, to a period of economic growth, and by the development the social complexity.

4. THE FULL AND THE LATE CHALCOLITHIC

The following cultural phase –the Late Chalcolithic of the Estremadura– whose beginning can be situated ca. 2600/2500 cal BC –in general can be well– documented in the settlements occupied or founded in the earlier cultural phase.

Eighteen available radiocarbon dates for Leceia for this period, together with the dates for the other cultural phases there represented, make this settlement the best characterized, in terms of chronological-cultural evolution, of all those known in the Portuguese territory (Cardoso, Soares, 1996). A greater precision is, at the moment, impossible, given that the available calibration curve is weak and has many oscillations. The *terminus* of this cultural phase can, in the same way, be situated at around 2200 cal BC.

Leceia produced, in this phase, in restricted areas of the inhabited space (as the presence of slag and drops of melted metal show), a variable copper industry, with an emphasis on small artefacts, such as awls, chisels, and punches. The preference shown for these kinds of artefacts can be explained by the scarceness of the metal at that time: copper would have been a better material than stone for the specific functions that they were used for. The large copper axes –no complete example of which has been found at Leceia– would have corresponded more to goods of prestige, or simple ingots, without practical function.

It is clear that pure copper, of which they were made, could not compete, in terms of durability and resistance, with any amphibolite axe, which was much less costly to obtain. Copper can be seen, in this way, only as an extension of the diversification of productions. The copper metallurgy, taking into account the improvement of the efficiency in instruments of production or of transformation, contributed to the diversity and specialization of consumer goods (Cardoso, 1999). In this context, we do not believe one should value its action too much as an agent of economic or social change. What is really important in the emergence of the copper metallurgy is their existence itself, as a significant indicator of the increase of social differentiation observed inside of each community, taking into account that the metallurgy was a domestic, specialized activity. On the other hand, this activity reveals the growing, of the economic surplus during the

Chalcolithic, having into account that in the most important sites of the Estremadura, metallurgic activities are documented, in spite the scarcity of copper in this region, contrasting with the situation observed during the Early Chalcolithic.

The late generalisation of copper artefacts in the Estremadura –also observed at Vila Nova de S. Pedro (Savory, 1970)– accompanies, simply, that of other technological novelties, typical of the SPR, in the 3rd millennium BC, such as weaving (the loom weights are almost unknown from the Early Chalcolithic) or the transformation of milk (the sieves for cheese and butter production are absent in that cultural phase). For this proposition it is interesting to observe, in spite of all the reservations for the methods of excavations that were not rigorous at the time, and the archaeometric analyses that were equally undeveloped, that A. do Paço (1964, p. 146) had also mentioned, in reference to Vila Nova de S. Pedro, that “The economic conditions that underwent a change with the arrival of the copper metallurgists, present now more indications with the industries of weaving, of the manufacture of dairy products...”.

Already in the 1950s, there the progression of the constructors of the *tholoi* –identified with populations of prospectors and copper metallurgists– with the diffusion of the use of this metal, from Andalusia, to the Estremadura, passing through the Alentejo (Ferreira, Viana, 1956). The dates of the Chalcolithic settlements of the Southwest Group appear to confirm this proposition (Soares, Cabral, 1993).

The results of the analyses systematically carried out by XRF on all of the approximately 130 artefacts recovered until now at Leceia, one of the largest prehistoric assemblages of metal objects in Iberia with homogeneous chronological-cultural characteristics coming from just one site –as well as the 45 pieces submitted for analysis using FNAA– allow for the following general conclusions (Cardoso, Guerra, 1997/1998).

- Arsenic varies between 0,5 and around 5% (FNAA analysis). The continuity of the distribution of these elements provides evidence for the accidental character of its presence, subordinate to the composition of the minerals used and not as a consequence of any intentional addition; this conclusion confirms, entirely, an earlier opinion (Ferreira, 1961; *id.*, 1970).

- The superficial secondary enrichment of arsenic, as well as iron, can be shown comparing the results of FNAA, respective to the non-altered interior of the pieces and of XRF, respective to its surface.

Recently, the work carried out in Leceia based on trace-elements found in the composition of the copper artefacts, suggests that the quartz veins associated with diffuse mineralizations of native copper of the Ossa-Morena Zone were the main source of metal used (Müller, Cardoso, in press), in spite of the iron outcrops of the pyrite belt of the

South-Portuguese Zone, as it was before generally admitted. In this context, the occurrence of diverse ingots of copper at Leceia, as well as in other chalcolithic settlements of the Estremadura, like Outeiro de S. Mamede, Bombarral (Cardoso, Carreira, 2003) and Outeiro Redondo, Sesimbra (Cardoso, 2004a, fig. 59) becomes important and illustrates the trade of copper from the area of exploration to the settlements, where they were transformed into a variety of artefacts, employing especially the technique of hammering.

If one demonstrates the mutual influence of a transregional character between the Chalcolithic cultural areas of the Baixo Alentejo and the Estremadura, subject to a pioneering study (Silva *et alii*, 1995), there can be found, equally, such a phenomenon between geographic areas even more distant. We are referring to the omnipresent Chalcolithic female divinity of Mediterranean origin; the presence in the Estremadura, under several representations, of the “Mother Goddess”, some of them with evident oriental characters, suggests the arrival of an exogenous population along the third millennium BC from the East of the Mediterranean, an evidence also from some recent results obtained in ivory objects from Los Millares (Almería), that are made of asiatic elephant tusks (Schuhmacher, Cardoso, 2007).

It is also in this reality of long-distance trade that the yet-to-be confirmed recent discovery of Chalcolithic Anatolian ceramics (of the Early Bronze Age II, ca. 2600-2200 BC) in Andaluzia, in “a context characteristic of the Southeast Copper Age –of the Millares– El Malagón types, associated with Beaker ceramics” can be interpreted (González Prats *et alii*, 1995).

The general environment of Mediterranean character, prevalent throughout the Chalcolithic of the Estremadura –reinforced by its geographic position– had favoured in diverse regions of the Mediterranean basin identical internal evolutions and phenomena of convergence. Furthermore, the valorisation of the commercial component in the diffusion of the architectonic tradition, of metallurgy, and of prestige goods was previously argued by R. Parreira (1990, p. 29).

To feed a population of 200 to 300 people, a number which we consider to be adequate for the observed reality at Leceia, in the apogee of the site, it would not be necessary an area of resource exploitation greater than that which could be attained in two hours walk. As it is not possible to invoke the threat embodied by another settlement of similar size, in the vicinity, the construction of Leceia owed more to reasons of a preventive order, as a land-mark, which could be seen by everyone. The simple presence of a fortification of this size, constituting a clear sign in the landscape, and the power and rights of their habitants over the involved territory, serving at the same time as an element of dissuasion (or intimidation, cf. Sangmeister, Schubart, 1972, p. 197) for any foreign group, independent of their size or composition. In fact, over the approximately 300 years of the effective functioning of the fortification (2900/2800-2600/2500 cal BC), this

would have occurred: in a structure reutilised for the accumulation of domestic wastes, of the Late Chalcolithic, there have been recovered remains from three individuals unburied, adults and all male, which makes one believe they were part of an attacking horde decimated by the defenders of the settlement (Cardoso *et alii*, 1991; Cardoso, 1994a).

We believe, therefore, that Leceia is a clear example of how, in the Baixa Estremadura, during the Chalcolithic, it is possible to correlate the traditional concepts of “fortification”, “cultural interaction” and “economic intensification” (*cf.* for the last two, Jorge, 1994, p. 473 and 475). To us, this interdependence is unquestionable: although there might have been interaction and intensification with fortification, the inverse we do not consider being possible, for the time and region in question.

Thus, the genesis of the fortified chalcolithic settlements of the Baixa Estremadura, as with those of the Beira Alta and Trás-os-Montes and Alto Douro, resulted in the internal evolution of an agro-pastoral system inherited from the Late Neolithic: the exploration of each territory, progressively more organized and efficient, reinforced by the improvement of new technologies of production, led to the occupation and effective demarcation of the best lands around the settlements, with resulting forms of tension increasingly more intense. The mediterranean *stimuli* would have been determinant in the introduction of the copper metallurgy, in a phase of consolidation of the agro-pastoral system, whose progression to regions increasingly more western, beginning in Andalusia appear to be proven by the available absolute dates.

However, despite the evident success of the economy of the Full Chalcolithic community established at Leceia, it is during this cultural phase that one observes the decline of its defensive character, evidencing perhaps the emergence of a new type of social organization, which lasted until the Late Bronze Age. According to this model, the fortifications, along the second half of the third millennium BC no longer constituted central nodes for the occupation of territories (Cardoso, 1997a), although some of the most important might have continued to be inhabited sites, until the Late Bronze Age, as was the case at Zambujal and Vila Nova de S. Pedro.

What is the meaning of this fact? Does the generalized tension which occurred throughout the third millennium BC in this same region –and so well-documented at Leceia by the numerous reinforcements of walls and bastions– had a gradual end? Briefly, the internal social evolution of these communities, characterized by intense competition by the control of the best territories, led to situations of generalized conflict, such as the case related at Leceia. As was already pointed out (Cardoso, 1998), this model of society contains itself their collapse, in the absence of a dominant politic power. The geomorphologic and ecologic characteristics of Estremadura territory, had no possibilities to support a society based on large settlements, like those of the South-East of Iberian Peninsula and

the Algarve region, as Alcalar (Gonçalves, 2000/2001), to which was pointed out an organisation similar to a pristine state (Morán & Parreira, 2004). But this evolution also failed, in the Southeast, along the 3rd. Millennium.

The new socio-economic order that was, at that time, progressively implanted, at least in the Baixa Estremadura, was expressed, in the end of Full Chalcolithic, by the almost universal abandonment of the old fortified settlements and by the multiplication of small nuclei in open settings, without natural conditions of defence, where Bell-Beaker ceramics predominate. However, the coexistence, proved by the stratigraphy of Beaker ceramics with vessels of the Late Chalcolithic of Estremadura (“acacia-leaf” patterns), as at Zambujal, Torres Vedras (Kunst, 1987, 1996); of Rotura, Setúbal (Silva, 1971; Gonçalves, 1971), Penha Verde, Sintra (Zbyszewski, Ferreira, 1958); and Moita da Ladra, Vila Franca de Xira (Cardoso, Caninas, in press), has expression in the radiocarbon dates which demonstrate the coexistence of two ceramic traditions, in the rare sites where they are found isolated, as at Leceia, before the middle of the 3rd. Millenium.

Thus, it is possible to admit the hypothesis that we are confronting two populations with distinct cultural roots (Cardoso, 2002; *id.*, 2004c), which reopens the question, already much discussed, of the Beaker diffusion.

Whatever the case, the apparent disarticulation of the Chalcolithic social structure, accompanied by the full expression of the Beaker ceramics, in the Estremadura, after the middle of the 3rd. millennium, corresponds, in reality, to an increase in social hierarchy. In fact, the establishment of trade networks over large areas is proved by the standardization of artefacts of large diffusion, the artefacts of the Beaker “package”: vessels, Palmela points, daggers, wrist-guards, bone buttons and, for the first time, gold implements, as evidence of the reinforcement of the social process of differentiation, which would come to be fully expressed later, during the Bronze Age (Cardoso, 2001).

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