The Iberian Peninsula displays extreme geographic and climatic differences, resulting in very different local preconditions. To what extent are these responsible for the heterogeneous social and cultural development in different regions observable during the 3rd mill. BC? To answer this question it is necessary to identify what was considered to be a resource and to determine how these resources were valuated.

This book aims at investigating and reconstructing the dynamics and the diversity of the sociocultural manifestations on the Iberian Peninsula in relation to the use of resources in a comprehensive way during the Chalcolithic. In general regional overviews and detailed studies of the use of infrastructure, raw materials or social relations the possibilities to identify key resources as factors in these processes are explored.
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Cover Picture:
View from the ore-rich Cerro de San Cristóbal in Logrosán (Cáceres) towards the dry lands of the Dehesa landscape in the Spanish Extremadura symbolising the abundance of mineral resources and the scarcity of water on the Iberian peninsula. Photo: Martin Bartelheim.

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Local Shop for Local People
Resource Management During
the 3rd Millennium BCE at São Pedro
(Redondo, Portugal)

Are you local? This is a local shop, for local people; there’s nothing for you here! (Quote from British series ‘The League of Gentlemen’ 1999)

Keywords: Chalcolithic; territory; local; resources; ore; weaving

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Abstract

The hill of São Pedro is located in the Alentejo Central, South Portugal, near the Serra d’Ossa. The research conducted at the site allowed to register the presence of a sequence of occupations between the end of the 4th and during all of the 3rd mill. BCE, with two fortified settlements and two of open occupation that are alternating during time.

In the present paper we intend to expose the management of the resources used throughout the history of São Pedro, revealing a deep knowledge of the territory, which allowed to create a supply network that takes full advantage of the multiple local resources: agriculture, hunting, textiles, stone – flaked and polished –, ore and others.

1. The Settlements of São Pedro:
A Brief Overview

The site of São Pedro is on the eastern side of the Redondo central plain, to the south of the mountainous terrain of the Serra d’Ossa, in the south of Portugal (Calado 1995; 2001) (fig. 1). The occupation itself is located on a steep-sided, flat-topped hill (fig. 4). The site was subject to an extensive excavation program carried out between 2004 and 2009, which encompassed around two-thirds of the estimated area of the site (Mataloto et al. 2007; Mataloto 2010).

The site was in use during the late 4th and most of the 3rd mill. BCE in what seem to be five distinct occupation phases. This chronology has been supported by a series of already published radiocarbon dates (Mataloto/Boaventura 2009, 37) (fig. 2). An apparently open settlement dating from the late 4th and early 3rd mill. BCE seems to be the earliest phase found (phase I). This is followed by the first major stage of construction (phase II) (fig. 3), that features a line of walls with several thick adjoining turrets and two, apparently central, circular towers on the inside. Around the middle of the second quarter of the 3rd mill. BCE another seemingly open phase (phase III) takes place, following the abandonment and dismantling of most of the structures which characterised the previous phase. Phase IV, loosely attributable to the end of the 2nd quarter of the 3rd mill. BCE, shows a small, circular
Fig. 1. Location of São Pedro in the South of Portugal and the Iberian Peninsula.

Fig. 2. Radiocarbon modelled dates of São Pedro; Phase II – SP 382; Phase III – SP 1389; Phase IV – SP 1467, SP 1565; SP 742; Phase V – SP 929.
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...fortification with two hollow turrets and measuring roughly 200m². Enclosed by this structure are two additional circular towers. Numerous remainders of huts constructed from perishable materials were discovered in the area outside the fortification. A new stage of the occupation once again follows the abandonment of the structures of the previous phase, probably during the 3rd quarter of the 3rd millennium BCE. This stage (phase V) is characterised for the most part by a set of stone foundations for circular huts. The end of this phase coincides with the neglect of the huts and the construction of a pavement surrounding the ruins of the fortification built in phase IV.

The complex succession of stages of occupation and complete or partial hiatuses, which takes place over several centuries, results in a very complex and dynamic stratigraphic sequence in which the strata belonging to previous stages are greatly affected by the following settlements. This makes the correlation between past actions and their resulting stratigraphy very difficult. However, a careful and rigorous analysis of the resulting data allows us to recognise trends and stratigraphic successions important to the historical process in the site.

2. The Landscape as a Resource: Plains and Mountains

The concept of resource used in the present paper must be understood in a very broad way, one which includes both material and immaterial things, essentially including the elements which provide a structure for the experience of living in a certain space. In this sense, the position of São Pedro in relation to its surroundings must be viewed as a strategic resource, shaping the course of history for the community or communities occupying the site.

From a purely natural landscape-related standpoint, the territory in São Pedro is found stretches from the southern ramparts of the mountainous...
Fig. 4. General view from South to the São Pedro hills (arrow). The plains and the mountains.

Fig. 5. Settlements in the southern area of Serra d'Ossa, end of 4th/3rd mill. BCE.
terrain of the Serra d’Ossa to the so-called ‘Redondo Ridge’, a line of hills running in a North-South direction, separating the fertile plains to the East from the less fertile and hilly terrain of the West (fig. 1). To the South the plains stretch more extensively until they meet yet another area of hilly terrain with poor soils (fig. 4).

São Pedro would have been integrated into a network of settlements located either on the rougher terrain of the hilly regions or on the outlying plains (fig. 5). This rather broad understanding places São Pedro at the heart of a territory on the south side of the Serra d’Ossa, in a position which would allow some control over the plains and the footpaths that would have crossed them in several directions. This central position must have given a certain degree of importance to the settlements at São Pedro, of special relevance in phase II. This phase seems to have been not only the most extensive stage, but also the largest and most complex fortifications, which in turn would imply a greater visual impact. A landmark such as this might even be capable of strengthening the self-identifying bonds between the people of the region.

On the high ground along the fringes of the proposed territory there are a number of fortified, or apparently fortified, settlements, such as São Gens to the north and Vinha to the east of São Pedro. The site of Monte da Ribeira, which lies in the outlying lowlands, might have been a centre for the aggregation of people who served as a structuring element for the smaller, seemingly open, settlements, which are scattered throughout the area. However, it is worth noting that these settlements network seem quite dynamic along the time, with some being founded and others abandoned and that this is reflected in the structuring of the territory, that probably would have seen significant changes during the 3rd mill. BCE, especially in its first half.

Due to the great number and apparent density of the settlements in the area, many of which are bound to have been contemporary with some of the phases of São Pedro, we believe that resource-management on the southern foothills of the Serra d’Ossa was done in a global and coordinated fashion. Resources would therefore be managed by the community, living in the area, for the entire community and not in accordance with the needs of the occupants of São Pedro. These would have to coordinate with the remaining sites, possibly through ceremonies indifferent groups would enter into some form of negotiation, taking place in a site in which regular meeting were held, possibly the site of Monte da Ribeira (Calado 2001), in view of its size (3ha) and location, in plain area, in between small rivers.

The environment where São Pedro and the other sites were set would have been an important resource in itself. The environment in which São Pedro and the other sites were set would have been an important resource in itself. Not only would there have been a wider variety of available raw materials (lithics, copper etc.) but also a greater degree of possibilities of land-use stemming from the diverse biotypes present in the area. Additionally, controlling paths crossing some of the most significant relief-systems in the area between the Tagus and the Guadiana rivers (in the south of present-day Portugal), would have proved a significant boon. Salt and flint, for instance, are resources, which cannot be found in the area and might have become more readily accessible as they made their way through the territory. Members of these communities seem to have travelled relatively frequently to the shores of the Guadiana rivers, as the presence of a large number of quartzite pebbles – found in the various phases of São Pedro and in other sites of the region – supports. The possibility that these communities played some part in distributing these goods between the two river basins is therefore quite plausible.

3. The Visible and the Invisible: Resources for Daily Life

In this paper ‘local’ is a key concept on resource management. However, we defend and use a broader concept of the geographical meaning of ‘local’ that goes way beyond the site. As ‘local’ we refer to an area on the southern slope of the Serra d’Ossa up to 10–15km distance from São Pedro, an area that could be crossed easily on foot within one day. Resource management is focused primarily on subsistence and daily life. An accurate approach to this subject requires significant anthracological and carpological analyses, which are regrettably still absent. We will therefore
have to make recourse to indirect evidence and several studies for specific sites analysed in the region (Soares 2013) or the Guadiana Valley in general (Duque Espino 2004). Some of the paleo-environmental studies seem to reveal a more heavily wooded landscape than that currently found. The significant presence of red deer faunal remains, addressed later in this paper and a cork and holm-oak based land-cover – to which a preliminary study of charcoal samples points – seem to suggest a somewhat wetter climate. This would have been especially true for the first half of the 3rd mill. BCE, which would still be affected by the ‘Bond event 5’ (Bond et al. 1997) contrary to the later period which would be under the ‘Bond event 3 (4.2ka)’ and, therefore, have a significantly drier climate (Bond et al. 1997; Berglund 2003; Mejías Moreno et al. 2014). The charcoal analyses for the Middle Guadiana Basin also support this claim, as they coincide with the beginning of Phase II, as proposed by of David Duque Espino (2004, 756) which indicates an increasingly xeric and humanised landscape.

Pollens analyses from the site of Perdigões – which is roughly 30km away from São Pedro – have to be interpreted cautiously as the authors themselves point out. Even though the results support a more open, grazing-oriented landscape (Danielson/Mendes 2013), these analyses may reflect the immediate surroundings of a settlement and an occupied area and not a wider regional reality.

Water would have been a key component in both everyday life and agriculture, even in the absence of irrigation. Even at the present time, there are several wells, springs and small streams, which attest to the wealth of the aquifers of the area surrounding São Pedro, including those known to lie under the town of Redondo itself. The agricultural component would therefore be focused on horticultural subsistence complemented by extensive cereal production. We do not claim that São Pedro was mainly geared towards cultivation, even though there is clear evidence of agricultural activity. Grinding tools, such as querns, have been found in the site, namely some twenty millstones, generally made from granite and in relatively poor condition. Some of these are very large and were reused in structures of later building phases.

However, these artefacts are not necessarily connected with cereal production and use and might have been used for grinding acorns for bread and beer, an activity attested to in pre-Roman times (Strabo, Geogr. III, 3,7). As we have stated previously, seed and charcoal analyses have not been carried out. However, several cereal imprints have been found in potsherds, which indicate that grains were present in dwelling contexts where pottery would have been manufactured. This evidence, coupled with the characteristics of some of the pits found, seems to point to the storage of high volume goods, possibly grain. One pot, [1538], which is large and was deposited with a stone lid – indicating that it had something in it – might well be an example of this practice (fig. 6).

It is however, necessary to state that most of the thick-rimmed closed vessels (vases and pots) related to storage were found in the earlier phases of São Pedro (fig. 7).

Throughout the various phases of São Pedro, agriculture would have been focused primarily on the group and its subsistence. The animal remains discovered also seem to support this interpretation, as they point to a relatively modest presence of domestic animals. In fact, analysis of the animal remains of São Pedro reveals that hunting was clearly more important, as wild species are more common than domesticated ones: deer account for 36% of the remains and the bones of Sus species found, many of which are probably undomesticated sus scrofa, account for 37%. The presence of domestic animals is comparatively less significant – bos taurus make up only 7% of the total and ovis/capra 9% – which again indicates that raising domesticated animals for meat or for other products was not a very important activity. Even ceramic cheese strainers – of which 22 were found – are relatively scarce in São Pedro, in comparison with other archaeological sites, like Penedo do Lexim (in Mafra), where these artefacts are present in significantly larger numbers; this might be yet another example of the reduced importance of animal raising in São Pedro.

On the other hand, the intensive use of game would imply that the community of São Pedro would have travelled with some frequency to wooded areas; perhaps those of the Redondo ridge or even in the Serra d’Ossa, where other settlements were located. It seems therefore, that this situation would only be possible if there was some coordination among the communities of the area, which allowed them to hunt with relative safety and not in competition with each other.

Manufacturing pottery would have been an important aspect of the everyday life of these communities, although it is difficult to pinpoint the origin of the clay used. Notwithstanding, a macroscopic inspection of the pottery reveals a predominantly granitic matrix pointing to the use of local clays in the vast majority of cases. These matrices are identifiable in the present-day pottery production of Redondo, which uses high quality clay available in the vicinity of São Pedro.
Fig. 7. Graph showing the distribution per phase of storage containers.

Fig. 8. Vessels SPD [2715] and SPD [0]162 with seashell impressed decorations.
The morphological study of the ceramics, which is in progress, supports the thesis that pottery was locally produced. The typological features of the most representative types of the assemblage are in keeping with the pottery tradition of the Serra d’Ossa (Calado 2001), while maintaining a few similarities with the earlier Neolithic wares, such as characteristic lugs and certain impressed decorative features, which are found in the earlier stages of occupation. The decorated pottery (its relative frequency, the technique and motif employed) also fits in perfectly with the tendencies observed in the Iberian Southwest (Costeira et al. 2013), even though some elements typical of other Iberian regions have also been found. These elements, such as the ‘folha de acácia’ and(90,533),(128,583)(90,533),(112,585), suggest contacts with the Portuguese Estremadura.

Additionally, shards like SPD [2715] 22 (fig. 8), featuring what seem to be seashell-impressed decorations, also imply some degree of contact with the coast, which might be related to frequent trips to coastal areas to obtain products like salt. Some other types of decorations, usually found in the later phases, suggest contacts with the Spanish Meseta (Mataloto et al. 2015).

Domestic activities would not have been restricted to the production of pottery, as there is evidence that weaving also took place. The loom weights themselves are a fairly numerous sample and have been the object of several papers (Costeira 2010; Costeira/Mataloto 2013). Due to the quantity of weights found, we feel that weaving and the products related to it might have played an important role in the management of local resources in the region.

In fact, the abundant loom weights allow us to know that weaving was relevant at the site, but this implies a number of additional resources and chores, ranging from the cultivation of certain crops, their harvest, the gathering or growth-management of other plants and even the treatment of the raw materials. Weaving, as a rule, is a fairly difficult practice to track in archaeological sites because for the most part, the materials associated with it are perishable. In fact, as in São Pedro, most archaeological sites on the southern Iberian Peninsula only have loom-weights, especially in areas where the climate or geology make the preservation of organic materials a rare occurrence. This makes these ceramic artefacts the principal means for studying weaving in the Chalcolithic of the Iberian region. Notwithstanding, several pieces of linen cloth, esparto grass and even hemp fabrics have been found, often in association with metal artefacts in the Iberian south, for example in Tomb 3 of Cortijo Bartolo, Granada; Tombs 11 and 38 in Los Millares, Almeria (Alfaró Giner 1984, 121; Cardito Rollán 1996, 129); in tomb 1 of the megalithic necropolis of Belle France, Calda de Monchique (Soares/Ribeiro 2003); and in the burial found in the Bela Vista 5 enclosure, Beja (Valera 2014, 43 l). Several cloth imprints on pots or baked clay have additionally been found, like the example from the Vígaria site in the Serra d’Ossa region (Calado 2001, 105), thus strengthening the notion that fabrics made from plant fibres were quite widespread in the 3rd mill. BCE in the south of the Iberian Peninsula.

3706 loom weight fragments have been found most of them poorly preserved and – in keeping with the styles considered typical in the Iberian southwest at this time – plaque and crescent shaped weights (fig. 9). Crescent loom weights are the most common type, making up 62.7% of the total sample, while plaque shaped weights are less numerous, accounting for 36.9% of the sample (fig. 12). Most crescent weights feature an oval section, making up 65%, whereas others are less common, circular sectioned crescents make up 23% of this sample and sub-rectangular ones are 11%. In the plaque weight group, the rectangular plaques with rounded corners and edges are the most common type, usually exhibiting two or more perforations on each side.

The technology involved in making these loom weights has already been addressed in greater detail in a previous paper (Costeira 2010) and was mainly aimed at producing well fired weights with compact, homogenous fabrics, often including different sizes and types of flux. Most of the weights feature fairly smooth surfaces and decoration is almost completely absent.
Fig. 9. Loom weights – plaques and crescents from São Pedro.
The majority of the loom-weights from São Pedro were found scattered throughout different deposits and sectors, usually in small numbers. These factors seem to support the idea that most of the weights found are part of refuse contexts and that weaving was done in different households and not a specialist activity.

However, there are some interesting stratigraphic units which have yielded large amounts of weights (ranging from 10 to 50 weights) (fig. 10). These contexts are found for the most part in sectors B, D and F and are usually the filling of pits (fig. 11).

The set of 138 weights recovered in structure [1032], an elliptical irregular pit found in Sector D, is primarily composed of rectangular plaques (127 of the total number) in a relatively poor state. This makes their correlation to an event of in situ abandonment difficult to sustain and it seems more plausible that they are associated with the discarding of items involved in some domestic productive activity, quite possibly related to one or more households in which weaving had a greater role. Most of the concentrations of weights found in sectors B and F are also poorly preserved and therefore face the same interpretative problems. Most of these concentrations usually feature a clearly dominant type of weight. However, concentrations in which a single given type is found exclusively are very rare. Notwithstanding, in pit [2336] located in sector D, a set of 50 crescent shaped weights was recovered, mostly oval-sectioned, 14 of which were almost complete and arranged along the western side of the deposits. In this particular case, the state of the weights and their relative uniformity seem to support their interpretation as the remains of a loom discarded in a pit. Certain buildings, such as tower [345] in sector A, have also yielded fairly large numbers of

Fig. 10. General plan of São Pedro showing the loom weights concentrations. A–F excavation sectors.
loom-weights in the stratigraphy associated with them. However, the diversity and the fragmented state of the artefacts and the complex stratigraphic relations do not support a single loom interpretation of the remains located inside this tower.

The manner in which the weights were incorporated in the archaeological record in São Pedro, (especially the large amounts found together), allows us to propose the existence of areas in which weaving was more relevant; these areas were located in the midst of the living space in general, especially in Phase II. Specifically these areas include the central area in places like the tower [345] and in other peripheral areas like the south-western corner of the excavated area, adjacent to the southern wall, or the north-eastern part of the excavated area, in deposit [1032] located just outside the main wall. However, we assume that the broad distribution allows us to propose that weaving was done in multiple households and, because of that, it was not a specialised activity even if it needs special skills.

Regarding the phasing of the stratigraphic units in which the large amounts of loom weights were found, these belong mainly to the earlier stages of occupation (Phases I and II), which might suggest a greater importance of weaving in these early stages.

Loom weights have been regarded as part of the package of the secondary products revolution (Sherratt 1981) since the late 80s (Gonçalves 1989), a theoretical association based exclusively on the use of wool, seen as part of the changes brought about by animal husbandry documented in the late 4th mill. BCE. This overestimation of the importance of animal fibres in the development of weaving has been thoroughly questioned in the meantime, because all the samples found – not only on the Iberian Peninsula but also in other areas of Europe such as the French lakeside sites and sites in the Swiss plateau (Caspar et al. 2005) – have exclusively been plant fibre cloth, and because there is no undisputed evidence of wool use before the Bronze Age. Archaeozoological studies have also significantly added to these reservations. Not only have they demonstrated that sheep in this stage of domestication might not have been able to successfully bear wool (Davis 1987, 156 f.; Greenfield 2010, 35), they have also revealed a great variety in the age of slaughter of the animals, which very often is not adjusted to a situation in which wool was a main concern (Marciniak 2011). Slaughter strategies and their intended purposes are however, difficult to understand (Helmer et al. 2007).

Regarding São Pedro in particular, the sheep and goat component of the bone assemblages recovered is a very minute one (Davis/Mataloto 2012) and therefore, the existence of any particular slaughter strategy is difficult to fathom. This, coupled with the large number of loom-weights found does not lend any credibility to the hypothesis that wool use was significant. Therefore, as an alternative, we propose that weaving in this particular site and perhaps in the region where it is situated, was primarily based on agricultural plant fibres, such as linen and perhaps some other wild plant fibres.

Economically, the role played by weaving in São Pedro has to be approached in varying scales. In the Serra d’Ossa region, especially on its southern side, the presence of loom-weights in Neolithic
and Chalcolithic settlements is very common. Quantifying their actual importance is often impossible, especially since most of the information comes from archaeological surveys and not from excavations. However, the great quantity of loom-weights found on the surface of sites like Monte da Ribeira (Calado 2001, 98) demonstrates very well the potential significance that weaving may have had in the region.

The chaîne opératoire of weaving and especially of the manufacture of linen cloth is a multi-staged and complex affair, involving a large variety of activities ranging from the raising and collecting of flax, the extraction and treatment of the fibres, the spinning of thread and weaving in itself. This wide range of chores is not necessarily connected with any single set of structures and they were probably distributed throughout several places (Martial/Médard 2007, 80). With this in mind, we do not consider São Pedro to be a site which specialised in weaving, but we find that it was probably part of a territory, in which this activity might be a relevant resource for the communities.

If we widen the scope to include the entire region of the Alentejo we find that, in general, loom-weights are very common in settlements and fairly scarce in funerary sites. The ubiquity of these artefacts has been interpreted by many authors, like Manuel Calado (2001) and Ana Catarina Sousa (2010), as evidence of the great importance that weaving would have had for these communities, contrary to what seems to be the case in other regions like the Portuguese Estremadura. Compiling and comparing quantitative data from regions like the Estremadura and Alentejo, which are archaeologically quite different, is a very complex task. With the available data, it is too risky to judge the importance of weaving in the two regions, especially as they seem to have different weaving traditions. This should not stop us from considering the production of cloth as a regional resource in Alentejo, one which might support some surplus production destined for trading on an interregional level, an economic activity which is very difficult to trace but well attested since the beginning of Roman times (Pliny the Elder, Natural History, lv.8, 191).²

4. Rolling Stones: A First Approach to the Lithic Resource Management

4.1. Raw Materials and Geology

During the excavation of São Pedro a large quantity of knapped stone artefacts mostly made from siliceous schists and jasper were found (fig. 13). The dynamic occupation of the site has greatly affected the preservation of these materials and subjected them to significant mixing, which results in a fairly fragmented and dispersed record. This is not however, a unique occurrence but rather the norm in sites occupied for a long period of time and without sudden hiatuses.

Geologically, São Pedro is a mica schist elevation located on the eastern side of the granodiorite plains, a few kilometres from the larger relief system of the Serra d’Ossa, a complex geological area, dominated by mica-schist, phyllite and grey schist bedrocks, which forms a NW-SE ridge in relation to the Terena syncline (Feio/Martins 1993; Araújo et al. 2013). These areas of siliceous schists to the north and east are, in all likelihood, the origin of the raw materials used in the production of the São Pedro lithic industry. The identification of specific

Fig. 12. Distribution of loom weights by sector.

² Pliny the Elder, Natural History, <https://ia802700.us.archive.org/12/items/naturalhistoryof02plinrich/naturalhistoryof02plinrich.pdf> (last accessed 08.02.2017).
Fig. 13. Lithic industry from São Pedro – a sample of debitage products and retouched tools.
microfossils in some of the stone tools discovered has allowed us to trace the origin of the raw material to the western flank of the Terena Syncline, on the Northern area of the Serra d’Ossa, which emerges in the area of the Monte do Alfaval, some 10km northeast of São Pedro. The discovery of small flint nodules in the scree areas 5km north of São Pedro and in the vicinity of the Monte da Ribeira site might be the origin of the few flint cores found in São Pedro and some of the non-blade-based flint tools. This also suggests that these communities must have had a very detailed and complete knowledge of the area, exploring its resources in a very sensible way.

Even though some stone fragments measuring a couple of millimetres were recovered, because of the status of the excavation as a salvage operation, sieving of the soil was only carried out in isolated instances. In addition to this, it is also important to mention that quartz was only collected when there were traces of knapping, which might result in the underestimating of the importance of this particular raw material. However, collecting every single fragment of quartz would have been thoroughly impractical, as quartz is found in veins in the site’s bedrock.

4.2. Overview over the Knapped Stone Industry

The lithic assemblage was analysed according to the underlying theoretical and methodological concept of chaîne opératoire (as defined by such authors as Inizian et al. 1999). Their technological and typological characterisation follows with some adaptations the criteria used in other studies of Neolithic and Chalcolithic lithic industries carried out by authors like Carvalho (1995/1996; 2009), Foresbacher (1998; 1999), Diniz (2007) and Sousa (2010).

Generally speaking, the analysed assemblage (N=7582) is quite fragmented, which coupled with the dynamic occupation of the site and the lamellar texture of the schists predominantly used seriously limits the possibilities of technological and typological characterisation (fig. 14). In fact, most of the analysed pieces are unclassifiable jasper and siliceous schist fragments (84%), where knapping traces are often very difficult to find. The remainder of the assemblage is for the most part retouched tools (12.2%), which were also found in a very fragmented state and unworked blanks (3.2%). The unworked debitage products are mainly flakes (75.2%), generally fairly small sized and long blanks (bladelets, mostly hyaline quartz and highly fragmented blades). Cores are noticeably scarce, accounting for a mere 0.3% of the sample.

4.3. Main Results: Raw Material Procurement and Economy

Detailed analyses of the raw materials involved will be very useful in clarifying any questions related to their origin and use. However, even in spite of their absence, it is safe to say that most of the resources used, such as the above mentioned siliceous schists and jaspers, (which are 87.2% of the assemblage), were sourced locally (fig. 15). Even not taking into account the chips and fragments, local raw materials are still the most common in the retouched tool category.

Knapping siliceous schist and jasper would have involved slabs of the raw material, which were then reduced to plaques and subsequently retouched in order to obtain the desired tools (Fábregas Valcarce/Rodríguez Rellán, 2008), which would explain the conspicuous scarcity of cores. These...
rocks were mainly used in the bifacial knapping of arrowheads, which are the single most common type of lithic tool found (44.3%). Additionally, arrowheads were found in different stages of production, making in situ production quite clear there. The bifacial knapping method was used in producing other artefacts, like ‘ovoid bifaces’ and large bifacial points. However, contrary to the situation in the Portuguese Estremadura, where fairly standard and elaborate bifacial tools can be found, these artefacts are quite irregular and might be the result of a local adaptation to the limits of the nearest raw materials available (Nukushina et al. forthcoming). Another important aspect of production is the heat treatment employed in the process of making these tools, visible in the thermal gloss and frequent potlid marks, which are probably the result of heat treatment prior to the retouch phase. It is interesting to find that heat treatment is most commonly found in areas where there are few high grade raw materials suitable for knapping (Boix Cabelt 2012, 39), which is the case in the region in question. Heat treatment would make the stones easier to work, increasing their homogeneity and elasticity.

In addition to these more complex and elaborate tools, a large number of plaque fragments and flakes were found which had marginal and irregular touch. These seem to be relatively impromptu tools, possibly the result of using debris generated in producing other tools.

The sample also includes a fairly significant quartz-based component (7.7%). Even though cores are again fairly scarce, more than half of the pieces found are made from quartz and hyaline quartz (53.8%). Whereas quartz cores are usually irregular or polyhedral and aimed mostly at the debitage of relatively small flakes (averaging at 32.6mm in length), which are quite commonly found and do not evidence any degree of standardisation. Hyaline quartz cores feature for the most part scars of bladelet debitage (of which the resulting products are also found). These elements show that there must have been an operative chain, which was aimed at the local knapping of small flakes and bladelets made from different types of quartz and also the production of heavier, coarser quartzite flakes. Quartz flake production has parallels in Perdigões (Lago et al. 1998, 121) and Porto das Carretas (Soares 2013, 205). Bladelets are fairly significant in the sample (28.3%) and are mostly made from hyaline quartz, a situation which is again mirrored in Perdigões (Lago et al. 1998, 148).

Flint makes up quite a small portion of the sample (1.6%) and usually appears in the form of retouched blades or bladelets and a few arrowheads. The scarcity of flint debris and cores suggests that this particular raw material was not worked locally.
Blades in general are quite important in São Pedro. Blades with marginal retouch for instance account for 12% of the tools found, even if non-retouched blanks are relatively infrequent (13.7% of the debitage products). Again, taking into account the absence of blade-cores and debris related to them, it would seem that São Pedro was a blade consumption context.

If fine-grained quartzite, which was used in some cases, was available regionally flint must have been brought from further afield. However, further analyses of the raw materials are needed to make the situation clearer.

The predominant use of siliceous schist, jasper and quartz in tool production coupled with the relative scarcity of flint products is a situation paralleled in other Chalcolithic sites of the Iberian Southwest – like Monte da Tumba in Setúbal (Silva/Soares 1987), Perdigões in Reguengos de Monsaraz (Lago et al. 1998), Perdigão, in Alandroal (Calado 2001), Porto Torrão in Beja (even if the data is fairly preliminary) (Rodrigues 2011; Santos/Rocha 2011), or Porto das Carretas in Mourão (Soares 2013) – in stark contrast with the sites of the Portuguese Estremadura, in which a similar strategy of locally sourcing raw materials results in a very different composition of the assemblages.

4.4. Local Resources and Solutions

The analyses which were undertaken have provided evidence for the existence of two distinct stone-working operative chains in São Pedro, the most important being the process for knapping siliceous schists and jaspers and secondly, the process involved in making quartz tools. Both of these strategies seem to be intricately connected with the local and/or regional sourcing of raw materials, as seems to be the typical for the Chalcolithic settlements in the Iberian southwest. The use of siliceous schist and jasper would have been primarily aimed at producing bifacial tools, such as arrowheads. This does not, however, exclude the opportunistic use of these fairly abundant resources for simple, marginally retouched tools, which are typologically difficult to classify due to their usually highly fragmented state (which might be original or not).

Even though blade blanks and retouched blades are fairly common in the assemblage, they are not part of the two local operative chains, which seem to suggest that the communities of São Pedro were not producing these tools but merely using them.

4.5. Axes, Adzes and other Tools

The study of the polished stone tools of São Pedro is still in a fairly early stage. Notwithstanding, we find it pertinent to make some observations which might shed some light on this class of artefacts, whose primary raw material, amphibolite, might have played a key role in interregional trading with regions like the Estremadura, according to the research of Cardoso and Carvalhosa (1995) and Lillios (1997).

Generally speaking, polished stone industries (axes, adzes, chisels and gouges) are distributed fairly evenly in every sector excavated. The assemblage is composed of more than 300 polished stone tools, complete or fragments (fig. 16). While axes and adzes are found in greater numbers other types of tools, like chisels and gouges are relatively scarce. The size of the polished stone tools varies greatly, ranging from some very sturdy implements to others which, due to their small size, gracile attributes or to the softer raw material employed, might well have had a ‘ritual’ use. Even though hard raw materials, mostly different kinds of amphibolite, are used in the vast majority of cases some rare instances of very soft rocks, such as schists, have been found. Although most of the assemblage features heavy use-wear, the discovery of some pristine tools makes detailed context analysis a requirement. However, these patterns are what are to be expected from a prolonged and fairly dynamic occupation. As of yet, elements which might be considered ‘ingots’ have not yet been found onsite. This suggests that the tools arrived at São Pedro pre-formed, probably due to the abundance of the raw materials in the surrounding areas, where small and medium-sized blocks of amphibolite can still be found to this day. Despite this fact, a considerable number of polishing stones were found in São Pedro. Polished stone tools seem again to follow a strategy of locally sourcing the
Fig. 16. Axes, adzes and chisels from São Pedro.
raw materials, which would later be worked and used within the occupied area throughout the various stages of occupation.

5. The Cycle of Metal: Raw Materials to Tools

The study of metallurgy has always played a fundamental role in understanding economic activity and trading in the communities of the 3rd mill. BCE in southern Portugal. In São Pedro, metals are the object of separate studies, which are part of larger projects, from which we have been given access to some of the early results (Gauss et al. unpublished; Orestes Vidigal et al. 2015). In this paper we intend to single out some of the most relevant aspects of metal production and its spatial and chronological contexts in São Pedro.

As can be seen in the table in fig. 17, two of the most important phases of the site coincide with the greater amount of occurrences of metallic objects, as might be expected. In the remaining phases of occupation it is difficult to be sure that the remains uncovered are not residues from earlier stages (fig. 17).

In every single one of the phases of São Pedro in which metal was found (II through V), there is evidence of the entire metallurgical process, ranging from smelting to the production of artefacts (fig. 18). In the area surrounding São Pedro there are no known occurrences of ores. However, in the wider area there are several surface veins of copper-ores at different points in the Serra d’Ossa, even without taking into account the large vein of the Mostardeira mine, which lies on the northern side of the hills. Lead isotope analyses of samples from São Pedro and the Mostardeira mine have revealed a certain similarity, which has also been found in copper samples from the site of Zambujal and in most of the copper artefacts from the 3rd mill. BCE from the lower Estremadura (Gauss et al. unpublished). Because of this, we believe that the metal produced from the ores extracted in this region must have been an important aspect of interregional trade. However, even though metallurgy has been found in most of the phases of occupation in São Pedro and is particularly relevant in the stages where the fortifications were in use, there is no real evidence that sustains intensive trade-oriented production. The distribution of the metal finds encompasses most of the occupied area: there was no specialised production area, thus, suggesting a smaller scale activity. However, a concentration of a significant number of metal remains on the inside of pit [293], which also has very dark soils, might be an example of a single specific context of metal production, that is unfortunately is hard to date because it lies immediately under the surface strata. Curiously, most of the metal found was located in the peripheral areas of the site, what might be related to the practise of discarding debris and not with actual production areas. There is a conspicuous lack of metallurgical remains in sector A, seen in every stage of occupation, possibly a sign that these activities might not have been carried out in the central area. It is worth noticing that only two metal artefacts and two crucible fragments were found in this central area, which means that at no point of the occupation this socially differentiated area was based on metal presences. On the other hand, most of the metallic elements recovered in sector C were recovered in or underneath contexts resulting from the abandonment of the structures and as such are probably the result of the discarding and cleaning of work contexts in the adjacent sector B.

Generally speaking, in São Pedro metal is, as is usually the case in settlements of the 3rd mill. BCE in southern Portugal, essentially of a utilitarian nature. Awls are the most common tool, with ten of them found in São Pedro alongside other work tools, such as small chisels and a spatula. The presence of cutting tools, like knives and daggers, is less noticeable and these are always very poorly preserved. Finally, a strange artefact with a sub-circular shape and elongated handle was found.

Recent studies have revealed that arsenical copper is frequently associated with stronger utensils, although this may be the result of using native coppers with a higher percentage of this
To summarise, we believe that from early on, metallurgy must have played a part as another of the domestic activities carried out in São Pedro. The copper was used most certainly to trade with other communities in order to obtain non-native raw materials or products like flint or salt. Access to the ore must have been guaranteed in the context of the settlements of the southern side of the Serra d’Ossa, which would play an important role in the circulation of the surpluses from the outlying regions. A network even reaching relatively distant regions, as can be seen in the metal from this region found in Zambujal.

6. Discussion

This paper is only a first contribution towards the study of the network of interactions between the communities of São Pedro and the southern flank of the Serra d’Ossa.
We find it important to associate the different occupations of São Pedro with a settlement network, which was dynamic and highly mutable throughout the 3rd mill. BCE and through which the area’s resources must have been managed and traded. A completely self-sufficient existence does not seem plausible and yet there is no clear evidence of a hierarchic, co-dependent settlement system. We therefore believe that settlements worked together, managing and negotiating their affairs as a community. Among these settlements, a synergistic system may have been created, which allowed for easier access to certain raw materials like copper, but also to local or ‘imported’ finished products like flint tools.

In any case, the eminently local aspect of the raw materials and activities documented at São Pedro is reflected not necessarily in a differentiated access, but maybe in a differentiated use of the materials external to central Alentejo, which seem to be concentrated in the larger sites like Perdigões. This does not necessarily imply the existence of political and/or economical elites, but might well be related to social and symbolic aspects of life, meaning that these sites were meeting places, where relationships within a community were negotiated and acted out, generating shared experiences in the process. This was probably closely related to luxury goods, like the ivory found in Perdigões (Valera et al. 2015) and their ostentation and manipulation.

Small settlements like São Pedro in its various incarnations would have played a crucial role in the production, management and local distribution of various materials. This would allow the communities living there to have access to ‘imported’ raw materials used in daily life, such as flint. However, this does not mean that certain local productions like cloth or metal might not have on occasion generated some surplus that might have been in turn traded for exotic goods, eventually later deposited in the larger settlements in particular events and rituals.

Still, we must make it quite clear that we do not think that there was any sort of specialised textile production in São Pedro, as the presence of large quantities of loom-weights in the most of 3rd mill. Alentejo’s settlements indicates (Costeira/Mataloto 2013). In the same way, we do not propose that there was any particular activity – weaving, metalworking, or any other – specifically geared towards generating surplus. This means that if these existed, they did so as the occasion arose and they would have been used as an answer to a specific need or conjuncture, to obtain a specific product or simply as an offering. Production would therefore function at an essentially domestic level and would be aimed at the needs of the community and the family group.

In lieu of an epilogue, through the study of the data recovered at São Pedro, we understand that the management of resources would depend on a very detailed knowledge and use of the surrounding landscape, whose use would have been coordinated with the surrounding settlements, therefore allowing for a near self-sufficient economic and productive existence. Surpluses, when and if they existed, might have been traded for ‘basic’ external goods like flint and salt, but also for more exotic goods, which in turn were not used locally and whose final destination place was elsewhere.

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