

A Solutrean zoomorphic engraved *plaquette* from the site of Vale Boi, Portugal

Eine Plakette mit solutréenzeitlichen Tiergravierungen aus der Fundstelle Vale Boi, Portugal

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ABSTRACT - The present paper describes an engraved *plaquette* with zoomorphic designs that includes three aurochs and a possible cervid. It was found in the site of Vale Boi, Algarve, southern Portugal, and its archaeological context is securely dated between 24-25 000 cal BP. All four figures seem to have been made at the same time, in a general composition, prepared and executed by a single author. The design follows the stylistic patterns found in southern Iberia, confirming the model of a large social and technological network across the Iberian Mediterranean coastal region.

ZUSAMMENFASSUNG - Der vorliegende Aufsatz stellt ein Geröll mit zoomorphen Gravierungen vor, die drei Auerochsen und möglicherweise ein hirschartiges Tier darstellen. Das Objekt stammt aus der Fundstelle Vale Boi, Algarve, Südportugal und wird in den Zeitraum zwischen 24-25 000 cal BP datiert. Alle vier Darstellungen scheinen zum selben Zeitpunkt einer gemeinsamen Komposition folgend von einem Autor hergestellt worden zu sein. Die Darstellungsart folgt der stilistischen Konvention aus dem Süden der Iberischen Halbinsel und bestätigt die Vorstellung eines großen, sozialen und technologischen Netzwerkes, das die mediterranen Küstenregionen untereinander verband.

KEYWORDS - Mobile Art, Upper Palaeolithic, Iberia, Aurochs
Kleinkunst, Jungpaläolithikum, Iberische Halbinsel, Auerochse

Introduction

Although Paleolithic art is known in Portugal since the early 1960's (Glory et al. 1965) as evident from the Escoural cave site (Fig. 1), which until recently had been the only one of its kind in the country (Araújo & Lejeune 1995; Bicho et al. 2007; Garcia et al. 2000; Lejeune 1995; Santos et al. 1981), a series of locations have been found during the last two decades, mostly in the northern region of the country. The Côa Valley was found in the early 1990's in the north-eastern Portugal, and is now the largest and a world famous open air complex of Paleolithic art (Aubry & Sampaio 2008a, 2009; Baptista 1999a, 1999b 2009; Baptista & Gomes 1997; Baptista et al. 2009).

In addition to the Côa valley artistic complex, there are also some isolated finds around or nearby small northern river valleys like the sites of Ribeira da Sardinha and Quinta das Laranjeiras in the Savor valley (Baptista 2001; Bicho et al. 2007), Mazouco in Trás-os-Montes (Jorge et al. 1981), and Ocreza and Poço

do Caldeirão in Beira Baixa (Baptista, 2001, 2004; Gomes, 2001). Further south, there is also the site of Molino Manzanéz in the international section of the Guadiana valley (Collado 2002, 2009).

Portable art covers a slightly different region (Bicho et al. 2007). Probably, Fariseu in the Côa valley is the most important site for its relevant number of decorated stone slabs (Aubry & Sampaio 2008a, 2008b). Other known sites are Quinta da Barca Sul (Côa), Buraca Grande (Pombal), Caldeirão Cave (Tomar), (Aubry & Moura 1993; Cardoso & Gomes 1994; Zilhão 1988, 1997), Chancudo 3 in Alqueva (Pereira 2010), and in Vale Boi, Algarve, where now close to a dozen decorated schist *plaquettes* have been found with abstract engravings dated to Gravettian, Proto-Solutrean, Solutrean, and Magdalenian (Simón et al. in press). In addition, one schist *plaquette* with zoomorphic elements attributed to the Solutrean was also found. Its engravings were preliminarily interpreted as a single horse and an aurochs (Bicho et al. 2010b).

In this paper, we present a complete analysis and a review of the interpretation of the engraved *plaquette* with animal motifs in Vale Boi, and dated between 24-25 000 calBP.

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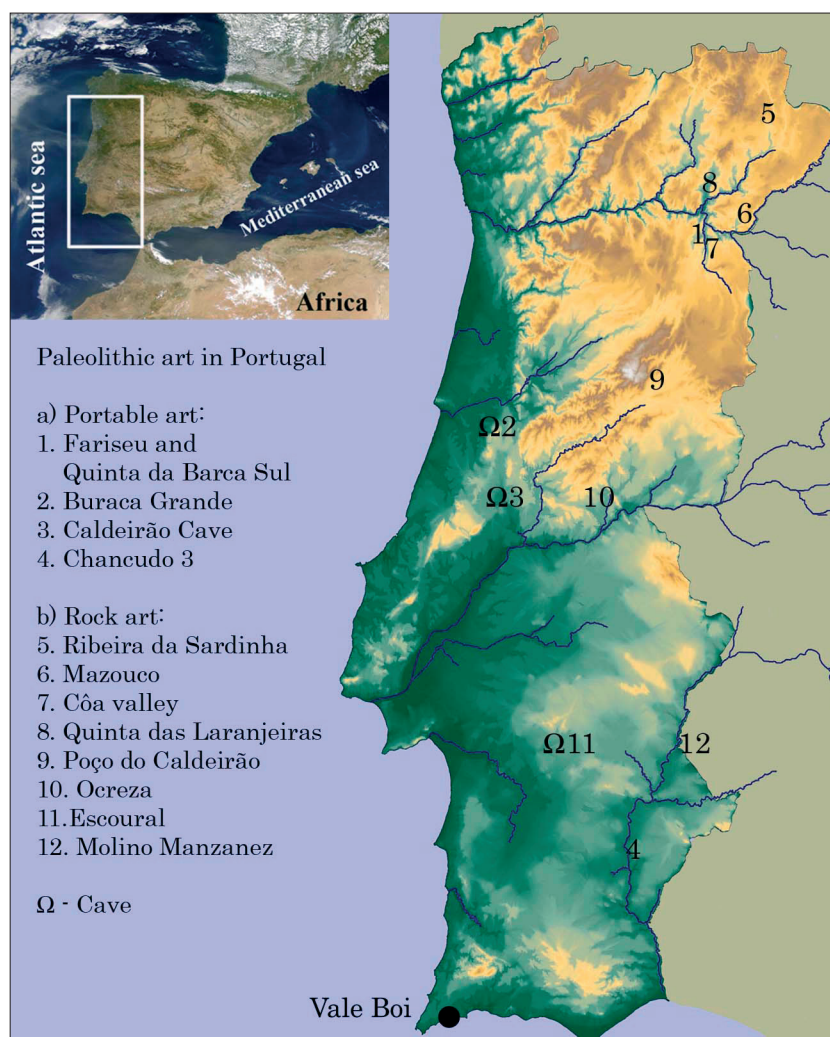


Fig. 1. Map of Portugal with open air and cave sites with Palaeolithic art.

Abb. 1. Karte mit Freilandfundstellen und Höhlenfundstellen mit paläolithischer Kunst.

The archaeological context of Vale Boi

The site of Vale Boi was discovered in 1998 (Bicho et al. 2010a, 2010b). It is located 2.5 km from the Atlantic shore, and is about 15 km east from the Vila do Bispo town. The site is at an average elevation of 30 m a.s.l. and spreads over 10 000 m² on a valley slope covering limestone bedrock. Excavation of the site started in the year 2000 with various test pits. Presently, there are three main areas of excavation: (i) the Slope, where midden deposits are found, (ii) the Terrace, with a sequence from Mousterian to Early Neolithic, and (iii) the Rockshelter, located in the high point of the slope at the base of a 10 meters high limestone face. The provenance of the decorated piece presented here is from the rockshelter.

The shelter sequence with five different geologic layers, covers a period between the late Gravettian and the Magdalenian (Bicho 2009; Bicho et al. in press). The Solutrean (layers A, B, C, and D from the most recent to the oldest), and late Gravettian (D) horizons are radiocarbon dated (Fig. 2), and are below the

collapsed shelter. The Magdalenian assemblage (Layer Z) was found above the collapsed layer Z. The zoomorphic decorated *plaquette* came from the base of the Solutrean Layer C, securely dated between c. 24-25 000 cal BP (Fig. 3).

Analytical methods

The *plaquette* as well as many other artifacts in Vale Boi, were partially covered with both ferruginous and carbonated concretions. The latter resulted from the dissolution of the surrounding limestone. These lithochemical deposits covered part of the artifact edges as well as some of the engraved striations. Thus, cleaning up the *plaquette* was necessary for a complete reading. In 2007 C. Bouzas Bello cleaned the *plaquette* by thorough mechanical removal of the carbonated concretions under a stereo microscope. With the tablet free of concretions, the carved lines were traced, and subsequently analyzed by two of the authors (MDV and MCS) and interpreted for sequencing of the *plaquette* engravings.

Phase	Layer	Lab. #	Sample	Age BP	cal BP (2 σ)**
Magdalenian	Z1	Wk-31088	Bone	15 660 \pm 86	18 606 - 19 246
Solutrean	B1	Wk-17840	Charcoal	20 340 \pm 160	23 840 - 24 780
Solutrean	B6	Wk-24765	Shell	18 859 \pm 90*	21 371 - 22 195
Solutrean	C1	Wk-24763	Charcoal	19 533 \pm 92	22 684 - 23 720
Solutrean	C4	Wk-26800	Charcoal	20 620 \pm 160	24 191 - 25 040
Solutrean	D2	Wk-26802	Charcoal	20 570 \pm 158	24 110 - 25 020
Gravettian	D4	Wk-26803	Shell	21 896 \pm 186*	24 770 - 26 030
Gravettian	D4	Wk-31087	Shell ornament	28 140 \pm 195*	31 200 - 32 320

Fig. 2. AMS dates from the Rock Shelter area, Vale Boi.

* Reservoir correction (ΔR) of 265 \pm 107yrs (Reimer and Reimer - <http://calib.qub.ac.uk/marine/>).

** Calibration used the Program Calib, 6.0 with the IntCal09 curve (Reimer et al. 2009).

Abb. 2. AMS-Datierungen aus dem Abribereich, Vale Boi.

The traced data from the decorated Vale Boi slab were made based on microscopy. Initially, a stereo microscope was used to read and interpret the engravings, but later on a Sony digital microscope with DFW-X 700 interface and cold light from the fibre optics was used. The photos were taken with an Olympus 9.08 megapixel camera, and the digital photography following standard criteria of analysis (Crémades 1994; Fritz 1997, 1999; Montero *et al.* 1998; Maura & Cantalejo 2004). The digital treatment of the images and the taphonomic interpretation were made based on the stereo microscope view, and immediately transferred to the digital photos.

Since the engravings are characterized by multi-directional and numerous superimposed grooves, forming a complex palimpsest representing a series of zoomorphic elements, the separation and

individualization of each figure is, at times, difficult to distinguish. The following analytical criteria were used to resolve this problem:

a) Morphological and technological characteristics of the grooves and figures;

b) Graphic sequence and recognition of the superimposed sequence of lines;

c) Anatomical representation of the animal front section (cervic-dorsal curve, horn shape, front limbs, forehead, nose, chin, neck, and belly). For the back section, the lines are not nearly as clear, and there may be a common use of grooves for the representation of each figure;

d) the conventions used to represent certain anatomical sections (such as the neck-head interface in Y-shape) or the connection between secondary lines (with spaces in between).

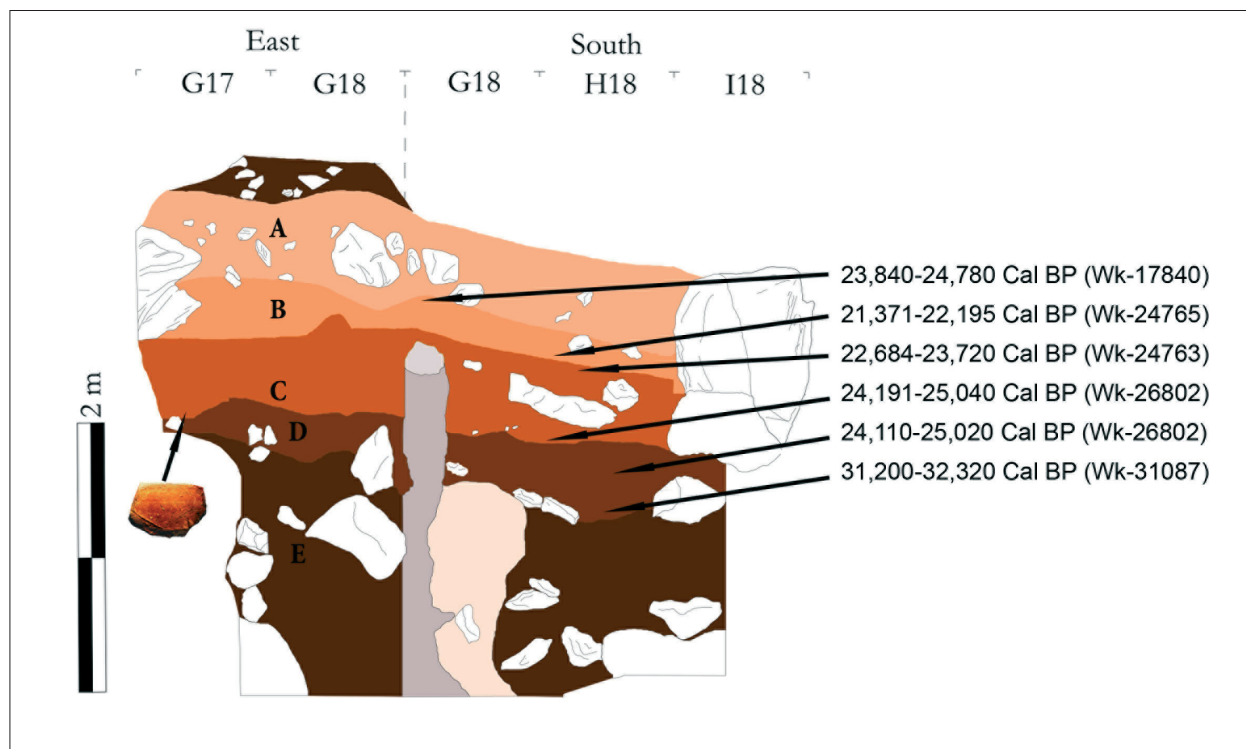


Fig. 3. Profile of the Rockshelter with the radiocarbon dates.

Abb. 3. Profil des Abbris mit den radiometrischen Datierungen.

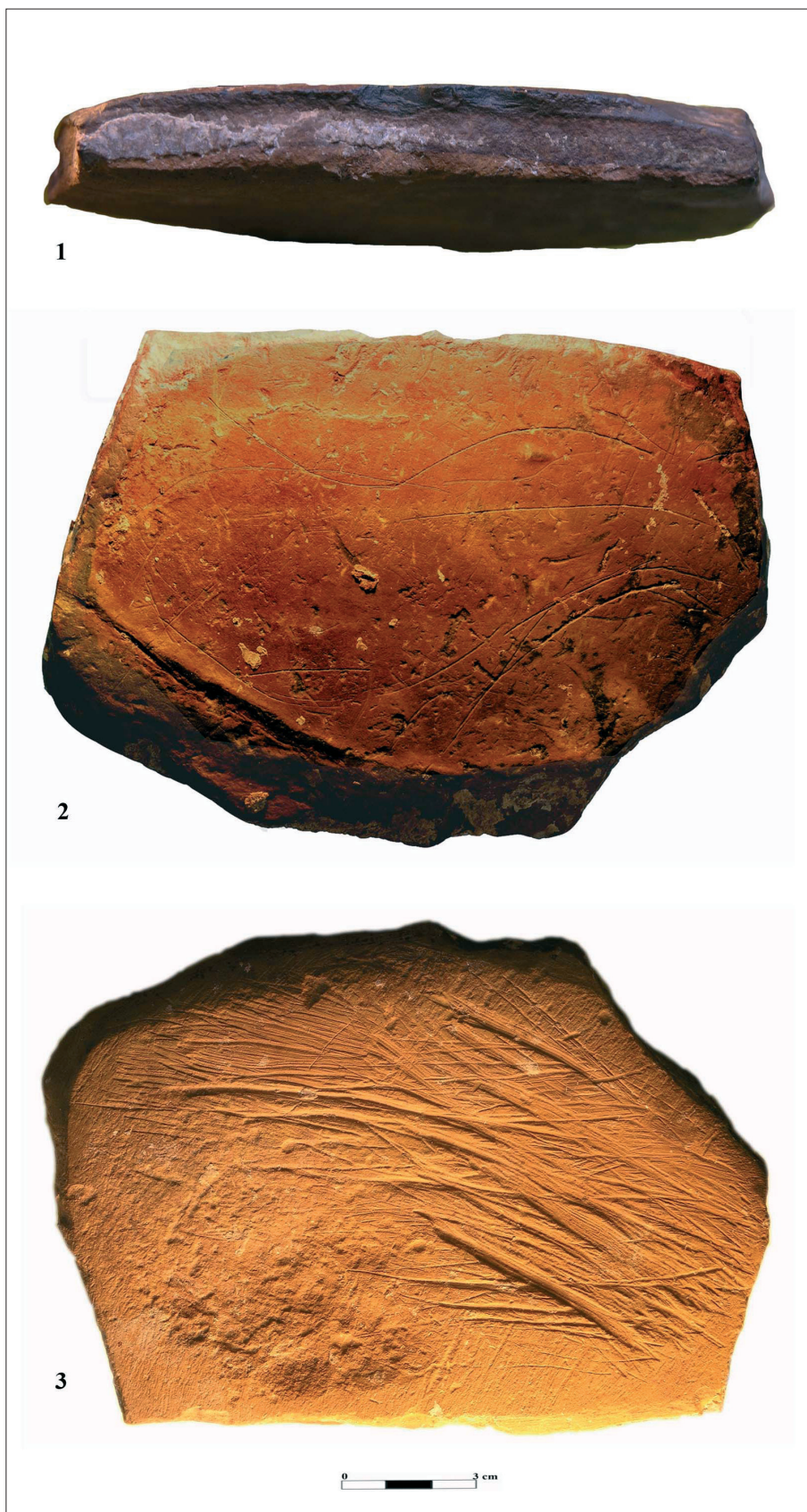


Fig. 4. Three views of the Solutrean *plaquette*; $\frac{2}{3}$ natural size.
Abb. 4. Drei Ansichten der Platte aus dem Solutr en; $\frac{2}{3}$ nat rliche Gr sse.

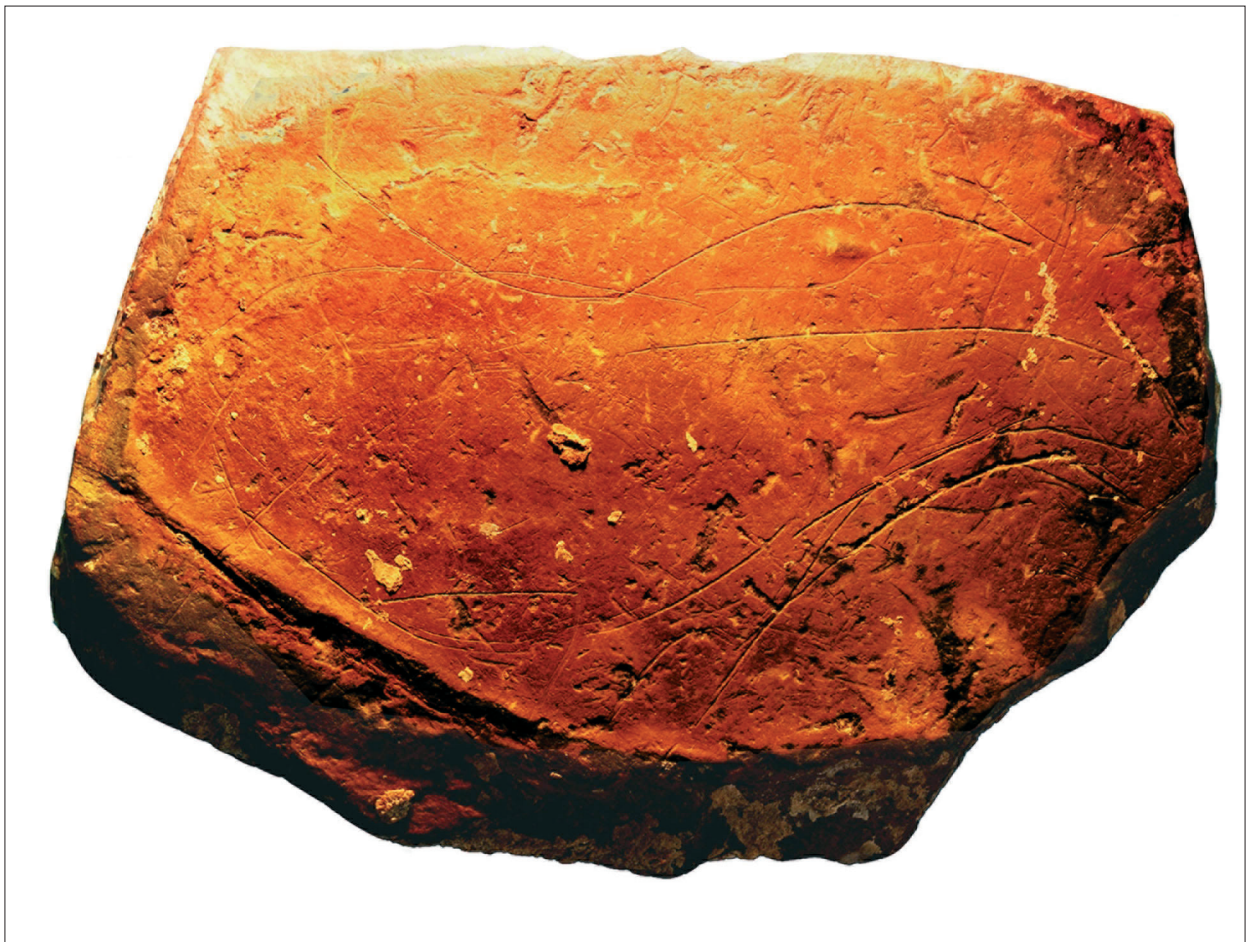


Fig. 5. Detail of the engravings.

Abb. 5. Details der Gravierungen.

The Solutrean *Plaquette*

The *plaquette* is a small slab made of schist. However, schist is present only on one side (surface A) while the other side is a yellowish iron oxide vein (surface B). This type of metamorphic rock is present few hundred meters north of the Vale Boi site, but the small stream also carries some pebbles of this raw material. Since the whole blank was completely altered, it is not possible to determine if it was initially a fluvial cobble, or a block, picked up at a primary source.

The *plaquette* is flat and trapezoidal in shape with dimensions of 71.4 mm in width, 52.9 mm in length, and 9.4 mm in thickness. The whole surface of the slab showed evidence of work – the final shape of the artifact was obtained with the removal of a series of flakes from the edges in both sides with a hard hammer and direct percussion (Fig. 4, 5, 6). The preservation is, in general, good on both surfaces, though there is some exfoliation and minor surface loss on side A affecting the top left quadrant. The presence of surface concretions, mostly on surface A, suggest that the piece was laid down on that side (in fact it was found in that position), where the iconographic repertoire is located.

The blank is unbroken, and thus, the present dimensions and shape are those resulting from the anthropogenic initial configuration. It was used both to obtain dye from one side (with strong and multiple deep striations), and as a blank for engraved portable art on the other side. Since the presence of the yellow iron oxide over the engravings on the top and right sections of the *plaquette* is evident, and this area coincides with the direction of the removals on side B, it is likely that the object was first used as an artistic or symbolic element and later used to obtain the yellow dye. The location of the yellow staining also suggests that the top section of the small slab was held with a slight inclination against a surface while the dye was scraped. This process was probably made with a liquid component (possibly water), since there is an appearance of light burnishing on opposite, but symmetrical areas of both sides where the hand of the artisan held the *plaquette*.

The engravings' predominant morphology is in V shape, though there are some marked by U sections. Other forms such as bar codes, comets, striae, double striations of burin are also present. The characteristics of the traces seem to indicate the use of one of more flint utensils, aspects, which is corroborated by the wear analysis of lithic tools that showed evidence of the use of some artifacts on hard materials (Bicho & Gibaja 2007).

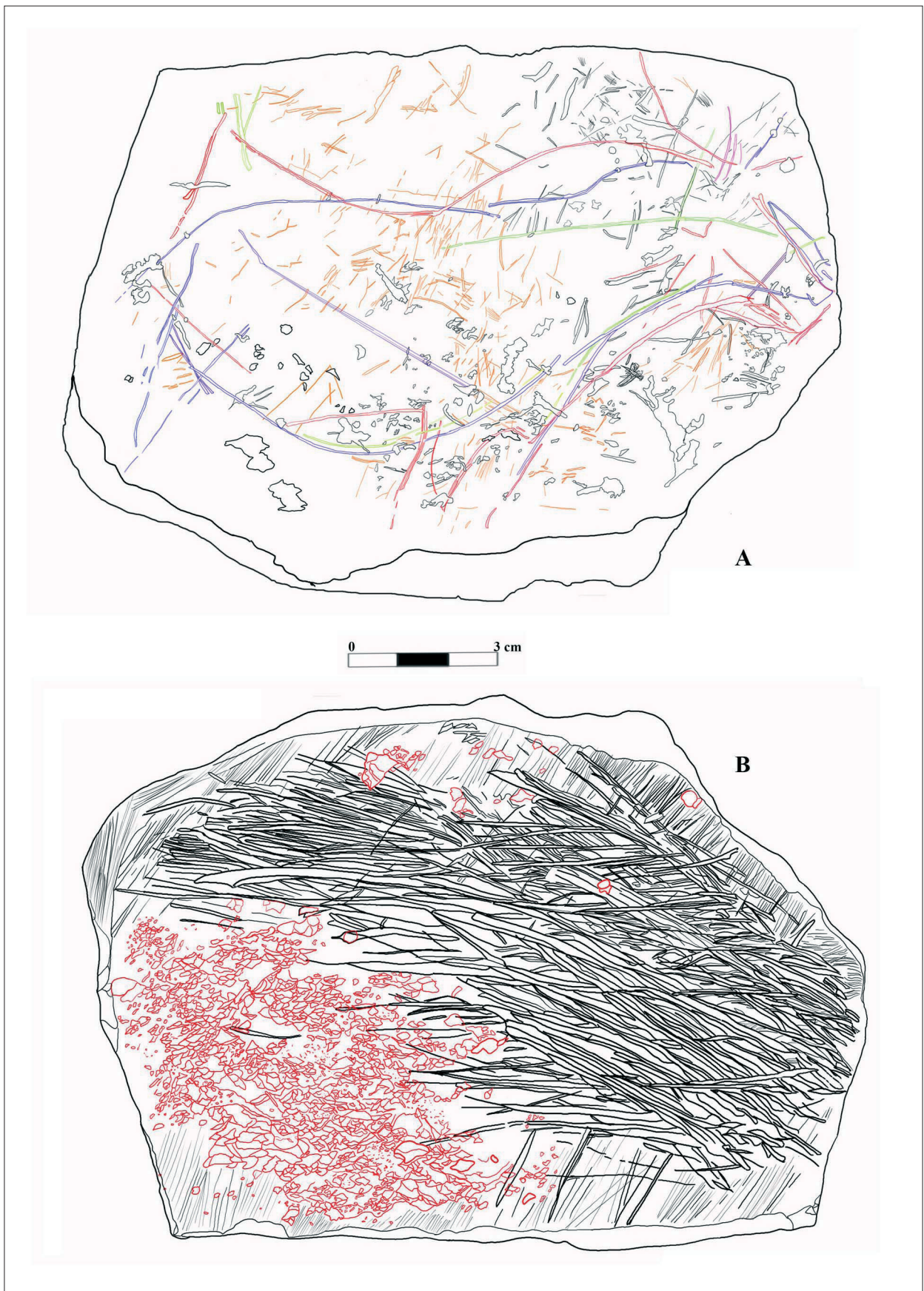


Fig. 6. Engraved lines on surface A and B.

Abb. 6. Gravierte Linien auf den Oberflächen A und B.

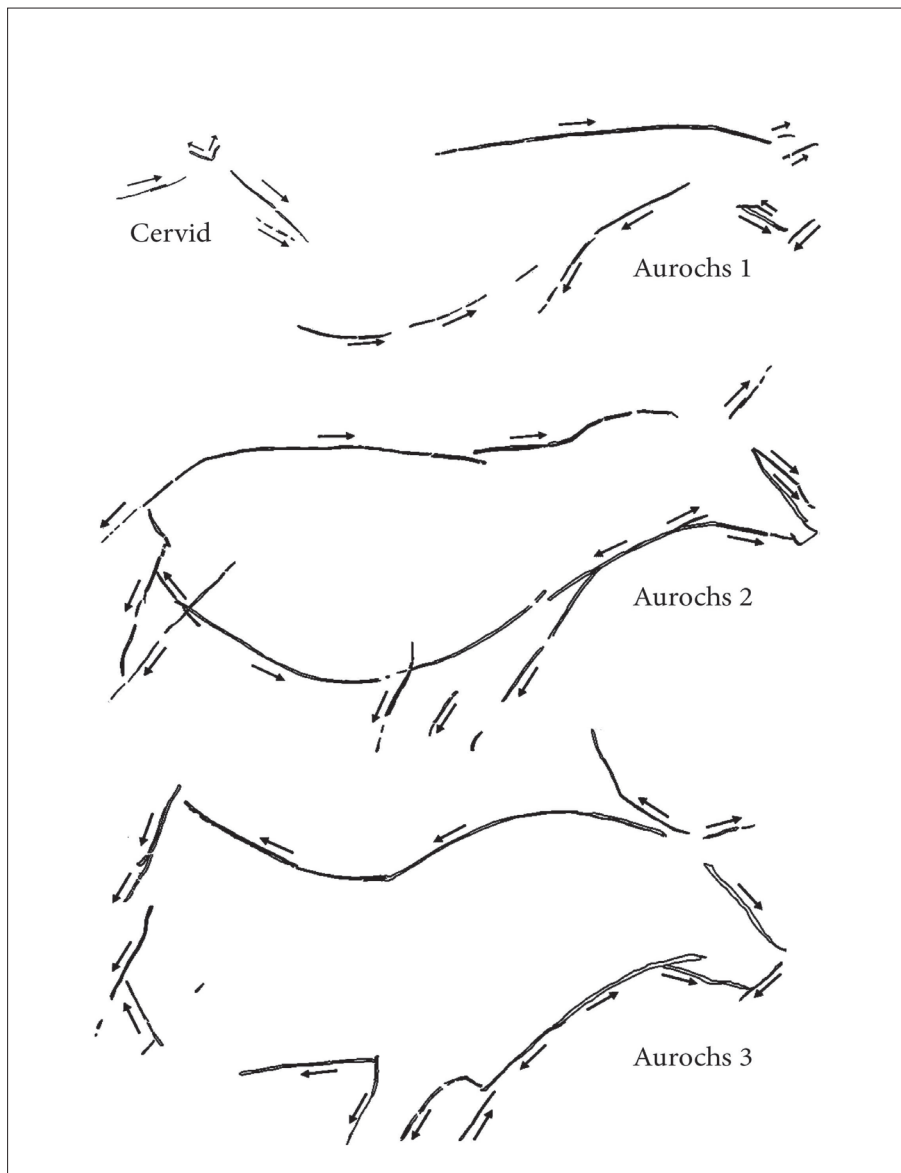


Fig. 7. Direction of grooves of all four figures on surface A.

Abb. 7. Ausrichtung der gravierten Linien aller vier Darstellungen auf der Oberfläche A.

The zoomorphic figures are three oxen, and possibly, though doubtful, a cervid. They are oriented from left to right, with head and front limbs engraved (Fig. 7).

1) Aurochs 1 is an incomplete and the least detailed bovid on the *plaquette*. It is represented by only the head and an open nose with a square tendency and what might be the horns. The merger between head and neck is represented by a y-shaped line. The horns and the neck-foreleg line are over imposed on the other aurochs. The lower section of the mouth uses the same anatomical section of aurochs 3.

2) Aurochs 2 uses the overall space of the *plaquette*. The body is represented in a disproportionate form with a large belly. The head is wide while the snout is narrow ending on a single line. The horns line is open in a v-shape towards the front with a broken horn. Like the other aurochs, the neck-head line is represented in a Y-shape. Two lines compose the dorsal-cervical

superimposed by Aurochs 3 grooves. The hind section of the body is represented by a progressively thinner and shallower groove as it gets to the end of the tail. This figure seems to be the union of two sections, the front and hind parts of the animal. The connection between the two is made by multiple lines in the body and at the end of the neck. Anatomical details such as the nose are added to these two sections. One interesting aspect is that the phallus line seems to have been drawn earlier than the rest of the aurochs' belly (the same strategy was followed in Aurochs 3). Finally, the back legs form an elongated triangle.

3) Aurochs 3 is a curved figure with a large neck and angular and massive look. The dorsal-cervical neckline is marked by a mid strong inflection, and arched line made with a deep groove. The horns are an open u-shaped line on top of a massive, rectangular head. This line is also deeply marked using grooves from Aurochs 2, ending with a straight nose,

slightly separated from the head and overpasses the jaw limit. The connection between the chest and the front legs is made by an open step. The back is formed by two semi-parallel grooves, slightly deviated from the same line on Aurochs 2. The belly line is added later with a discontinuous and shallower line parallel to that of Aurochs 2. The hind legs seem to have used the lines from Aurochs 2, though complemented by new, short, and parallel lines in the top third of the leg. The relation between the front and hind sections seem to be unbalanced and slightly incorrect due to the partial use of the previous figure. It seems that the author did not calculate the proportions of the animal correctly, and the figure ended up being limited by the space prepared for the engraving. Among the three aurochs, this is the latest to be represented on the *plaque*.

4) The last, incomplete, figure, possibly a cervid, is sketched by a series of simple and light grooved lines representing the ears, partial neck, mouth, and snout, superimposed on the aurochs figures. However, if one removes the lines forming the different aurochs, it reveals that this figure is not formed by a complete body. Thus, it is a rather elusive figure.

The figure authorship and the artistic sequence

In such an artistic piece, one of the possibilities is to consider various authors for the group of figures. However, this does not seem to be the case in this Solutrean *plaque*. The artistic ensemble represented in the *plaque* shows a repetitive and

	Neck (back)	Back	Horns	Chest	Snout	Jaw	Neck (front)	Front legs	Belly	Hind legs	Phallus	Hip	Tail
Neck (back)	(4) A3/A3	-	-	-	-	-	-	-	-	-	-	-	-
Back	-	(5) A3/A2	-	-	-	-	-	-	-	-	-	-	-
Horns	-	-	(9) A1/A2	-	-	-	-	-	-	-	-	-	-
Chest	-	-	(8) A3/A1	(6) A3/A3 (7) A3/A2	-	-	-	-	-	-	-	-	-
Snout	-	-	-	-	(10) A3/A3 (16) A3/A1	(11) A2/A2	-	-	-	-	-	-	-
Jaw	-	-	-	(12) C-A2	(13) A2/A2	-	(17) A3/A3	-	-	-	-	-	-
Neck (front)	-	-	-	-	-	-	(18) A2/A2 (19) A2/A2 (20) A2/A1 (21) A3/A3	(22) A3/A2/ A1	-	-	-	-	-
Front legs	-	-	-	-	-	-	(23) A3/A3	(26) A3/A2	(25) A3/A3 (28) A3/A2	-	-	-	-
Belly	-	-	-	-	-	-	-	(14) A3/ A1+A2 (15) A3/A3 (27) A1/A2/ A3	-	(31) A3/A3 (29) A2/A3 (32) A3/A2	(35) A2-A3+A2	-	-
Hind legs	-	-	-	-	-	-	-	(24) A3/A2	(30) A3/A2 (31) A3/A3	-	(34) A2-A2+A3 (36) A3/A3/A2	-	-
Phallus	-	-	-	-	-	-	-	-	-	-	(33) A3/A2	-	-
Hip	-	-	-	-	-	-	-	-	-	-	-	(2) A3/A2 (3) A3/A2	-
Tail	-	-	-	-	-	-	-	-	-	-	-	-	(1) A3/A3

Fig. 8. Relation and sequence of superimposed lines from Figure 9. Caption: /-over; A-aurochs; C-Cervid.

Abb. 8. Beziehungen und Sequenz der sich überlagernden Linien aus Abb. 9. Zeichen / = überlagert; A = Aurochse; C = Hirsch.

uniform use of the whole available space that was prepared previously. There is a general adjustment of the proportions and the use of conventions in all three aurochs by a single author. This is confirmed by several aspects that include: (i) the use of Y-shaped lines between the neck and the jaw, which makes the beginning of the jaw seem slightly off from the neck in all three aurochs, (ii) the presence of a short space (1 to 2 mm) between the two lines forming the Y, (iii) identical direction of the lines in aurochs 1 and 2, and partially identical direction in aurochs 3, (iv) the drawing of phallus before the belly and legs in at least 2 aurochs, suggests that even before the completion of the figures, there was the desire to represent male animals, (v) the re-utilization of the lines making the aurochs chest is all 3 animals, and (vi) the general integrative and holistic perspective of the whole ensemble.

The engraving sequence also seems to confirm the presence of a single author. There are two moments of creation: (i) the first one at the time of organizing the space and deciding the number of figures and general location by adjusting the pictorial area when drawing the phallus and dorsal-cervical lines, and (ii) the second one at the time of finishing the figures. This can be seen partially by the superposition of the lines (Figs. 8 & 9), where Aurochs 3 tends to be superimposed to aurochs 2 and 1 in all the anatomical

areas of the animals. This is indicated by the points 2, 3, 5, 7, 8, 16, 24, 26, 28, 30, 33 and 36 in Figure 9. Aurochs 3 is the most recent figure to have been engraved at points 14 and 22, in cases where the three figures are superimposed. However, it is very likely that all the figures were made at the same time, since on one point there is a slight reversal of the order. At point 27, for example, a second line forming the belly of Aurochs 1 is superimposed on the front legs of Aurochs 2 and 3. Thus, the anatomical parts of various aurochs were engraved in the following order: dorsal-cervical lines → phallus → front legs → heads → noses → necks → hind legs/belly

Discussion

The site of Vale Boi extends the use of Paleolithic art to the southern edge of the European continent. Together with other sites from southern Iberia such as Nerja, Ambrosio, Bajondillo, El Pirulejo, and Gorhams (Sanchidrián 1994; Ripoll 1988; Pellicer & Sanchidrián 1998; Simón & Cortés 2007; Simón *et al.* in press) Vale Boi represents the very few examples of portable art in south-western Iberia. However, while most examples from those sites lack good chrono-stratigraphical control (with the exception of one artifact from Nerja, two from Gorhams, and the Magdalenian assemblage from El Pirulejo), the Solutrean *plaquette* as well as all

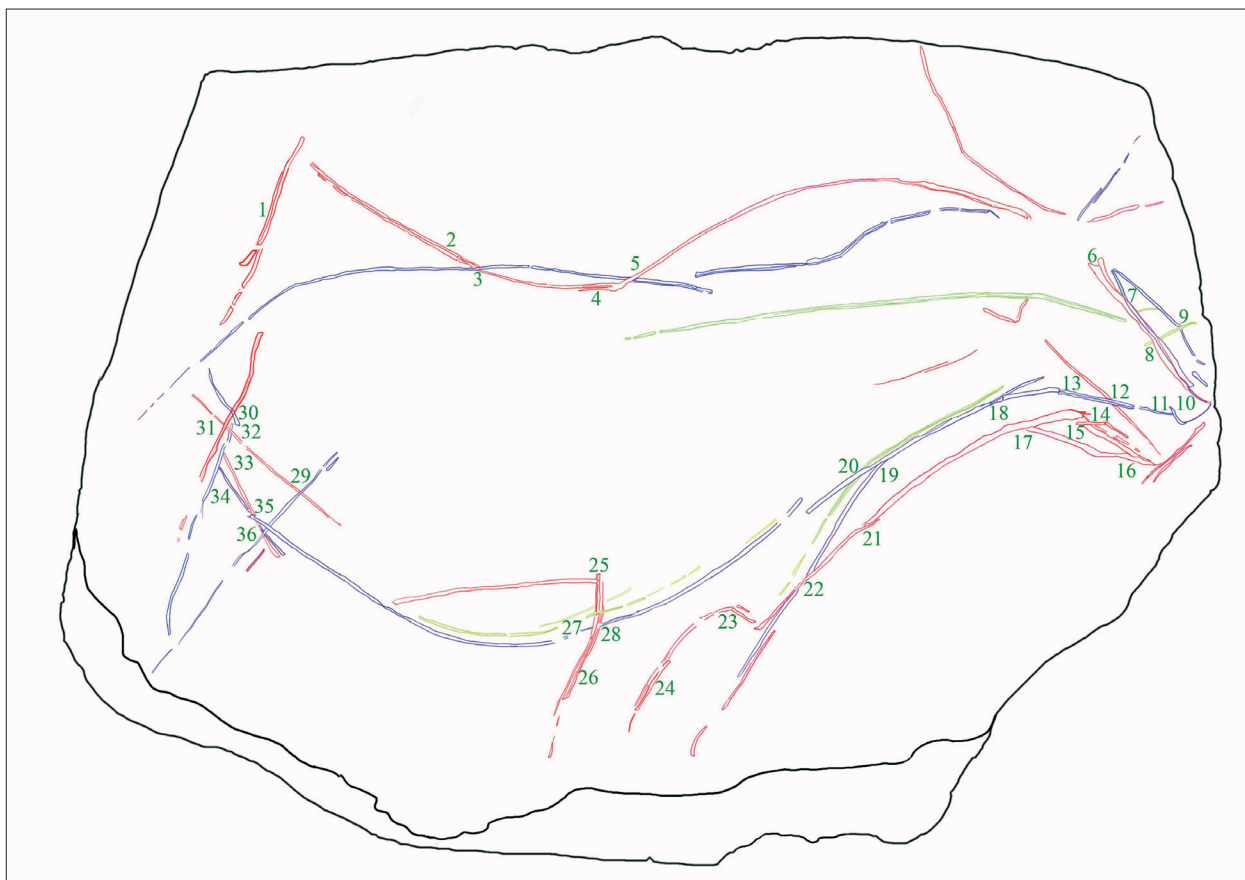


Fig. 9. Engraving sequence of Surface A.

Abb. 9. Gravierte Linien auf der Oberfläche A.

other decorated artifacts from Vale Boi are well dated, either by radiocarbon or its stratigraphical provenience. The Vale Boi Solutrean *plaquette* is thus the oldest found art element in the whole of southern Iberia.

The iconographic zoomorphic elements represented in the Vale Boi *plaquette* are within the range seen in other areas of the Iberian Peninsula for the late Gravettian/early Solutrean phase of the Mediterranean art sequence. The presence of superimposed figures seen in the Vale Boi artifacts is also very common in the Côa valley sites (Aubry & Sampaio 2009; Baptista et al. 2009) as well as in Parpalló (Villaverde 1994). There are differences, however, since the iconographic elements are completely integrated in this particular ensemble and were made simultaneously forming a single and holistic composition. The anatomical zoomorphic stylistic conventions used in Vale Boi are also found in other regions of Iberia. This

is the case of the Gravettian parietal art found in the open-air site of Fariseu (Garcia & Aubry 2002), the wall engravings from Meravelles (Villaverde 2005) and portable art from Malladetes and Parpalló (Villaverde 1994, 2005) all of early Solutrean age. The straight/oblique/biangular set of the head and the straight/biangular design of the front legs seen in Aurochs 2 and 3 are well dated to the late Gravettian, and the first part of the Middle Solutrean of Parpalló (Villaverde 1994). Furthermore, the line of the chest in Aurochs 3 with a characteristic S-shape and the three parallel lines signing the front legs in Aurochs 2 and 3 are seen exclusively in the *plaquettes* 16122A, 16094, 16110, 16117 (Fig. 10) from the lower and middle Solutrean age contexts from Parpalló (Villaverde 1994). The same design is found in the art cave of La Pileta, where the front legs of the Aurochs were directly radiocarbon dated to $20\,130 \pm 350$ RCYBP (GifA-98162 - Sanchidrián et al. 2001), which statisti-

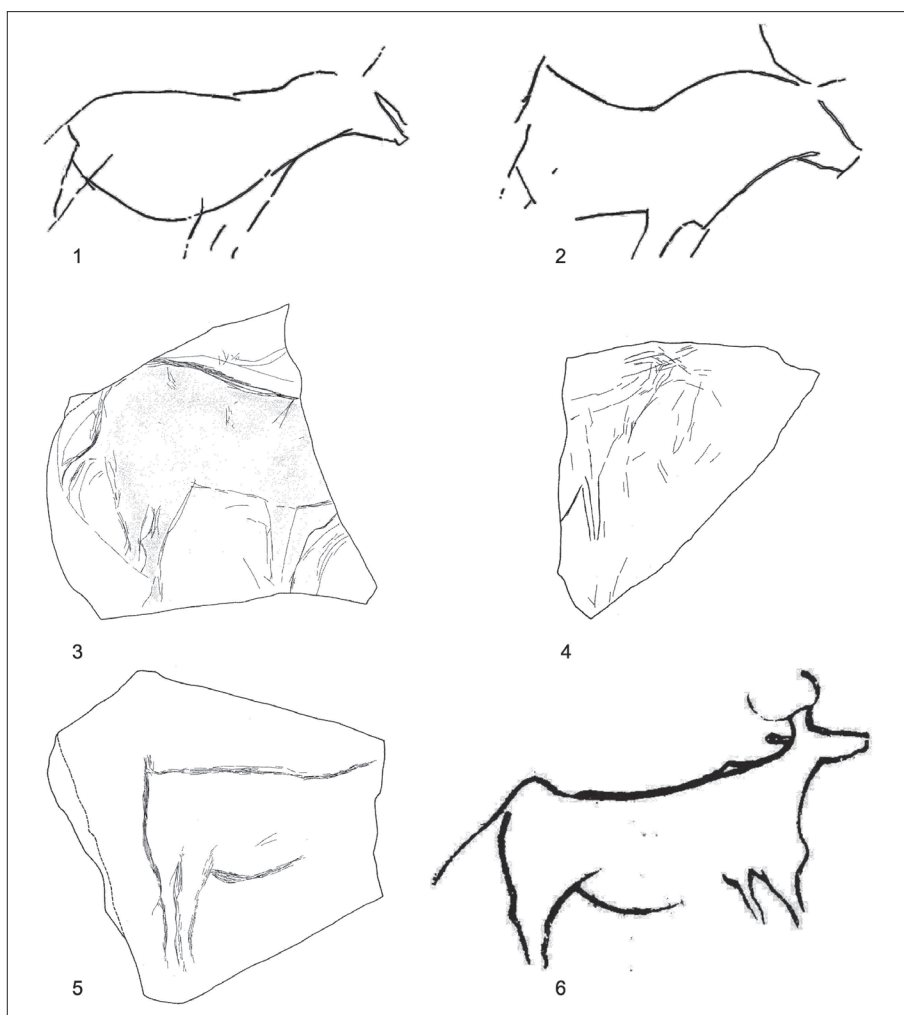


Fig. 10. Examples of Aurochs from various sites in Southern Iberia. 1. Aurochs 2, Vale Boi; 2. Aurochs 3, Vale Boi; 3. *Plaquette* no. 16122A, Parpalló; 4. *Plaquette* no. 16094, Parpalló; 5. *Plaquette* no. 16117, Parpalló (Villaverde 1994); 6. Aurochs, La Pileta (Breuil et al. 1915).

Abb. 10. Beispiele für Darstellungen von Auerochsen aus verschiedenen Fundstellen aus dem Süden der Iberischen Halbinsel. 1. Auerochse 2, Vale Boi; 2. Auerochse 3, Vale Boi; 3. *Plakette* Nr. 16122A, Parpalló; 4. *Plakette* Nr. 16094, Parpalló; 5. *Plakette* Nr. 16117, Parpalló (Villaverde 1994); 6. Auerochse, La Pileta (Breuil et al. 1915).

cally is identical to that of the lower part of Layer C from Vale Boi, where the *plaquette* was found. The pointed end of the back legs in Aurochs 2 is also found in the only aurochs dated to the early artistic cycle of Ardales Cave (Cantalejo et al. 2006).

Conclusion

In conclusion, the Solutrean *plaquette* is clearly within the Iberian stylistic tradition, and fits well with the chronology of an early Solutrean time. It had a double function: as a portable art element, and used for the acquisition of a yellow dye, very common in Vale Boi since early Gravettian times. The stylistic and technological analysis showed that there are four figures (three aurochs and one possible cervid). They were produced simultaneously, most likely by anatomical area of the body (dorsal-cervical section, phallus, head, neck, front legs and hind legs, and belly) using the whole available pictorial space in the *plaquette*. This *chaîne-opératoire* suggests that the artistic ensemble was made by a single individual.

The portable art found in Vale Boi is singular because the *plaquette* presents notable artistic quality. There is a high degree of stratigraphical control during excavation resulting in very good dating this decorated piece. Thus, it is easy to articulate with the general known western Paleolithic art sequence. The stylistic characteristics seen in Vale Boi are clearly embedded in the regional Iberian tradition from Valencia, and Andalucía, which have also been referenced in other types of artifacts in Vale Boi (Bicho 2009; Bicho et al. 2004). That is the case of the lithic technology (Casalheira 2009), the body ornaments (Bicho et al. 2004; Regala 2011), and the bone weaponry characterized by high number of implements in Vale Boi as well as a wide typological diversity, very different from the Context seen in Portuguese Estremadura (Bicho 2009; Bicho & Stiner 2006; Évora 2007). In addition, the wide range and high frequency of typical Solutrean lithic weaponry (Bicho 2009) shows a very close proximity to the Mediterranean Spanish world, indicating close ties with those human groups. Thus, the style of the zoomorphic designs of the *plaquette* presented here fits well with the rest of the archaeological context seen in Vale Boi during the Gravettian and Solutrean phases. Archaeological data, thus, seem to indicate that there was a strong social network covering the coastal Mediterranean world, from Valencia to Vale Boi during Solutrean times.

ACKNOWLEDGEMENTS: The results presented here were only possible due to funding from Fundação para a Ciência e Tecnologia (projects POCTI/HAR/37543/2001 and PTDC/HAH/64184/2006), National Geographic Society and Archaeological Institute of America.

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