MENSCHEN – KULTUREN – TRADITIONEN 21

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FROM SEDENTARISATION TO COMPLEX SOCIETY: SETTLEMENT, ECONOMY, ENVIRONMENT, CULT

Proceedings of the workshops in Lisbon, Tehran and Lima (2016 – 2019)

ForschungsCluster 1
Von der Sesshaftigkeit zur komplexen Gesellschaft: Siedlung, Wirtschaft, Umwelt, Kult

DEUTSCHES ARCHÄOLOGISCHES INSTITUT

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REICHERT VERLAG

Band-Herausgeber:innen/*Volume Editors*:
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Titel/*Title*: From Sedentarisation to Complex Societies: Settlement, Economy, Environment, Cult. Proceedings of the workshops in Lisbon, Tehran and Lima

Reihe, Band/*Series, Volume:* Menschen - Kulturen - Traditionen, 21

Herausgebende Institution/*Institutional Editor*: Deutsches Archäologisches Institut
Umfang/*Length*: XXVIII, 552 Seiten/*Pages* mit/*with* 283 Abbildungen/*Illustrations*

Peer Review: Dieser Band wurde einem Peer-Review-Verfahren unterzogen./*The volume is peer reviewed.*

Verantwortliche Redaktion/*Publishing Editor*: Deutsches Archäologisches Institut, Redaktion der Eurasien Abteilung, Im Dol 2–6, Haus II, 14195 Berlin
Redaktionelle Bearbeitung/*Editing*: Judith Thomalsky, Natalie Mez, Aleksandra Kostyra, Markus Reindel, Michael Kunst
Prepress: le-tex publishing services GmbH, Leipzig
Buchgestaltung und Coverkonzeption/*Book Design and Cover Concept*: hawemannundmosch, Berlin
Umschlagfoto/*Cover Illustration*: Catrin Gerlach

Druckausgabe/Printed Edition
Erscheinungsjahr/*Year of Publication*: 2024
Druck und Vertrieb/*Printing and Distribution*: Dr. Ludwig Reichert Verlag Wiesbaden · https://www.reichert-verlag.de
Druck und Bindung in Deutschland/*Printed and Bound* in Germany
ISBN: 978-3-7520-0813-5

Bibliografische Information der Deutschen Nationalbibliothek: Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über https://dnb.de abrufbar./*Bibliographic information published by the Deutsche Nationalbibliothek: The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available online at https://dnb.de.*

Digitale Ausgabe/Digital Edition
Erscheinungsjahr/*Year of Publication*: 2024
DOI: https://doi.org/10.34780/1wb6-0caf

The Early Neolithic settlement of Carrascal (Oeiras, Portugal)

by *João Luís Cardoso*

Keywords: Early Neolithic, settlement, Portugal, Carrascal
Palavras chave: Neolítico Antigo, povoado, Portugal, Carrascal

Location, stratigraphy and chronology

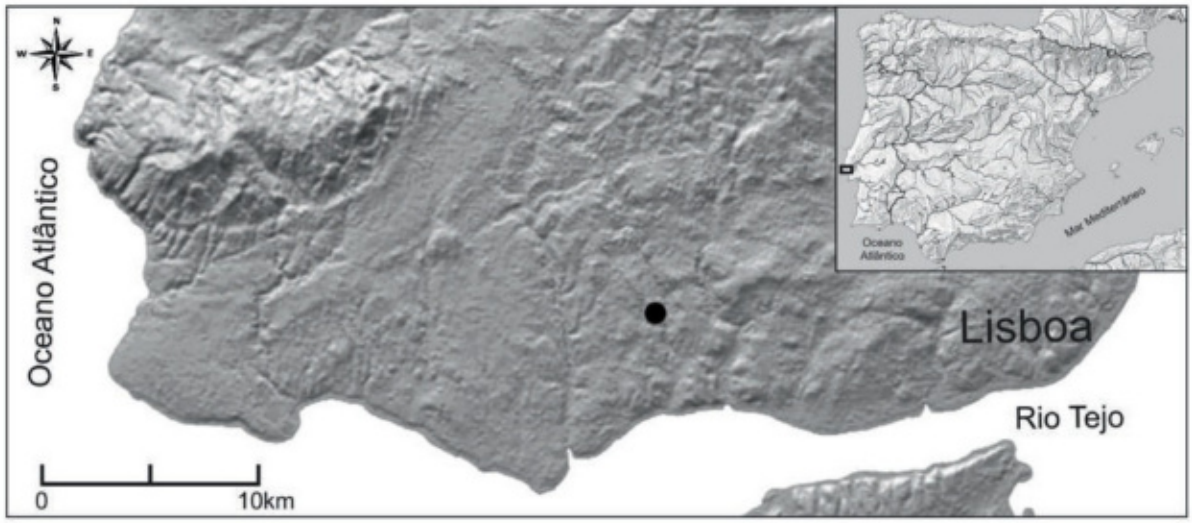
The Early Neolithic site of Carrascal (Oeiras) is located on the lower Lisbon Peninsula, around 12 km west of Lisbon, on the right bank of the stream of Barcarena. The human community that occupied the site during the Early Neolithic maintained a direct connection with this water course, which was during that time a secondary estuary of the larger Tagus estuary, located ca. 3 km away (Fig. 1). The Early Neolithic artefacts appear in a thin reddish-brown layer, directly above the geological substrate, formed by a hard cretaceous recifal limestone from the Upper Cenomanian. In that layer, some artefacts were found in situ, such as a manual grindstone (Fig. 2) and one of two ground slabs, presumably used as polishing tools for axes or adzes (Fig. 3), related to the human occupation of the small areas between the limestone blocks. Domestic structures are attested by two "cuvettes" excavated in depressions within the limestone beds, which were filled with basaltic blocks gathered in the vicinity (Fig. 4). It is believed that these were used as hearth-heaters, given the heat-retaining ability of this type of rock. The Early Neolithic layer was exposed just below a stratum dating to the Late Neolithic. It became difficult to establish a clear separation between layers; consequently, it was sometimes difficult to link some of the artefacts found at the interface of these two strata with Early Neolithic contexts.

Six radiocarbon dates performed on samples taken from terrestrial mammal bones were obtained in order to precisely establish the Early Neolithic time span.[1] On the basis of this important set of dates we can conclude with certainty that the Early Neolithic occupation of Carrascal occurred during at least the beginning of the last quarter of the 6th millennium cal. BC, if not just before, contemporaneously with the necropolis of Gruta do Correio Mor, in Loures,[2] alongside the important residential site of Lameiras, Sintra.[3]

Archaeological material

Concerning the materials recovered from the excavations, in the case of knapped stone artefacts, the large quantity of chipped products is explained by the proximity of the site to raw-material acquisition areas. There was clearly intense flint working at the site. Besides a significant number of lithic nuclei that indicates that the site was a large workshop settlement (Fig. 5),[4] the main artefact groups identified include: perforators, side scrapers, backed flakes, truncations, notches and denticulates, flakes, blades and bladelets with simple, marginal/partial retouch and sometimes with use wear, segments, and heavy-duty tools. The polished stone tools are

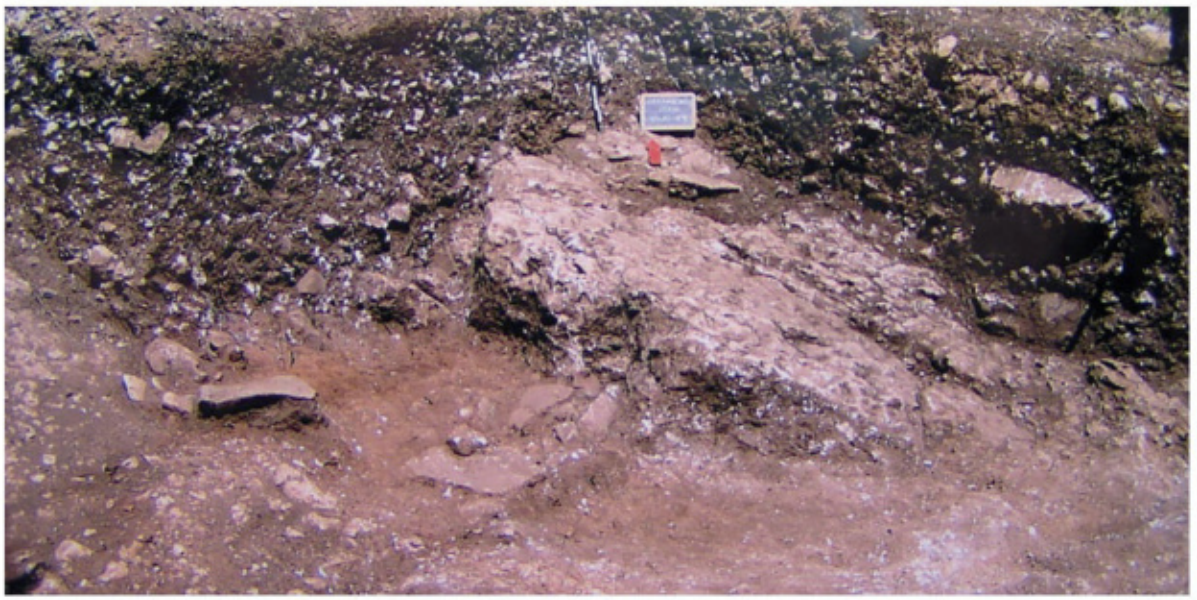
1 Cardoso 2011.
2 Cardoso et al. 1996.
3 López-Dóriga – Simões 2015; Davis et al. 2018.
4 Cardoso et al. 2008; Cardoso 2015.



1 Above: location of the Carrascal site on the north coast of the Tagus estuary and on the Iberian Peninsula. Below: view upstream towards the valley of the stream of Barcarena, pointing out the Neolithic site of Carrascal on the left and the fortified Chalcolithic site of Leceia on the right (photo by M. C. André).

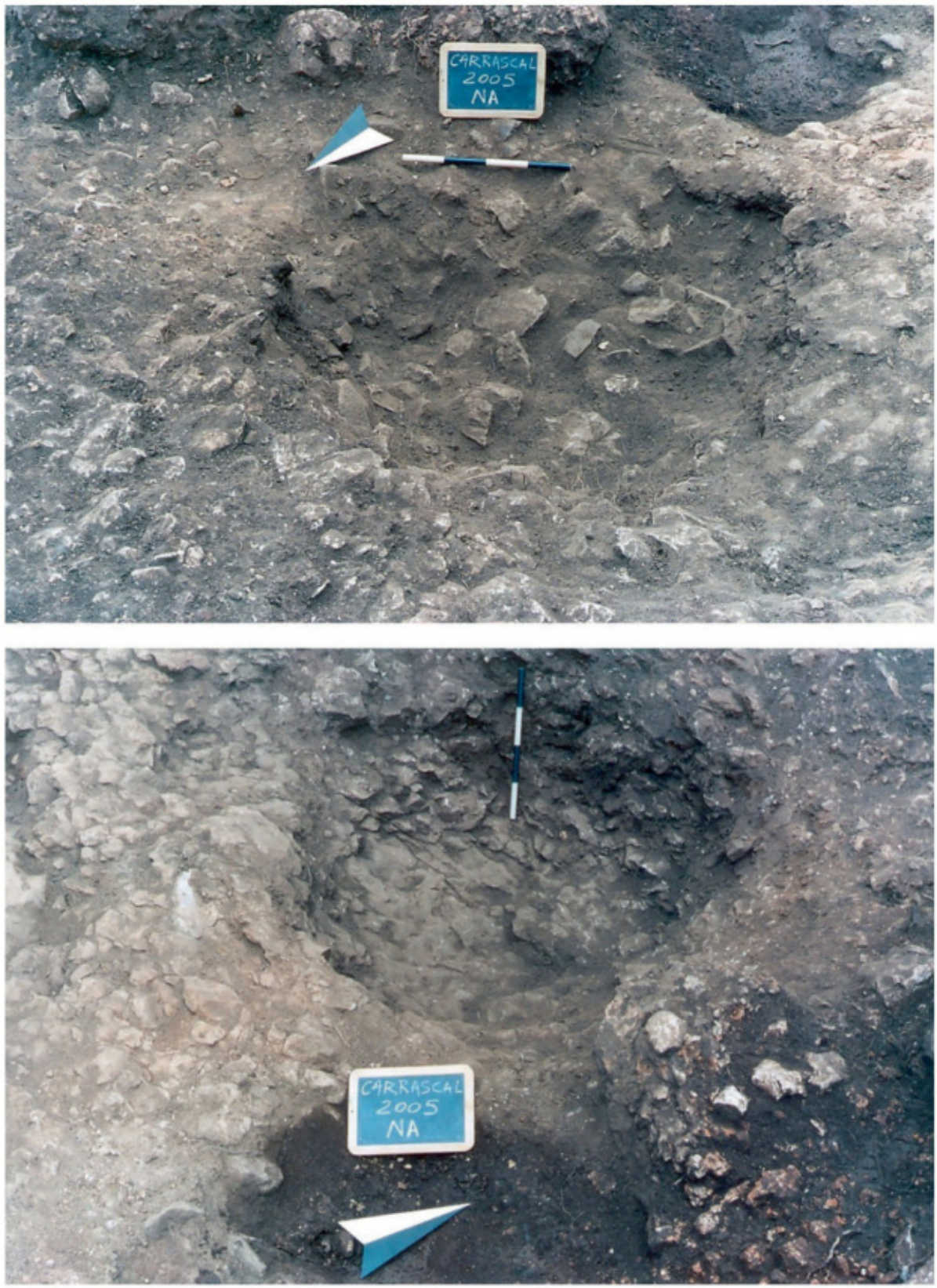
all of small size; axes and adzes are present, all were made from local igneous or metasedimentary rocks (Fig. 6). This reveals a lack of trade for better quality raw-materials, a phenomenon only evident from the Middle Neolithic onwards, with the acquisition of amphibolite from Alto Alentejo region more than 120 km away.[5]

5 Cardoso 2020.

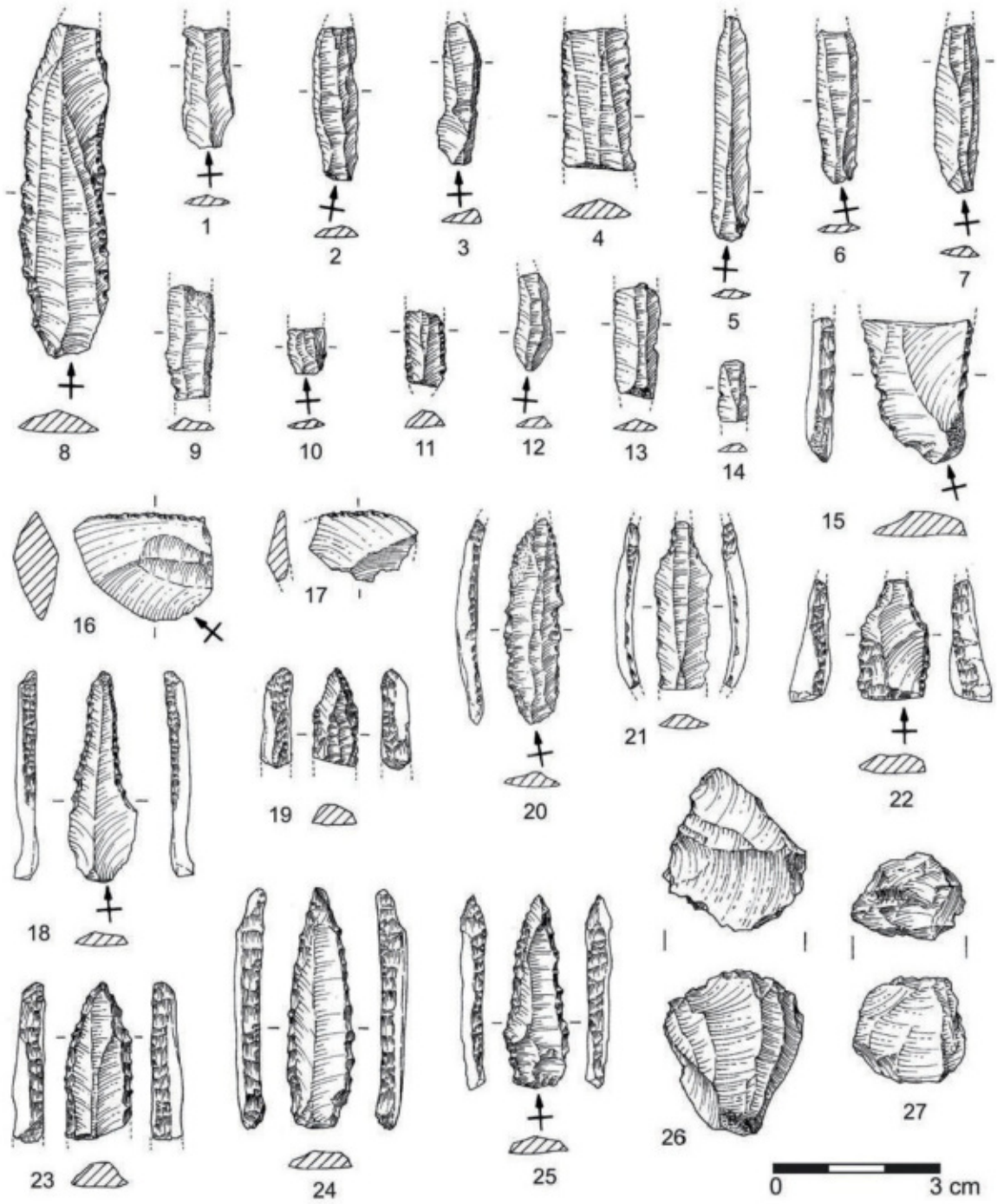


2 Carrascal. Stratigraphic sequence. At the base, the layer of the Early Neolithic, with a manual millstone in situ and fragments of a large storage vessel (photo by João Luís Cardoso).

3 Carrascal. Two polishers of polished stone artefacts, one found in situ (photos by João Luís Cardoso).



4 Carrascal. Cuvette excavated in the cretaceous limestone substrate, corresponding to a fireplace. Above, in the course of the excavation, showing the filling of basaltic blocks, favorable to the conservation of heat and abundant carbonaceous materials, giving it a dark hue. Below, the same structure after being completely excavated (photos by João Luís Cardoso).

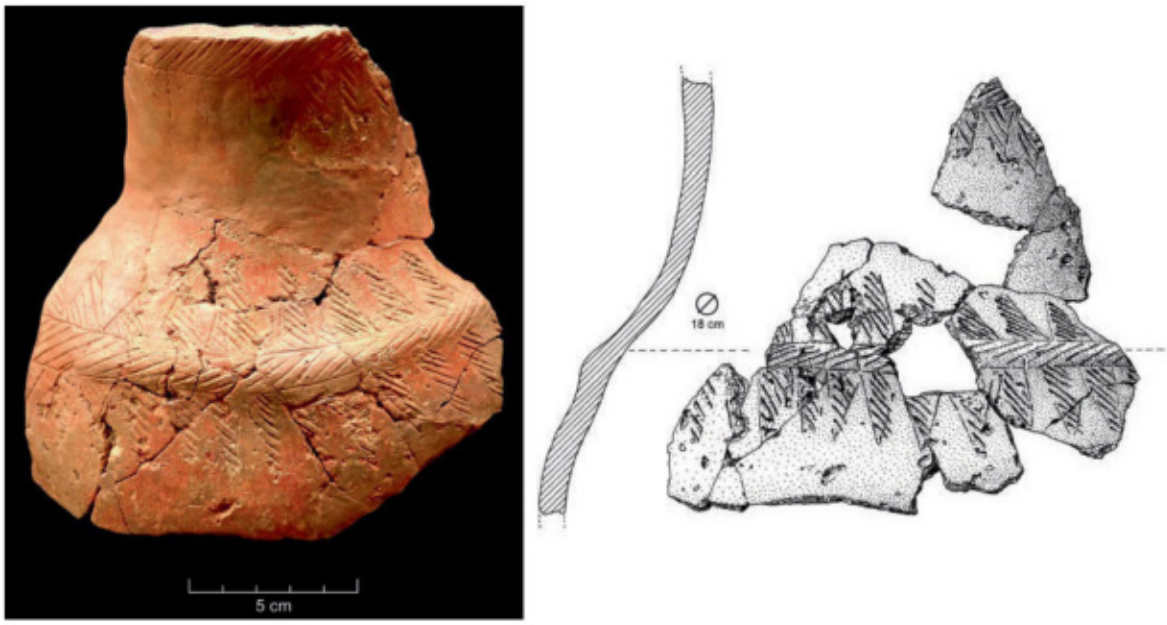


5 Carrascal. Chipped stone artefacts (drawings by B. L. Ferreira).

Ceramics are very abundant – including large storage vessels – and reveal the residential nature of this settlement, with a perennial occupation. The Cardium technique was used on less than 10% of the decorated ceramics, and some of the shells used to perform this decorative technique were larger than usual *Cerastoderma edule* shells. Most of the decorated ceramics exhibited motifs produced by incision, impressed and plastic techniques, along with the presence of mixed techniques, all of which are characteristic of the Early Neolithic (Fig. 7). Occasionally some decorated vases reveal a more carefully finishing, with the application of an "Almagro type" coating over all the surface, decorated with thin incised lines, forming narrow triangles filled by oblique lines (Fig. 8).

6 Carrascal. Polished stone artefacts made with rocks of local or regional origin, of igneous (nos. 1, 4) or metasedimentary (nos. 2, 3, 5) nature (photo by João Luís Cardoso).

7 Carrascal. Ceramics decorated with incised, printed, plastic and ribbed techniques, characteristic of the Early Neolithic (photo by João Luís Cardoso).



8 Carrascal. Fragment of vase decorated with surface rubbish due to an "almagre-type" coating (drawing and photo by B. L. Ferreira).

Faunal remains

The diet of this Early Neolithic population included aurochs (*Bos primigenius*) and cattle (*Bos taurus*), as proven by the difference of size observed between the materials belonging to both species, especially through teeth (Fig. 9). In fact, general size observations and osteometric data (available for proximal phalanxes, astragalus and some teeth) confirm the presence of both species. A few of the bovine long bones (mostly diaphyses, which do not allow for length measurement) may indicate that some animals were very small, a situation usually observed in the domestic species of the Neolithic times in Portugal. All the skeletal elements are present and the calculated MNI is three, with one fetal individual (calcaneum) and two adults.[6]

Both wild boar and domestic pig are likely present. Nevertheless, the distinction between this two species is often very difficult, more so in Western Iberia due to their overlapping size ranges[7] as measured using variation in size and morphology of the lower third molar as a way to distinguish wild and domesticated swine remains. This method requires the presence of this particular tooth in the collection, preferably in considerable amounts. Davis and Detry[8] also noticed that, in Portuguese collections, the diameter of the distal trochlea at its narrowest point (HTC) and the tibia distal width (Bd) can be used as suitable distinction indicators: for the large Zambujal Chalcolithic fauna collection, they identified wild boar when the humerus HTC measured more than 20–22 mm and tibia Bd exceeded 29–35 mm. Unfortunately, the Carrascal sample is much smaller, only allowing a few measurements, most of them from non-diagnostic elements. Still, the humerus data (n = 3) imply the presence of pig (n = 2; 18–19 mm) and perhaps also of wild boar (n = 1; 21.1 mm).[9]

The presence of the domesticated dog (*Canis familiaris*) is indicated only by a single proximal ulna fragment. This piece was modified by polishing and used as a perforator. The presence of domesticated dogs can be correlated with sheep/goat herds.

In fact, caprinae are common in the Iberian Early Neolithic. In Carrascal, several diagnostic elements were recovered (humeri, astragali and metatarsals), indicating the presence of sheep; no goat specimens were identified.[10] As with the other taxa, all of the skeletal elements are present, but the difference between the number of anterior and posterior elements is wider for caprines.

The strategy of animal food production includes, apart from hunting, the intense gathering of aquatic resources from the paleo-estuary of the stream of Barcarena. In fact, during the Early Neolithic, the presence of a wetland along this small stream, directly influenced by the daily sea level variation, explains the abundance of the Portuguese oyster (*Ostrea edulis*) in the archaeological record (Fig. 10). This species was intensively collected by the inhabitants of the site in this humid area, which disappeared soon after as a result of the progressive flood deposition of sediments of the Tagus estuary during the Late Flandrian transgression.[11] Other common aquatic species present in the archaeological record are the limpet (*Patella* sp.) and mussels (*Mytilus* sp.), both abundant in the rocky substrate of the intertidal level along the adjacent coastline.

Discussion

The excavations carried out at the Early Neolithic site of Carrascal between 2003 and 2005 afford the following conclusions:

The physical location of the site, on a gentle slope and at low altitude reveals the strategy of exploiting different types of biota in the region during the last quarter of the 6th millennium BC. In fact, the north slope of the Tagus estuary was intensively exploited, as the abundance of limpets and mussels reveals. Intense collection of aquatic resources at the small paleo-estuary of the stream of Barcarena – which at the time reached the section of this watercourse that ran nearby the site, is confirmed by the abundance of the Portuguese oyster; it is interesting to note that this stream was also undergoing a rapid siltation process. In fact, some 2000 years later, the presence of this species in the early occupation of the site of Leceia (Late

6 Cardoso – Valente 2021.
7 Albarella et al. 2005; Davis et al. 2007, 60–62.
8 Davis – Detry 2013.
9 Cardoso – Valente 2021.
10 Cardoso – Valente 2021.
11 Cardoso 2013.

9 Below: two lower M1–2 compatible with *Bos primigenius* and *Bos taurus*, due to the notable difference in size. Above: two upper M2 attributable to *Sus scrofa* and *Sus domesticus*, on the same side, due to the same reason (photos by João Luís Cardoso).

10 Carrascal. Below: set of *Ostrea edulis* valves. Above: set of valves of *Patella* sp. showing the intense collection carried out during the Early Neolithic, both in the paleo-estuary of the stream of Barcarena, and along the adjacent shoreline (photos by João Luís Cardoso).

Neolithic) is residual.[12] On the other hand, the agricultural and livestock exploitation of the land surrounding the inhabited place constituted the most important source of food resources, as evidenced by the presence of grinding implements, on the one hand, and the identified faunal record on the other. Domestic species predominated: cattle (*Bos taurus*) and sheep (*Ovis aries*), and, residually, the dog (*Canis familiaris*), related to the guarding of herds. Wild game is represented by the aurochs remains (*Bos primigenius*) and also by the wild boar (*Sus scrofa*).

Large quantities of sizeable ceramic containers, the existence of grinding tools, and the presence of cattle are all arguments favourable to a perennial occupation of the site, despite its specialized estuarial economy.

Intensive flint work, using locally gathered raw-material, reveals another important economic activity at the site, as shown by the abundance of raw materials present in the Cretaceous limestones on which the site itself is situated, and in the form of nodules and siliceous plates. This specialized activity developed together with the local production of polished stone tools made of local or regional rocks, as seen by the presence of two polishers. The absence of imported rocks for the manufacture of polished stone artefacts also demonstrates the lack of exchange networks between this region and the Alentejo interior during this early phase of the Neolithic period. Only during the Middle Neolithic has the use of amphibolithic rocks – of higher hardness and tenacity – been verified.

Conclusions

We can conclude that the Early Neolithic site of Carrascal was an important residential settlement and which now has one of the most well-established chronologies of

12 Cardoso 2013.

the Estramadura region. The six radiocarbon dates from the site cohere with the general chronological framework of the region and corroborate the conclusions of the typological analysis of ceramic and lithic productions. Altogether, these data indicate that the settled occupation of Lower Estremadura began during the early stages of the Early Neolithic, during the second half of the 6th millennium BC.

Abstract

The Early Neolithic site of Carrascal is located on a soft slope of the valley of Barcarena (municipality of Oeiras, district of Lisbon), about 3 km from the northern margin of the Tagus estuary, and in the vicinity of a paleo-estuary located downhill and supplying an abundant collector activity, namely of oysters (*Ostrea edulis*). The abundance of cores and flakes recovered and the occurrence of silex in the cretaceous recifal limestones that exist around the site, is compatible with the inference of an important workshop; likewise, the production of polished stone artefacts made essentially with rocks of local origin has been proven; and, in the register of ceramic productions, with decorations typical of the Early Neolithic – incised and printed – large vessels occur, for the storage of various products, such as cereals. In effect, a manual millstone was collected, still in its original position. The faunal remains are rich and diversified, with the following taxa present: *Bos primigenius; Bos taurus; Sus* sp. and *Ovis aries*, showing the abundance of domestic animals as well as wild game. Finally, domestic structures are represented essentially by two cuvettes, excavated in the geological substrate, filled with basalt blocks collected in the vicinity, corresponding to fireplaces. Together, the abundance and diversity of the remains found indicates a perennial establishment corresponding to an important occupation dating to the last quarter of the 6th millennium BC, according to the six radiocarbon dates performed on faunal remains.

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