# Nossa Senhora das Lapas: excavation of prehistoric cave burials in central Portugal

Luiz Oosterbeek
Escola Superior de Tecnologia de Tomar, Portugal.

## Introduction

The cave of Nossa Senhora das Lapas is a small diaclase in the Dogger limestones that define the left margin of the river Nabão, 10 km north of Tomar, in central Portugal. It's coordinates are: latitude 39° 39' 43" N. and longitude 8° 24' 439"W. Greenwich.

Excavation of the site began in 1988, as part of a research programme concerned with the late prehistory of North Ribatejo (Oosterbeek 1987), and it forms part of a necropolis of several burial caves (including Cadaval, Ossos, Morgado, Sobreirinho; Oosterbeek 1992a, 1992c). The aim of this excavation was to study the single evidence of a cave burial which was in use from c. 5000 B.C. to c. 3000 B.C.

In this paper three aspects will be focused on. Firstly, the method of excavation to which particular attention will be devoted, since many of the problems in the study of the Portuguese Neolithic derive from a lack of understanding of diagenesis of archaeological sites in karstic environments. Secondly, the stratigraphy and major finds of the site will be briefly described. Finally, an attempt will be made to assess the meaning of the assemblages identified at Senhora das Lapas within local, regional and inter-regional scales of observation.

## The importance of caves

The importance of caves to archaeology, and particularly to Iberian prehistory, has been appreciated since the last century (e.g., Delgado 1884; Appolinario 1896, 1897). In his famous synthesis of Iberian prehistory, Pedro Bosh-Gimpera (1932) identified a 'Culture of the Caves' on the basis of its decorated pottery, as one of the four major cultures of the Peninsula (Navarrete Enciso 1976). In Portugal some authors continue to argue that there is a specific Neolithic to be found in caves (Paço and Ferreira 1971; Ferreira 1982). Even if these views are now largely discounted, a simple scan of prehistoric assemblages would indicate the importance of caves throughout prehistory (e.g., Correia and Teixeira 1949; Tarradell 1964; Serrão 1967; Bernabò Brea 1970; Castro and Ferreira 1973; Asquerino-Fernandez 1978; López 1978; Gonçalves 1978; Zbyszewki 1979; Olaria i Puyoles 1986; Oosterbeek 1988; Jorge 1990).

In Portugal, where erosion is fairly high and sedimentation is slow, caves nevertheless form the main basis for relative stratigraphic chronology (Zbyszewki 1963). This necessitates adaptations in field work, and some knowledge of cave formation process (Renault 1970; Bouillon 1972), which have been systematically neglected by most cave archaeologists. The record of cave excavations shows an abnormal dominance of 'disturbed' layers, which instead are likely to be complex stratigraphies. Diaclases are formed by the evolution of cracks in the rock. Such caves have a very irregular pattern. They may be galleried, or may take the form of rock shelter. Sometimes the present entrance is through a well.

Cave deposits have different origins. Thermal fracturing is responsible for some of the deposits, and is dependent on the amount of water present in the rock, the rhythm and intensity of ice formation and the nature of the rock. Under very cold or glacial conditions, the thermic fractures produce big blocks that fall from the ceiling and walls, thus enlarging the shelter or entrance of the cave. Under warmer weather conditions, with only seasonal or daily ice, the products of fracturing are smaller and, mixed with external sediments, become a sandy-clayish deposit that tends to absorb moisture, thus

favouring secondary thermic fracturing of all the previously formed blocks. Under a more temperate climate the thermic fracturing ceases, and chemical changes become important, which reinforce the ability of the deposit to absorb moisture. If the weather becomes colder again, the main factor influencing new thermal fractures will be the humidity level of the deposit, and not the hardness of the rock. In cold and unstable climates, fine sediments can be deposited by solifluction. In warmer climates, deposits can enter the cave in various ways: from the entrance to the inside (mainly the finer sediments), from the overlying land surface to the inside through existing vertical cracks, or from adjoining karstic formations.

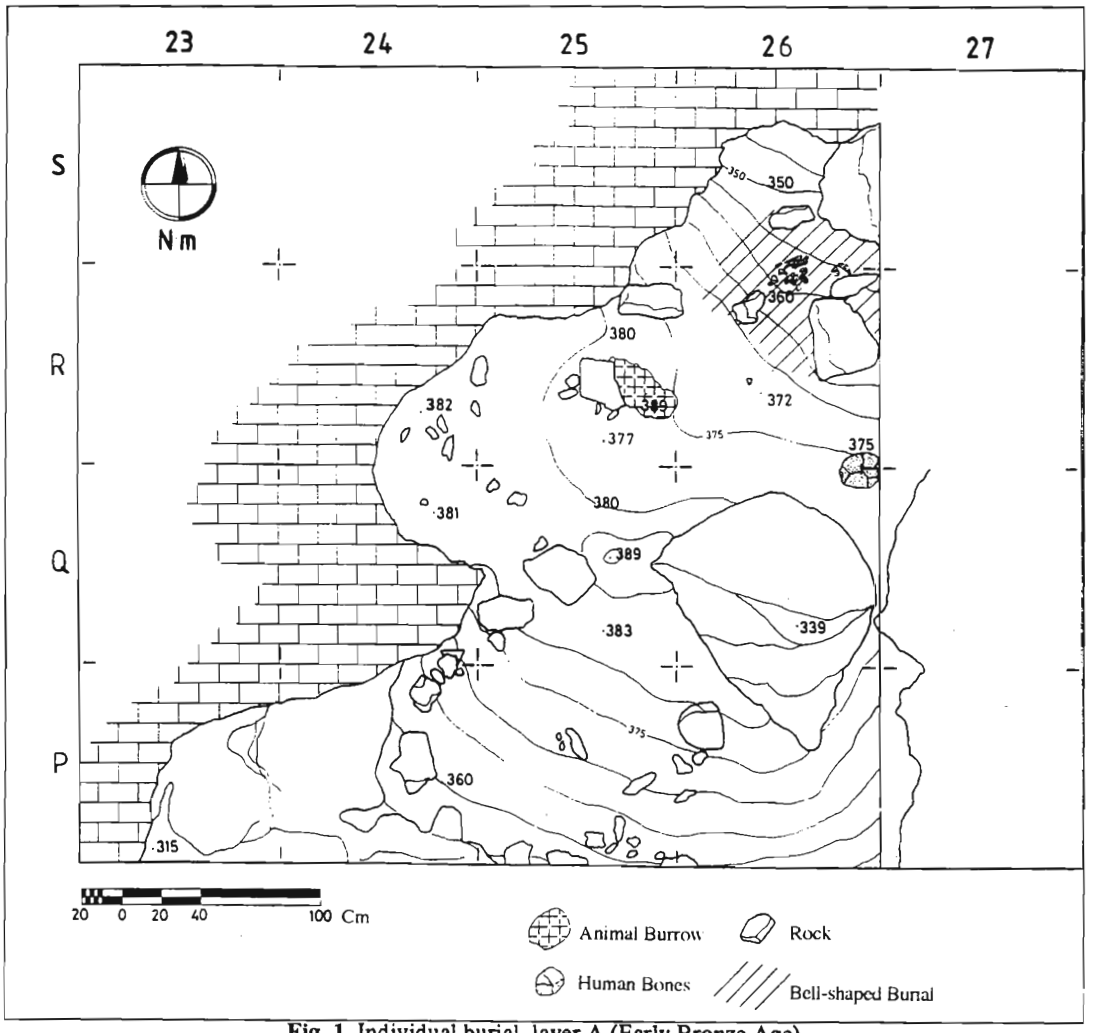


**Fig. 1** Individual burial, layer A (Early Bronze Age)

Biotic agents, including roots and other vegetative elements, and animals also contribute to cave deposits. Among these, human activity is a very important agent of both physical and chemical change for the sedimentation and erosion processes, and has become the most important agent in the caves of the Nabão valley, such as Nossa Senhora das Lapas.

Once a cave deposit exists, it will undergo changes. Thermic secondary fractures are an almost continual process. Solifluction also acts as a physical agent of change. This, and more frequently the

action of water, can totally remove a deposit, thus leaving a stratigraphic gap.

Chemical changes may have an effect on cave deposits, relate to temperature and humidity. Under cold conditions the solution of carbonic gas in water is the main source of these. Under warmer conditions, the organic elements, including those relating to human activity, favour the solution of carbonates, thus increasing the acidity. The accurate recording of these indicators of the formation of cave deposits may be of considerable importance towards their final interpretation.

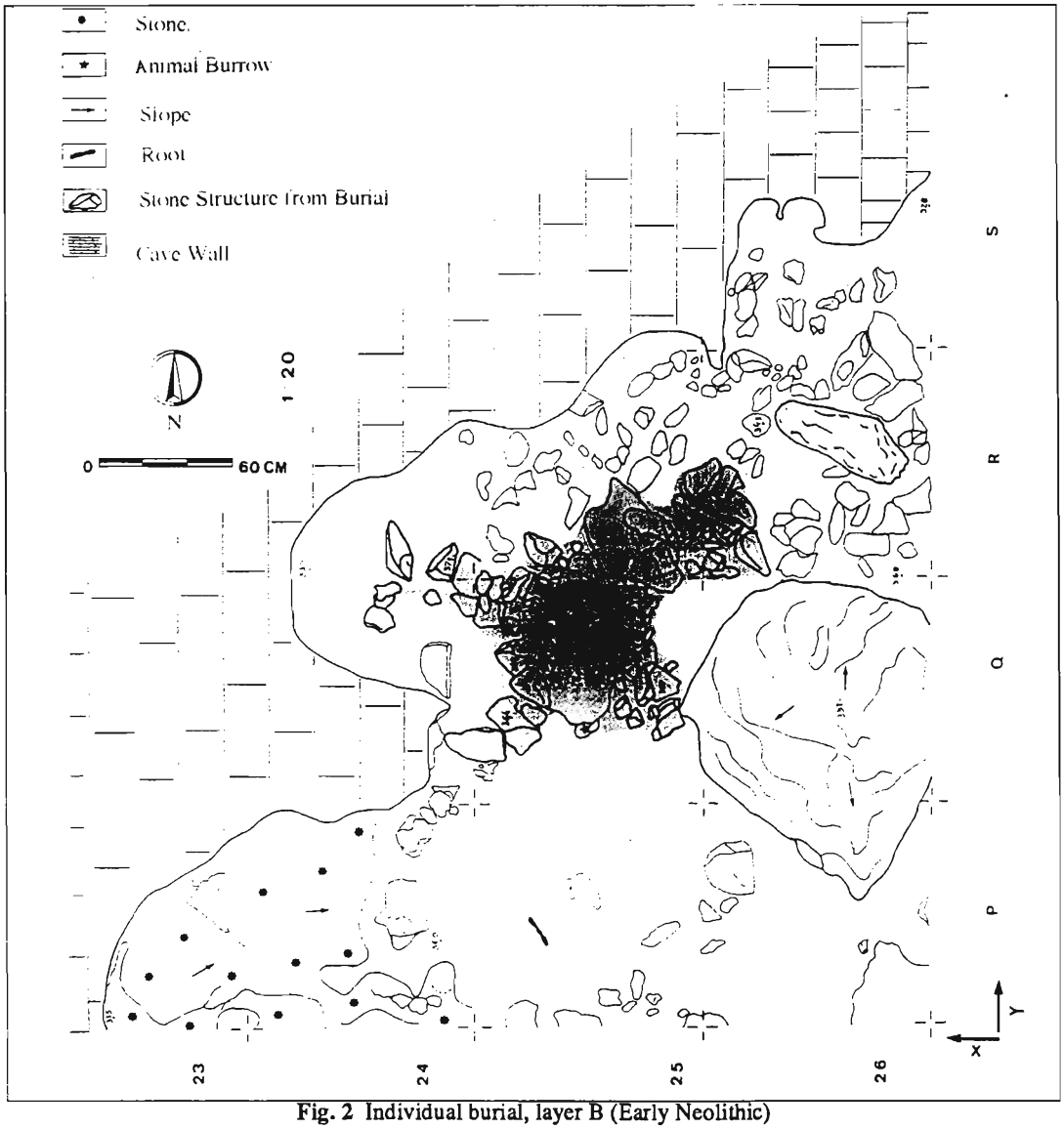


Fig. 2 Individual burial, layer B (Early Neolithic)

For example, whereas the presence of stone slabs of thermic origin indicates a daily or seasonal ice, lithochemical formations indicate the presence of warmer conditions. The importance of these for cave excavations have been acknowledged by several authors (such as Bonifay 1952, 1955, 1956, 1969; Lumley 1965; Miskowski 1966; Laville 1969, 1973).

## Method of cave excavation

There are no substantial differences in the formal way of setting up a cave excavation from those on any other site. Throughout the research project 1 square metre grids were used, with their orientation depending on the shape and size of the cave. Survey excavations were undertaken to provide an indication of the stratigraphy

Unlike those at open air sites, cave deposits are closely delimited in area, but are subject to many horizontal discontinuities. An exhaustive understanding of a deposit is often essential, since physical and chemical changes can produce their effects in a very limited area, with strong implications for the archaeological record. For example at Tomar, in Cadaval cave, water washed away part of the late Pleistocene deposits. The Holocene deposits were, therefore, deposited in a somewhat irregular well. At the base of the horizontal stratigraphy, a trench 4 m long hence included 1 m of the latest Palaeolithic deposit, 1 m of big stones that had fallen from the ceiling due to thermic fracture in the early Holocene, 1 m of early Holocene deposit and 1 m of earlier Palaeolithic deposit (Oosterbeek 1985a).

Apart from such genetic changes, other agents can lead to dificulties in interpretation. Animals can break and scatter artifacts horizontally and vertically. Humans can build structures, such as burials, digging into previous occupied layers. Differences in texture of the deposits can favour the migration of a significant percentage of finds.

Particular attention must therefore be given to the recording of data. Geology forms the basis for interpretation, even more so in cave excavations than in other types of sites, since most of the occupied layers in caves do not have a clear stratigraphic sequence. The use of artificial levels of 5 cm depth, even in apparently very disturbed deposits, has produced satisfactory results.

During excavation, details of the matrix sediments must be recorded. Apart from the usual colour, texture, structure and nature of the materials included in the deposit, three additional items have been recorded in the field: grain size, evidence of thermic activity, and evidence of chemical changes.

To determine grain size, a square was sampled, within which the diameter of all limestone fragments bigger then 1 cm were measured. These were grouped in classes, providing an initial indication of thermic intensity, reinforced by the identification of other evidence for thermic fracturing, such as stone slabs with sharp edges, secondary thermic fracture of stones, and secondary thermic cracks.

Concerning chemical changes, the rate of corrosion was determined by examining the edges of stones and classifying them according to degree of sharpness (very sharp, sharp, rounded and unrecognisable).

There is no recipe for cave excavation, and other problems, such as the effect of cave fauna, must be considered. However, cave excavation is not more difficult then that of any other type of site. It requires looking not only below and beside (as is the case for most sites) but also above and outside (Cruz 1990).

At Nossa Senhora das Lapas, an area of 10 square metres was excavated, based on a 1 square metre grid, using artificial layers of three to 5 cm, within the identified geological layers. This methodology was justified by the complexity of the stratigraphy, often heavily disturbed, and enabled the tracing of agents of disturbance, permitting the production of a spacial, as well as stratigraphical, interpretation of the site. All sediments were dry-sieved with a 5 mm mesh, and all the finds were tridimensionaly recorded whenever possible.

## Stratigraphy

Three layers were identified. Layer A is sandy-silty, brownish and very disturbed, with several cryoclastic stones and a maximum depth of 25 cm. It included an individual burial (Fig. 1).

Layer B is a red, hard, clayey deposit, with fewer stones and again 25 cm thick. It also included an individual burial (Fig. 2).

Layer C is 30 cm deep, red and clayey, with no human occupation. It is formed from the decomposition of the bedrock.

The sedimentary evolution of the cave through the Holocene can be summarised as follows:

n: stratigraphical episodes not yet excavated;

n+1: in the early Holocene, retreat of the entrance to its present position, forming an external platform of c. 8 square metres (former entrance of the cave);

n+2: cryoclastic fractures produce a cone of blocks inside the cave, which top is not yet covered by sediments;

n+3: beginning of chemical decomposition at the base of the cave (*lapias*), forming layer C, together with sediments blown into the cave;

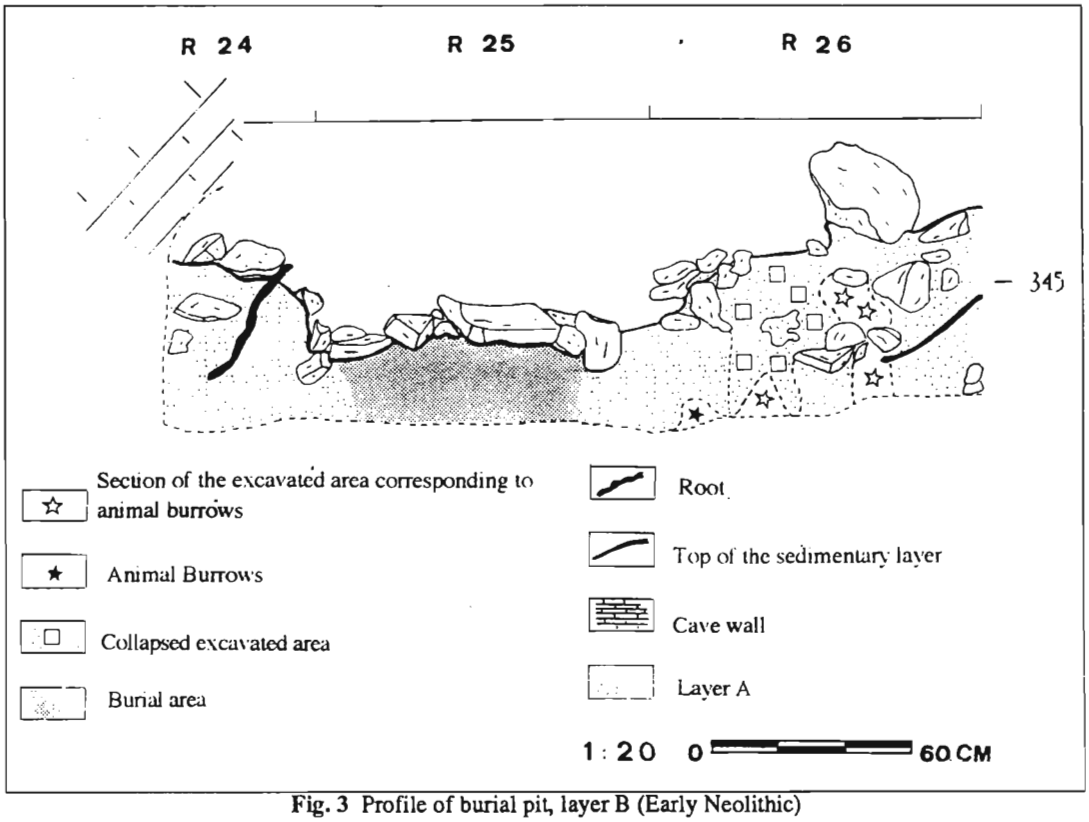


Fig. 3 Profile of burial pit, layer B (Early Neolithic)

n+4: deposition of layer B, mainly of anthropic origin, probably in the Atlantic period;

n+5: deposition of layer A, partially of anthropic origin, but also including sediments blown into the cave, together with particles fallen from the roof of the cave. This layer dates from the Sub-Boreal to the present;

n+6: disturbance of the layers by animals, particularly fox.

The sequence has a significant convergence with the Holocene sequences of other neighbouring caves, such as Gruta do Cadaval (Oosterbeek 1985b) and Gruta dos Ossos (Oosterbeek and Cruz 1993). The retreat of the entrance (n+1) has been recognised in most of the other caves in the area, and so has the cone formation, e.g. at Cadaval. All caves with an entrance facing south or southeast (e.g. Gruta do Morgado, Gruta dos Ossos, Gruta de Nossa Senhora das Lapas, Gruta do Sobreirinho), have very

shallow deposits, mainly of anthropic origin, both endogenous sediments and those blown into the cave being few. This contrasts with caves facing north or northwest (e.g. Gruta do Cadaval). Such a phenomenon suggests that the wind was predominantly blowing from the north. Similar differential patterns of erosion and sedimentation in open air sites, e.g. Fonte Quente (Oosterbeek and Cruz 1992), confirm this hypothesis.

The arrival of warmer and more humid weather in the Atlantic period is implied by intense lithochemical activity observed in the other caves. However, there are no indications of this at Senhora das Lapas, for reasons which are not yet fully understood.

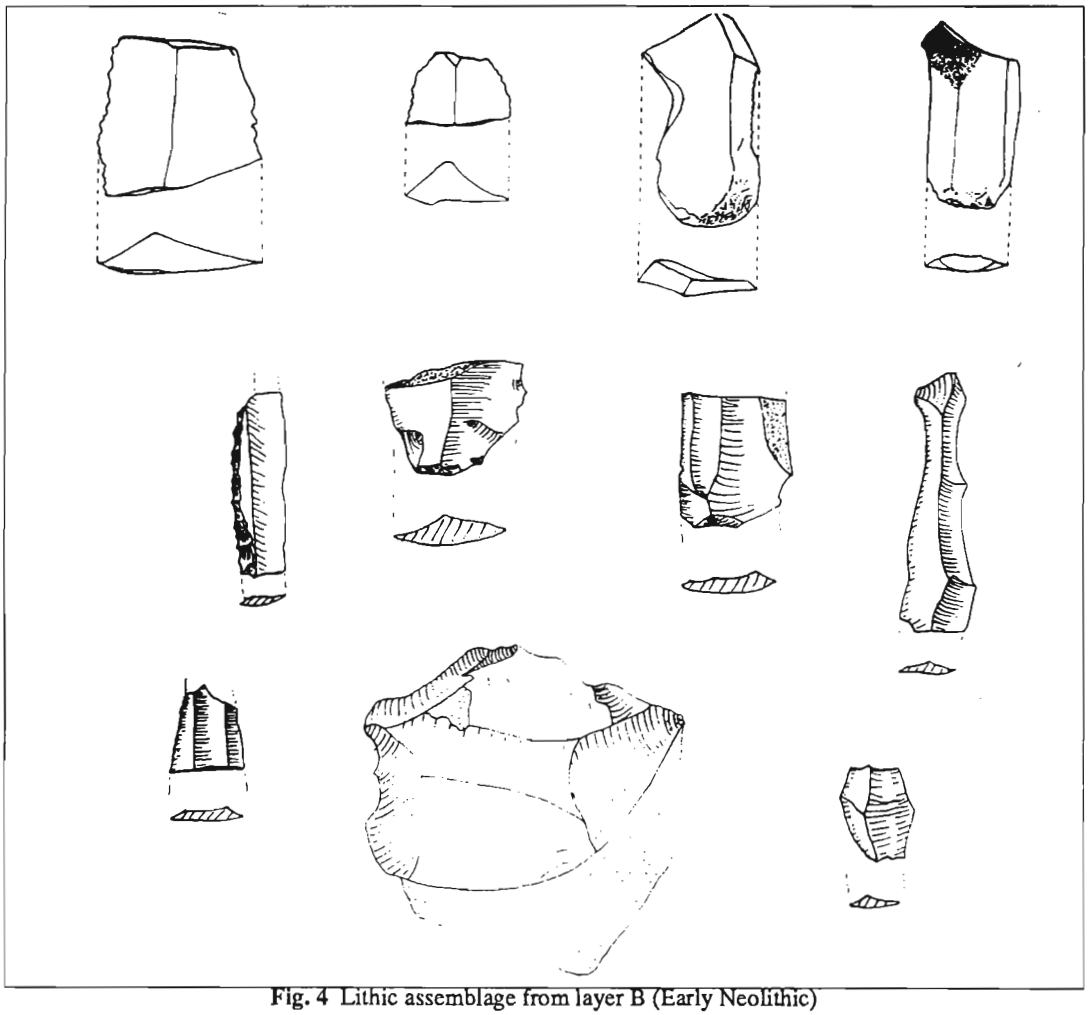

Fig. 4 Lithic assemblage from layer B (Early Neolithic)

The abundance of stones derived from cracking of the inner walls and roofs of the caves, corresponding to the Sub-Boreal phase (Early Bronze Age), suggest either return to colder conditions with increased cryoclastic activity (Guillien 1970) or, as suggested by some authors (Collcutt 1979), may be the result of seismic activity (the whole area being allocated to the curb 9 of the Richter scale in the national chart of potential seismic activity). Such a hypothesis may also explain some of the structural disturbances observed in open air sites, like Anta 1 de Val da Laje (Oosterbeek et al. 1992).

**The individual burial from layer B**

This structure consisted of a sub-oval alignment of small stones (collected from within the cave), in which the bones of a child were deposited, together with some artifacts (Fig. 3). The structure was partially disturbed, but its stratigraphical association could nevertheless be established.

A radiocarbon date has been obtained on the human bones (skull, metatarsals):

ICEN-805: 6100±70 B.P. (5230-4847 cal B.C.)

This date is compatible with the ones obtained from a similar context in the cave of Caldeirão, also in the Nabão valley (Zilhão 1988):

OxA-1037: 5970±120 B.P. (phalanx of Bos)

OxA-1036: 5920± 80 B.P. (phalanx of Bos)

TO-350: 5810±70 B.P. (human rib)

This assemblage is chronologically placed after the Early Neolithic, with characteristic cardial impressed ware (Rubio de Miguel 1975; Arnaud 1981). In the region this has been identified at Gruta do Caldeirão (Zilhão 1988) and Gruta do Almonda (Zilhão *et al.* 1991). It precedes another phase defined as 'Middle Neolithic of ancient tradition' (identified at Gruta do Cadaval - Oosterbeek 1985b; Oosterbeek and Cruz 1988).

Associated with the layer B burial were found (Figs. 4 and 5):

- Flint unretouched blades and bladelets, predominantly of triangular section, which constitute the dominant type of lithics in the local Neolithic sequence, until the Chalcolithic (Oosterbeek 1992b);
- one backed bladelet, of flint, a survival of the upper Palaeolithic tradition;
- one *languedocian* pebble, of quartzite, which relates directly to the local Mesolithic tradition of macro-tools (Oosterbeek and Cruz in press);
- plain and linear incised pottery, also observed in the early Neolithic at cave of Caldeirão. The pot are sub-spheric, and were produced by firing under reducing conditions. The fabric is good, with small quartz inclusions, in the tradition of the earliest Neolithic (Barnett 1985). Some sherds show evidences of *almagre* on their external surfaces, and one has a button. The same sort of decorative elements are found in the local middle Neolithic at the cave of Cadaval;
- green stone discoid beads, which use spans the local Neolithic;
- beads of *Glycymeris glycymeris* Lam. shells, again characteristic of the regional early Neolithic.

**The individual burial from layer A**

Layer A is heavily disturbed, except for a small area that was protected by the cone of blocks filler from the cave roof. Here a pit was dug and a single burial was placed in contracted and seated position (Fig. 6). The skeleton was recovered in anatomic connection, except for the head, which had rolled to one side. It is assumed that the body had been tied, with the head remaining uncovered, rolling away as the body decomposed.

A few artifacts were found with the skeleton, including:

- a flat copper axe, sub-trapezoid, with a proximal V-shaped notch, that corresponds to the earliest phases of L.Monteagudo's (1977) typology of metal implements from Iberia (Fig. 7);
- two sherds of pottery with Beaker decoration, one Beaker-shaped ware, without decoration, and one derived from a thick rimmed pot. The pottery was fired under reducting conditions, with a final moment of oxidation, and has few quartz inclusions;
- fragments of polished bone, including a spatula made of *Cervus* spp. rib;
- although some lithics may correspond to this burial, there are no good stratigraphic relations, since they were found in disturbed areas.

This assemblage is considered to date to the Early Bronze Age, i.e. from the beginning of the second millenium B.C. (Leisner *et al.* 1961, 1964).

## Discussion

This cave provides interesting evidence of two individual burials separated by some 2500 years. The cave of Nossa Senhora das Lapas is located in a section of the Nabão valley 500 m long, which runs from west to east, in contrast to its predominant north-to-south orientation. This area, called *canteirões* by the locals, includes several caves, all of which have been used as burial places in late prehistory. No evidence of settlements have been found in the immediate surroundings. This area seems to have had long use as a necropolis, from the early Neolithic to the Calcholithic (Oosterbeek and Cruz 1991). It is interesting to note that, along the valley, other groups of caves (Castro 1973; Batata 1983, 1985;

are not visible from very great distances (Oosterbeek 1992c), they are still clearly visible within the small valley where they have been built. The same obviously can not be said of the caves, recognition of their location being dependent upon recognition of tracks. The landscapes are also very different. The megaliths are sited in an area of acidic soil of moderate agricultural potential, very well suited for cattle. In contrast, the area of *canteirões* is of limestone, with steep slopes, very narrow or absent marginal platforms along the river (where, nevertheless, very good soils could enable the practice of arable cultivation), and flat hilltops with very shallow soils, probably thicker in prehistoric times.

If the presence of other soils, within one hour distance, is considered, the caves remain limited to the same setting, with the widening of lowland arable platforms beside the river providing very heavy soils, which were only used for agriculture after the introduction of the ard in the Early Bronze Age.

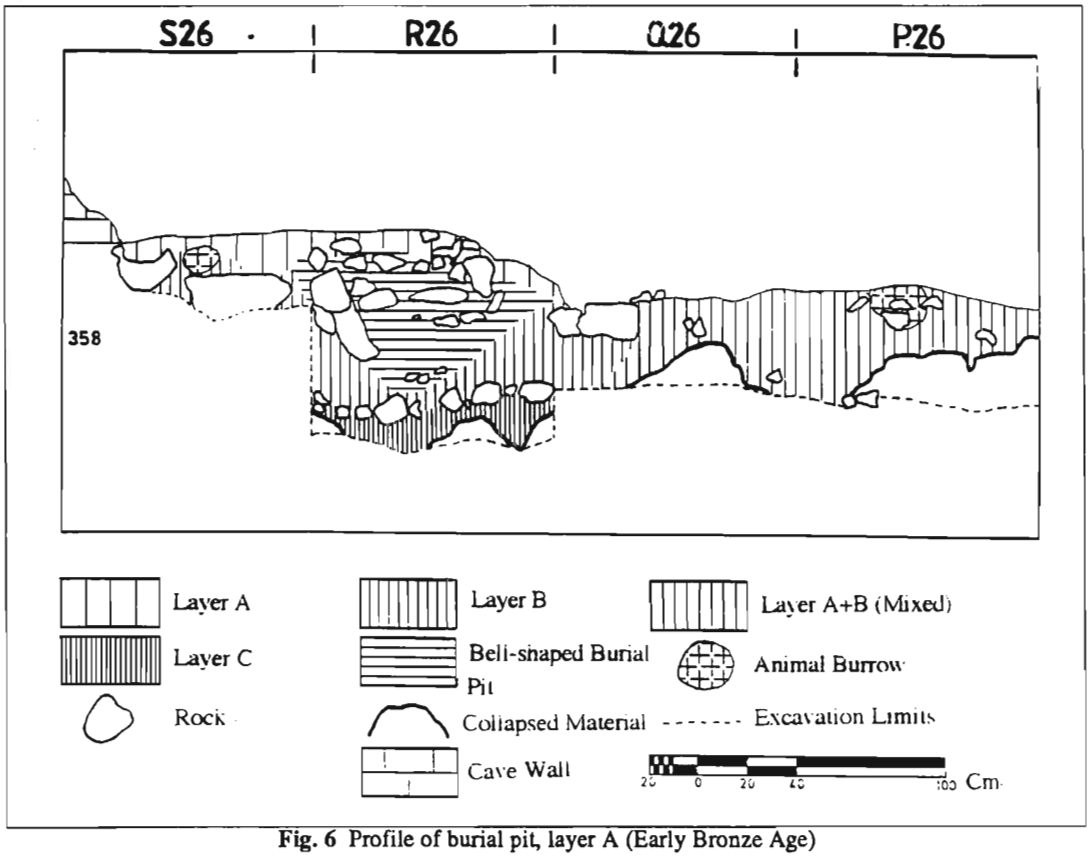


**Fig. 6** Profile of burial pit, layer A (Early Bronze Age)

In contrast, the megaliths are very close to light soils with a moderate to high pH, derived from the erosion of the gneiss and granite strata. Such soils have a high arable potential.

Although it is not the only possibility in central Portugal (other patterns existing, e.g. in the Beira region), this association of sites and soils has been observed elsewhere. In the Alentejo megalithic monuments (e.g. Reguengos de Monsaraz - see Leisner 1959) tend to occupy the arable soils, whereas corresponding settlements lie in lower productivity areas, such as Coruche. As for the caves, again there is no single pattern of distribution, but necropoles in similar clusters have been studied in many areas along the limestone massif, e.g. at Senhora da Luz in Rio Maior (Gonçalves 1978), and further south at Furadouro (Appolinario 1897) or Eira Pedrinha, near Coimbra (Correia and Teixeira 1949).

The individual burial from layer B must be interpreted within this framework. It is an example of

the second part of the Early Neolithic in western Iberia (the first corresponding to the Cardial impressed ware assemblages). It shares with similar sites in the region (Gruta do Caldeirao) and beyond, from the limestone massif north of Lisbon (e.g. Bocas 1 at Rio Maior) to the Alentejo Atlantic coast further south (e.g.Vale Pincel - Silva and Soares 1980), the cardial complex tradition.
This is evidenced in the burial patterns (individual, associated with animal bones and tools), and the industries (lithics, beads, and pottery shapes, although the cardial itself tends to disappear, and incised and other patterns of impression and plastic decoration on pottery emerge).

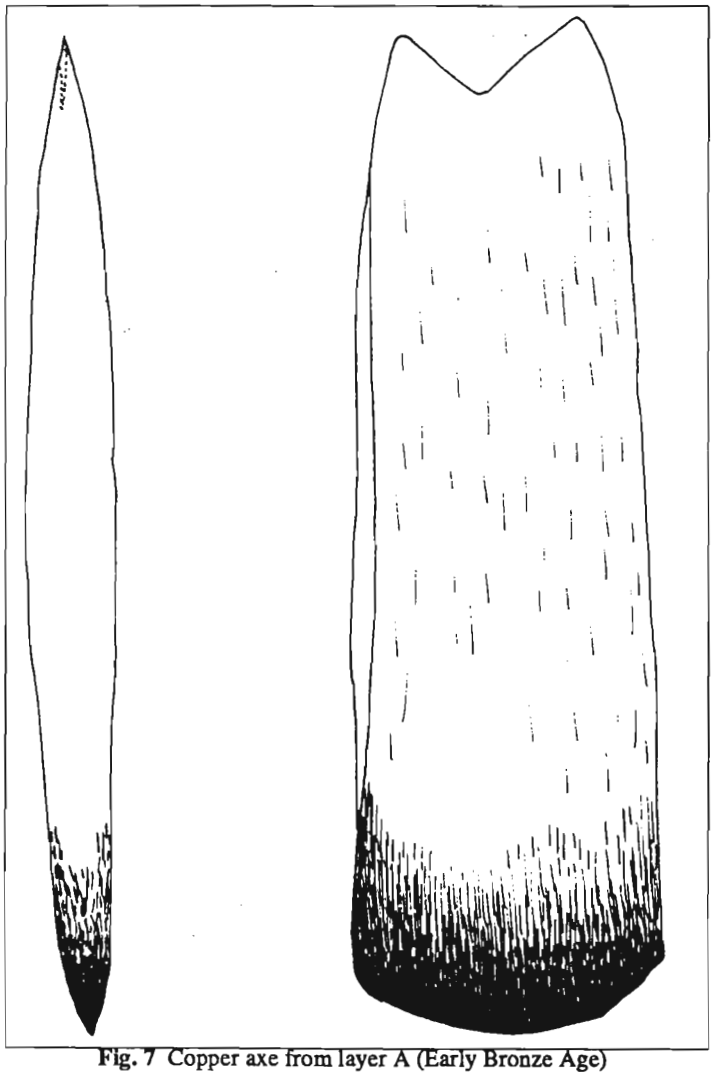

**Fig. 7** Copper axe from layer A (Early Bronze Age)

It is by no means an homogeneous culture and important variations have been recognised in the pottery decoration patterns, which have a central place in defining the symbolic boundaries of each group. Nevertheless, all these related assemblages seem to occur in areas of poor arable potential, but with a high ecological diversity, suggesting a similar economic system, as well as a significant divergence from the earliest megalithism in the Alentejo and Ribatejo. If this assumption is accurate, the variability of the assemblages could represent local and regional symbolic identities (of group or,

later perhaps, lineages), derived from the interaction of the first Cardial culture with the local Mesolithic populations. In addition, the origins of megalithism may not be found in coastal population growth and migration to the inland (as many authors have suggested), but in a separate tradition (Oosterbeek 1992c), bearing little relation to the initial input of cardial impressed ware. The fact that the pattern of occupation of the limestone massif and Atlantic coast seems to survive until the Late Neolithic, with megalithic influences only in its eastern border (e.g. Torres Novas - Gonçalves 1978; Oosterbeek 1988), supports this model for a dual tradition of the Portuguese Neolithic.

The burial from layer A, although also individual, is separated from the former by more then 2000 years. In between, a number of collective burials have been recognised both in caves ( such as Gruta do Cadaval, Gruta dos Ossos, Gruta do Morgado) and megaliths (Val da Laje necropolis). These collective burials conceal an increasing process of social differentiation, revealed through the increasing complexity of ritual structures associated with them, but largely through the variability salient items of material culture between different burials (in technological, rather then morphological terms). The author believes that this long period experienced the consolidation of lineage ranking, and increasing economic and social integration of both Neolithic traditions (Cardial and Megalithic).

The burial from layer A has closest relations with the Beaker settlement of Fonte Quente, 10 km south in the Nabão valley (Oosterbeek and Cruz 1992). Interpretation of the site suggested that, in this region, Bell-Beakers were the main symbols of a new social and economic model, visible through:

- the introduction of metallurgy (absent in previous stages);
- the hierarchy of settlements, with no evident fortifications (elsewhere represented by the hillforts, such as Vila Nova de S.Pedro, Zambujal or Maxial, the later in the Zêzere valley);
- the ideology, reflected in the emergence of differentiated individual burials, often including weapons (such as in layer A at Senhora das Lapas cave);
- the use of animal traction in agriculture (evidenced at Fonte Quente).

It is these changes that probably permitted the rise of social complexity, through increased status of some individuals, evidenced in the burials patterns. In this sense, the Beaker culture is the result of a process of technological improvement (production, storage, and transport). The period generated a greater social differentiation (to be observed in the ranking of collective burials, possibly reflecting lineage ranking), and enabled the intensification of long distance exchanges (of products, prestige goods, and technologies).

The Beaker culture appears to be the culmination of an already existing system, but is also the beginning of a new system, which is economically defined by the 'secondary products revolution' (Sherratt 1981), and socially by the emergence of individual hereditary status.

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