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Bell Beaker relationships along the Atlantic coast

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ABSTRACT Petrographical analysis and archaeological studies realised in southwestern Brittany indicates that most of the Bell Beakers found in this region were produced locally, while a small number of examples are characterised by volcanic rock inclusions and a decoration impressed with a small shell (*Donax Vittatus*). The same techniques of decoration have been observed in Portugal, that is why a programme

of analysis on some Portuguese Bell Beakers has commenced. The aim of this programme, which began last year, is to specify Bell Beaker circulation mechanisms and exchange routes along the Atlantic coast and, finally, relationships between littoral, where Bell Beakers are concentrated, and the hinterland. The first results come from the fortified site of Leceia (Oeiras), excavated by J. L. Cardoso.

1. Historical problem and method

1.1. *Bell Beakers in Europe*

The Bell Beaker phenomenon is defined by bell-shaped richly decorated vessels, sometimes associated in graves with copper daggers, flint arrowheads, stone wristguards and V-perforated bone buttons. This panoply, which appears in the second half of the third millennium BC, is dispersed in all over Europe: from the Atlantic coast to Hungary and from the British Isles to north Africa.

For over a century, archaeologists have imagined different origins and routes to explain the wide distribution of Bell Beakers (Harrison, 1974). With the New Archaeology, in the 1970's, emerged social explanations, in which "Bell Beaker panoply" is viewed like emblem of power (Clarke, 1976).

Context of discoveries (mainly in graves, megaliths in western Europe), the symbolic composition of the panoply (beaker-dagger-wristguard) and the disparities in the distribution of Bell Beakers all over Europe made, that is now considered as a supra-cultural and identity marker, but without resolving the problem of the wide ceramic distribution. Indeed, it is impossible to answer to this question only through stylistic analysis.

1.2. *Method*

Our method combines several kinds of analysis: a classical approach with typology, study of the "chaîne opératoire" concerning fabrication but also decoration, raw material analysis (mainly petrographical ones).

2. First case study: southwestern Brittany

2.1. Bell Beaker Context

We have already tested our method on southwestern Brittany (south Finistère), where 25 sites, mainly megalithic graves excavated at the end of the 19th century, provide around one hundred Bell Beakers.

Three distinctive groups of pottery could be identified on the basis of techno-typological and petrographical analysis (Querré and Salanova, 1995).

2.2. Analysis results

The first group is composed of cardium impressed Bell Beakers, with clay matrix and inclusions derived from weathering of basic rock including amphibolites. According to the geological context and shells used for the decoration, these beakers could be a local production.

Decorative techniques of the second group are different, being incised and stamped before firing. This style is usually found in southern France and the Iberian Peninsula. However, the mineralogy of the fabric (mica and clay from weathering of micaschist) is also compatible with local production.

In contrast with the both groups, Bell Beakers of the third group have been decorated with a small and fine shell (*Donax Vittatus*). The mineralogical inclusions correspond to volcanic rock with sanidine, which is not present in the local or upstream geology. These vessels must have been imported.

The basic question is: where does this group come from?

3. Second case study: Leceia (Oeiras, Portugal)

3.1. Why the Tagus estuary?

To answer to this question, we have chosen to extend our programme to Portugal, especially the Tagus estuary, for four main reasons.

Firstly, the Tagus estuary has the highest Bell Beaker density in Europe: between Santarém, Sintra and Setúbal about 2000 vessels were found (Salanova, 2000a).

Secondly, some exchanges of copper objects (Palmela points) exist about the same period along the Atlantic coast.

Thirdly, typological similarities between beakers from Brittany and from the Tagus estuary are well known. There are also similarities in decorative techniques.

Fourthly, there is geological compatibility between the Tagus estuary (presence of volcanic rocks) and the foreign vessels we have identified in Brittany.

Considering these convergences, we plan to study Bell Beakers from major Chalcolithic sites known in Tagus estuary region, including Leceia. Objectives are to characterise Portuguese Bell Beakers, determine the origin of vessels and finally to confirm or not the linkage between Brittany and Portugal.

3.2. Bell Beakers from Leceia

The first application of our programme, which started last year (2003), concerns one of the numerous fortified sites known for the Tagus estuary Chalcolithic: Leceia (Oeiras).

The site, excavated by J. L. Cardoso in the 1990's, comprises triple lines of defence with towers and two stone structures outside the fortifications (Cardoso, 1994, 2000). In these two stone structures, which were probably houses, produced only Bell Beakers vessels.

The Bell Beakers from Leceia correspond to the three styles already defined in Portugal: Classical (Maritime or Standard), Palmela style and Incised (Soares and Silva, 1977). Sherds discovered in the both structures belong to the Palmela style. On the contrary, those found inside the fortification, in the upper layers, belong mainly to the Maritime style.

The 10 samples analysed come from the fortification.

3.3. Analysis results

According to thin section analysis, we can distinguish three fabric groups.

Sherds from Group A (4 vessels) have an abundance of fine grain inclusions. Their granulometry is homogeneous and the rock or mineral fragments are mostly angular. Mineralogy is dominated by quartz, plagioclase and alkali feldspar that correspond to a composition from a granitic source (Fig. 1).

Group B (4 vessels) is characterised by inclusions with two grain sizes populations. Coarser particles include grog, an artificial temper and alkali feldspar (Fig. 2). Muscovite and biotite can be observed. Quartz is always present. Grains are mostly rounded.

The main characteristic of the Group C (2 vessels) is presence of hornblende in the fabric. This green amphibole is associated with potassium feldspar and quartz (Fig. 3). Granulometry is heterogeneous, but finer grain particles are dominant.

The three main groups of paste correspond also to specific style groups: sherds from Group A belong to Maritime and "Pontillé-Géométrique" styles, those from Group B to Maritime and incised styles and those from Group C to Maritime style.

Concerning geological context and consequently, nature of local raw materials, Leceia is situated west of Lisbon, in a locality dominated by calcareous formations. Carbonated inclusions never appear in the fabric of Bell Beakers of Leceia which we have analysed. However magmatic rocks including granitoid examples, outcrop at the vicin-

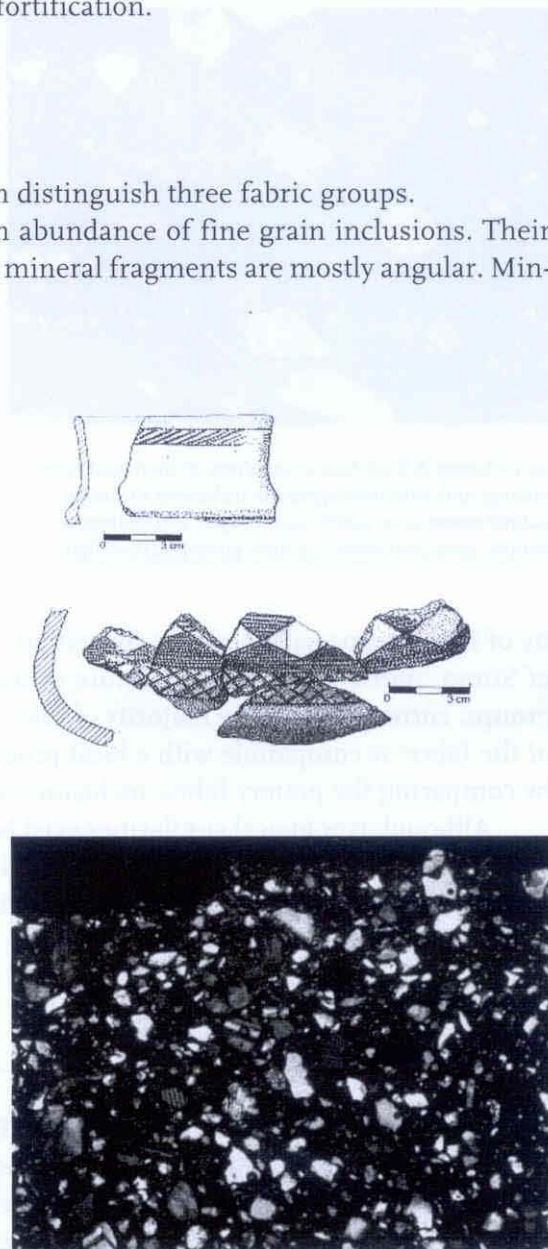


FIG. 1— Group A from Leceia: sherds and micrography showing fine grain inclusions with quartz, alkali feldspar and plagioclase (real width: 3,5 mm, crossed polars).

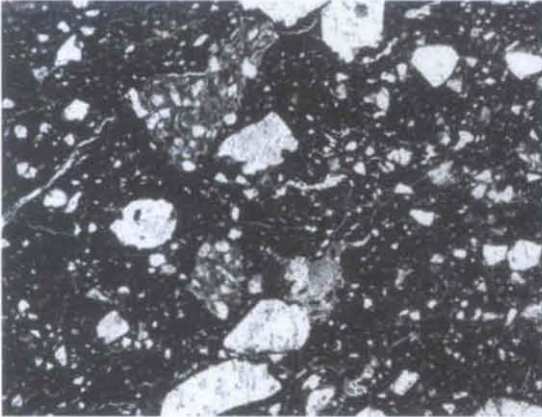
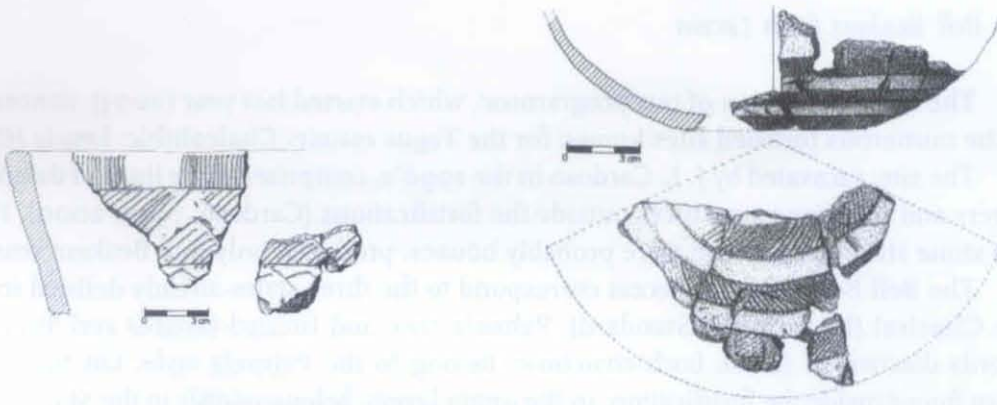


FIG. 2 – Group B from Leceia: examples of sherd and fabric micrography with heterogeneous inclusions including natural minerals as quartz and feldspar and additional temper, grog (real width: 3,5 mm, plane-polarised light).



FIG. 3 – Group C from Leceia: example of a sherd and corresponding micrography of the fabric showing inclusions of hornblende (in grey), quartz and alkali feldspar (real width: 3,5 mm, plane-polarised light).

ity of Leceia, especially plutonic formations and dykes which belong to granitoid complex of Sintra, north of Leceia. The nature of the inclusions, characteristic of the four pottery groups, corresponds to the majority of these rock types and consequently, the composition of the fabric is compatible with a local production. This hypotheses need to be confirmed by comparing the pottery fabric inclusions with potential local raw materials.

Although typological similarities exist between beakers from Brittany and from Leceia, particularly with Classical or Maritime style, none of them contain volcanic inclusions. There is no relationship between the imported group Bell Beakers find in Brittany and the analysed ceramics of Leceia.

4. Research perspectives

The first case study of the Portuguese Bell Beaker programme concerns only 10 samples from Leceia. All of them seem to be produced locally. However the ceramic production seems to be structured according to Bell Beaker styles and raw materials for Leceia. This hypothesis has to be tested by analysing an extending corpus from Leceia and vessels from other Portuguese settlements (analysis ongoing on Vila Nova de São Pedro, Monte do Tosco, Zambujal,...), by using mineralogical studies but also other analytical methods (chemical analysis for example).

We need to specify on one hand the Bell Beaker circulation mechanisms and exchange routes both inside Portugal and along the Atlantic coast, and on other hand relationships between the coast, where Bell Beakers are concentrated, and the hinterland.

In France, we know that these mechanisms are diversified: vessels exchanges (in some rare cases), technical or stylistic transfers, human contacts (Salanova, 2000b). It is difficult to explain the real similarities between Brittany and the Tagus estuary without human contact or ceramic exchange. Even if large scale ceramic exchanges are very rare during pre-history, it seems necessary to verify it through raw material analysis.

NOTES

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