NEW YORK UNIVERSITY
Proceedings of the International Symposium
April 08-10 2013, New York (USA)

2015 # 7

http://www.palethnologie.org
ISSN 2108-6532

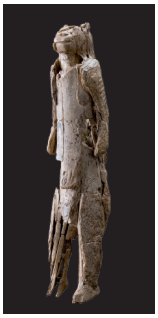
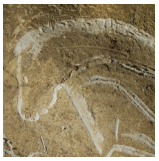
directed by

Randall WHITE
Raphaëlle BOURRILLON

with the collaboration of
François BON

AURIGNACIAN GENIUS

Art, Technology and Society of the First Modern Humans in Europe

FACE FOUNDATION PARTNER UNIVERSITY FUND

PALETHNOLOGY
Bilingual review of prehistory

P@LETHNOLOGY
Bilingual review of prehistory

Review published by the P@lethnologie association, created and supported by the TRACES laboratory, Inrap and the Ministry of Culture and Communication.

Contributions should be addressed to:

P@LETHNOLOGY REVIEW
Vanessa LEA, Research associates

CNRS / UMR 5608 – TRACES
Maison de la recherche
5 allées Antonio Machado
31058 Toulouse cedex 9, FRANCE

Phone: +33 (0)5 61 50 36 98
Fax: +33 (0)5 61 50 49 59
Email: vanessa.lea@univ-tlse2.fr

This digital publication received support from

EARLY AND ARCHAIC AURIGNACIAN PERSONAL ORNAMENTS FROM ISTURITZ CAVE:

Technological and Regional Perspectives

Randall WHITE, Christian NORMAND

Introduction and basic data 139
1 - Isturitz Cave, Normand excavations, stratigraphic overview 141
2 - Aims of this presentation 144
A - Shaping and perforation techniques at Isturitz 144
B - Does the choice of mammal teeth used for personal ornaments remain stable during the course of the Aurignacian? 146
C - The perforated human tooth 149
D - Raw materials used for making beads 151
E - On-site production or allochthonous bead production? 153
F - Personal ornaments in amber (and lignite) 154
G - Tubular beads 156
H - A major discovery: personal ornaments from layer 4d (Archaic Aurignacian) 157
Conclusion 159
Acknowledgements 159
References cited 159

To cite this article

White R., Normand C., 2015 - Early and Archaic Aurignacian Personal Ornaments from Isturitz Cave: Technological and Regional Perspectives, in White R., Bourrillon R. (eds.) with the collaboration of Bon F., *Aurignacian Genius: Art, Technology and Society of the First Modern Humans in Europe*, Proceedings of the International Symposium, April 08-10 2013, New York University, *P@lethnology*, 7, 138-164.

Aurignacian Genius: Art, Technology and Society of the First Modern Humans in Europe
Proceedings of the International Symposium, April 08-10 2013, New York University

EARLY AND ARCHAIC AURIGNACIAN PERSONAL ORNAMENTS FROM ISTURITZ CAVE:

Technological and Regional Perspectives

Randall WHITE, Christian NORMAND

Abstract

Recent excavations at Isturitz Cave by Christian Normand have yielded a rich assemblage of Aurignacian personal ornaments in chronostratigraphic context. Here, we present the first study of this corpus, focusing on the techniques used for perforating teeth; the chronological variation in the selection of animal teeth (and one human tooth); the raw materials used for the beads and pendants (amber, ivory, talc, bone); data concerning local personal ornament production (or not); the exploitation of amber and its provenance; and the existence of abundant personal ornaments (pendant-anthropomorphic sculpture and shells) in the Archaic Aurignacian levels.

The stratigraphic sequence from Isturitz allows us to demonstrate the chronological evolution of personal ornaments during the course of the Aurignacian in Aquitaine, as well their intra-regional variability. We conclude that this chronological and intra-regional variation considerably complicates the recent hypothesis of regionalized personal ornaments, representing ethnic entities that last for more than ten thousand years.

Keywords

Isturitz Cave, Personal ornaments, Early Aurignacian, Archaic Aurignacian.

Introduction and basic data

Today, there is a consensus that for modern humans, material systems of personal ornaments serve as a way of constructing diverse personal and social identities (White, 1999; Sanders, 2002; Yentsch, 1995). They do so mainly by evoking the history, the values and the beliefs of the group through deep metaphoric links between the chosen raw materials and created forms, on one hand, and a diversity of conventional social identities on the other. It is thus legitimate to imagine that the invention of the first material systems of personal ornaments reflects the first, internally differentiated human societies.[1]

Our own research into Aurignacian personal ornaments aims to understand not only the formal qualities of the finished objects, but also to bring to light the processes (technological, esthetic, symbolic) contributing to the construction of these meaning-laden forms. Regional systems of ornaments cannot be understood without evaluating the choice of raw materials, fabrication-

1. Here, we emphasize this notion of personal ornament "systems". For us, rare examples of perforated objects more than 40 000 years old, isolated in time and in space, can indicate the technological and esthetic capacity of these distant ancestors, but their ornamental activities appear to be sporadic, and seemingly never coalesce into organized regional entities.

suspension-presentation procedures, as well as their archeological and chronostratigraphic context (Bar-Yosef Mayer, 2005; Stiner, 2013; Vanhaeren *et al.*, 2013; Cristiani *et al.*, 2014). Which, admittedly, is asking for a lot...

In order to understand systems of personal ornaments, it is essential to work on the broadest possible range of samples from reliable stratigraphic and cultural contexts. Yet, in many cases, data derived from early excavations do not fulfil these two criteria.

On one hand, recovering small objects was not one of the excavation aims for many sites. In particular, the use of dry sieving with a mesh ≥ 5 mm, still in use in certain Aquitaine sites until the 1980s, undoubtedly deprived us of many personal ornaments. Recent excavations where sieving with ≈1.5 mm mesh results in almost exhaustive recovery, enable us to assess the extent of the deficit of small elements at over 90% for early excavations. In the specific case of personal ornaments, absence of awareness and lack of interest in this type of artifact had even more dramatic consequences.[2] Not surprisingly, personal ornaments, fragments and fabrication waste are minimally represented or even absent from collections resulting from early excavations.

Similarly, stratigraphic and spatial contexts are missing or imprecise for many or most personal ornaments. Either the different Aurignacian techno-complexes were not differentiated, or cultural identification is erroneous or needs to be reevaluated. As a consequence, arguments and hypotheses are often based on heterogeneous samples spanning several millennia. In this context, the identification and interpretation of systems of personal ornaments lose all their meaning and the recently published sweeping overviews of Aurignacian personal ornaments are unconvincing being founded on unreliable empirical data (Vanhaeren, 2002; Vanhaeren, D'Errico, 2006).

For these different reasons, it is clear that most of the data derived from early excavations cannot be used to reply to current questions. It is thus essential to focus on data from recent excavations (or at times early excavations) that paid careful attention to these issues.

From this point of view, the recent excavations from the Aurignacian sites of Brassempouy (Landes), Castanet (Dordogne) and Isturitz (Atlantic-Pyrenees) provide data able to contribute to our knowledge of Upper Paleolithic society and systems of personal ornaments. The meticulous recovery of objects linked to personal ornaments was integrated into excavation and recovery procedures. Excavators were taught how to recognize ornaments and fabrication waste and all sediments were wet-sieved (mesh = 1.5 mm).[3] Sieve residues were sorted several times in order to retrieve the smallest fabrication waste (ivory shavings, talc dust).

One of the most important contributions of the programmed excavations at Isturitz Cave was the discovery of more than 200 perforated objects (or worked in other ways in order to be suspended) as well as a number of waste products linked to their fabrication (cf. table 2). It is no exaggeration to say that these abundant (Archaic and Early) Aurignacian personal ornament objects from a modern excavation[4] transform our scientific knowledge of the symbolic aspects of the first modern humans in Western Europe.

Isturitz Cave is located in the western Pyrenees, at the center of a zone of circulation and contact between Aquitaine and the Cantabrian coast and was excavated during the first half of the 20th century. Those excavations yielded a remarkable archeological complex covering the Middle

2. It is probable that the small ornamental assemblages from recent Aurignacian excavations, such as Abri Pataud, Le Flageolet I, La Ferrassie, only represent a small proportion of the ornaments and fabrication waste present in these sites, this deficit being due to the absence of rigorous recuperation methods, notably wet-sieving.
3. In fact, the absence of ornaments in Europe or elsewhere cannot be taken seriously for sites where fine-mesh wet sieving was not undertaken.
4. Quite a significant number of these objects come from the Saint-Périer spoil and the reworked deposits left in place by the latter.

Paleolithic and almost all of the Upper Paleolithic. New research in the Saint-Martin gallery brought to light important Aurignacian occupations attributed to the Archaic and Early phases of this technocomplex. In this article, we will present an overview of the main data relating to the personal ornaments, for which Isturitz is a key site.

We will only present here general preliminary observations and the most remarkable objects as the complete data will be published in a subsequent monograph (see also White, 2001a, 2002a, 2003, 2007a, 2007b). As one of us (R. W.) is responsible for the analysis of the personal ornaments from other Aurignacian sites in the process of being excavated in Aquitaine (White, 2007a, 2007b) and elsewhere (White, 2002b), it will be interesting to carry out comparisons between the type and technology of the personal ornaments from Isturitz and other sites in Aquitaine.

1 - Isturitz Cave, Normand excavations, stratigraphic overview

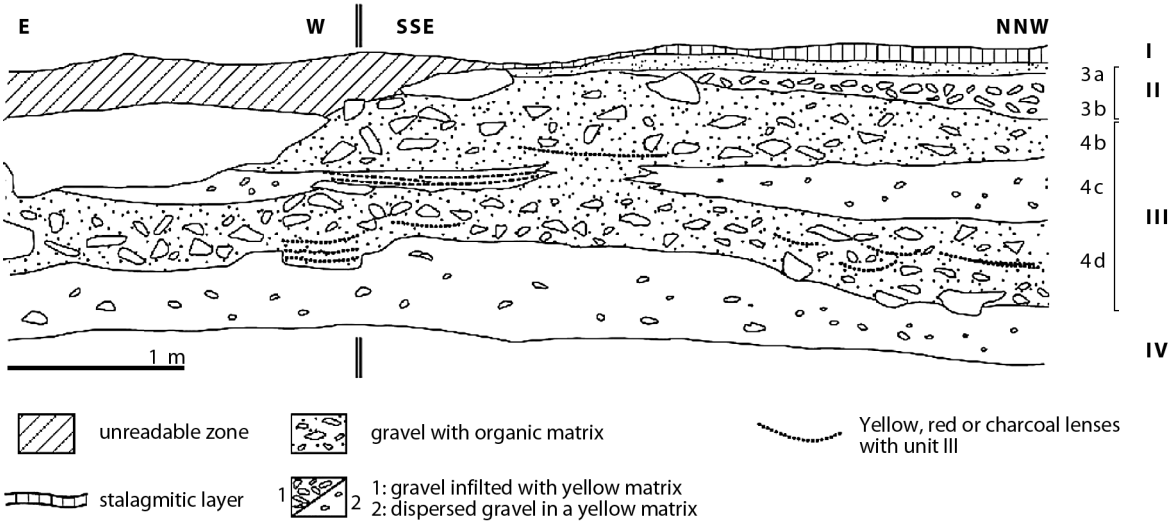
The location of the recent excavations in the Saint-Martin gallery is illustrated in the table 1. This zone is divided into two sectors separated by a large block: the "fouille principale" sector (main excavation) and the "coupe" sector (section). The archeostratigraphy of these two sectors was recorded separately and the stratigraphic correspondence between the sections is probable, but has not yet been demonstrated with certainty.

The Aurignacian sequence from the excavated zone in the Saint-Martin gallery is made up of three main complexes (table 1):

An **upper complex**: This complex was divided into three subcomplexes in the "Main Excavation" sector (C 3a, C 3b summit and C 3b base) and two in the "Section" sector (C 3I and C 3II). C 3a, C 3b summit and C 3I contain sparse diagnostic material. A fragment of a backed piece and a Noailles type burin discovered in C 3a suggest an attribution of all or part of the material to the Gravettian. The top of C 3b and C 3I are undoubtedly part of a relatively recent Aurignacian phase, which could explain the two dates obtained for C 3b summit (Beta 136048: 28 290 ± 240 BP and Beta 136049: 29 400 ± 370; Barandiaran *et al.*, 2000). However, these dates were made on unburnt bone fragments that may have been subject to leaching and are thus not totally reliable. A considerable quantity of the material from C 3b base and C 3II, which is more abundant, presents characteristics of the Early Aurignacian, in particular the presence of several Aurignacian blades and bladelet production from carinated cores. An attribution to this phase of the Aurignacian thus seems likely.

A **middle complex**: We differentiated two main subcomplexes in the "main excavation" sector (C 4b and C 4c) and one in the "section" sector (C 4I), which are further subdivided. C 4b and C 4I yielded very rich series, with for example a lithic toolkit containing over a thousand pieces. The study of these pieces points to an attribution to an early phase of the Aurignacian with several differences in relation to the material from Brassempouy some 60 km distant, for example (Bon, 2006). At Brassempouy, bladelets are almost exclusively derived from carinated cores, whereas at Isturitz, this method is predominant but coexists alongside two others: a débitage following on from blade débitage and a separate débitage on the edge of flakes, usually associated with the archaic Aurignacian. The sedimentary integrity of these assemblages is good (Texier, Lenoble, 2005) and it is probable that a real anthropogenic association exists between these methods. How can we interpret these observations? At the present time, we think that they reflect territorial differences, especially as the dates corresponding to these subcomplexes are similar to those from Brassempouy (C. Szmidt, oral inf.). As for the base of this middle complex, layer C 4c4 could evidence a link between the Archaic and Early Aurignacian. Six dates were recently obtained, with an average age of 37 180 ± 420 BP (Szmidt *et al.*, 2010).

Site	Layer	Square	Number	Weighted ^{14}C age in years BP (# targets)	Laboratory number
Isturitz	C 4c4	W132	1074	37 000 ± 1600 (3)	AA69179
		W133	725	37 300 ± 1800 (2)	AA69180
		W133	736	36 800 ± 860 (7)	AA69181
		W133	637	37 580 ± 780 (10)	AA69183
		W132	1003	40 200 ± 3600 (1)	AA69184
		W132	327	36 990 ± 720 (8)	AA69185
				mean: 37 180 ± 420 (31)	



Recent excavations		
Lithostratigraphy (Texier 1997)	Archeostratigraphy (Normand 2002)	
I	C 1	
	C 2	
II	not present	
	not present?	
	C 3a	
	C 3b sommet et C 3I/II	Late Early Aurignacian
III	C 3b base	
	C 4b1/2 and C 4I	Early Aurignacian
	C 4c and C 4II	Intermediate between Archaic and Early Aurignacian
	C 4d and C 4III	Archaic Aurignacian
IV	C 5	
V	C 6	

Table 1 - Normand excavations, dates and Aurignacian archeostratigraphy linking both sectors (after Texier, Lenoble, 2005).

Stratigraphic unit	Nature	Number
3b base and summit	vestigial canine, red deer	3
	tooth, lion	1
	tooth, wolf	1
	tooth, undetermined species	1
	tooth, undetermined ungulate	1
	tooth, bovid	2
	tooth, human	1
4a	tooth, horse	1
	tooth, fox	2
	tooth, undetermined mammal	1
4b	tooth, fox	8
	tooth, hyena	1
	tooth, bovid	25
	vestigial canine, red deer	5
	tooth, undetermined mammal	4
	tooth, undetermined species	1
	bead, basket-shaped	3
	bead, flattened	1
	bead, globular	1
	bead, cylindrical	1
	bead, with double incisions	6
4c	pendant, amber	2
	tooth, bovid	1
4d	pendant, calcite	1
	sheels, pierced	15
4l	bead, basket-shaped	6
	bead, bone, cylindrical	1
	bead, tabular	1
	tooth, bovid	1
4la	bead, basket-shaped	3
	tooth, fox	1
4lb	bead, basket-shaped	1
	tooth, fox	2
	tooth, bovid	2
	tooth, undetermined mammal	1
	vertebra, fish	1
4lc	bead, basket-shaped	6
	tooth, wolf	1
4ld	bead, basket-shaped	1

Table 2 - List of the personal ornaments by stratigraphic unit when the exact provenience is known (excavations 1996 to 2005).

A **lower complex**: it includes the C4d complexes in the "main excavation" sector and C 4III in the "section" sector, which correspond to very dense human occupations with abundant remains. The only published dates are from burnt bone fragments discovered in a test pit in 1998: 36 550 ± 610 BP (Gif 98238) and 34 630 ± 560 BP (Gif 98237) (Turq *et al.*, 1999). However, subsequent excavations lead us to rule out these dates as the sampled zone turned out to be disturbed. The currently available typo-technological data for C 4d and C 4III clearly link these series to the Archaic Aurignacian, already observed in several sites relatively close to Isturitz, such as Gatzarria (Laplace, 1966; Sáenz de Buruaga, 1991), Labeko Koba (Arrizabalaga, Altuna, 2000) or Cueva Morín (e. g. Maíllo Fernández, 2003).

2 - Aims of this presentation

With continued work at the site and more in-depth stratigraphic knowledge, it is now possible to demonstrate a certain number of technical, material, chronostratigraphic, spatial and even regional tendencies.[5] We present here a first study of this corpus, with particular focus on the techniques used for perforating teeth; the chronological variation in the selection of mammal teeth (including one human tooth); the raw materials used for beads and pendants (amber, ivory, talc, bone); the data concerning local versus external personal ornament production; the exploitation and provenience of the amber used; and the existence of numerous personal ornaments (pendant-anthropomorphic sculpture and shells) in the levels dated to the archaic Aurignacian.

A - Shaping and perforation techniques at Isturitz

Working mammal teeth to make holes for suspension is a relatively complicated and elaborate procedure at Isturitz (figures 1-3). A single tooth (fox) was worked by basal grooving (or "rainurage), but two perforated bovid teeth also bear grooves on at least one outer edge of the tooth. This observation shows once again that basal grooving is not limited to the Châterperronian (White, 2001).

Practically all of the bovid teeth and the vestigial deer canines underwent complicated and intensive alteration, made up of several preparation stages. The root of the tooth was first thinned by fine abrasion, removing large surfaces of the cement layer. Then, on each side of the root, the zone to be perforated was prepared by rather crude scraping. In some cases, the exact perforation location was deepened by scraping, through the application of a pressure tool, or by pecking.

In most cases, once this preparation was finished, semi-rotation was used for perforation, which is rather rare technique in other Aurignacian sites in Aquitaine (White, 1989a, 1989b, 1992, 1993a, 1993b, 1997). Often the lips characteristic of a change in direction of the semi-rotational movement are visible on the internal edges of the hole.

It is legitimate to wonder if this perforation and preparation technique is particularly adapted to the morphology of bovid teeth or if it is a more widely used technique at Isturitz. The microscopic observation of teeth from other taxa, allowed us to observe the generalized application of this operational chain across different species and tooth morphologies.

5. In order to do so, we ruled out the objects recovered in the Saint-Périer spoil and the reworked deposits left in place by the latter.

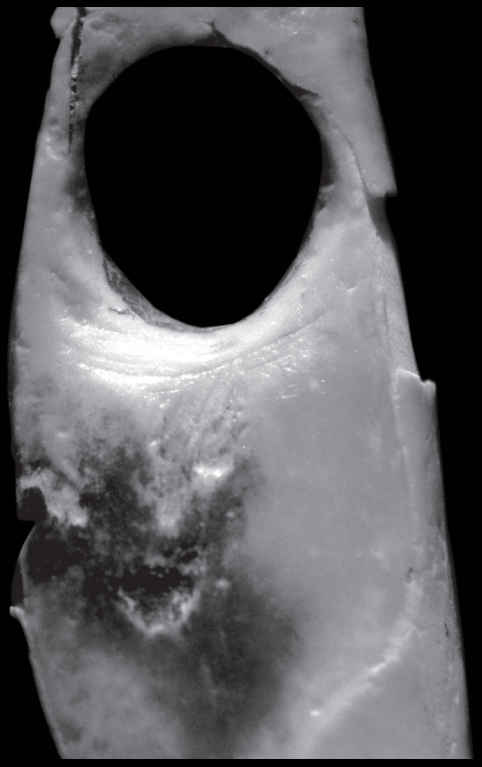


Figure 1 - Bovid tooth, first thinned by fine abrasion, then scraped, and then perforated by semi-rotation. Note a first preparation in the middle at the bottom (repeated on the other side of the tooth) of the perforation, subsequently abandoned (6.4 ×).

Figure 2 - a: Totally worked vestigial deer canine (or facsimile), with bifacial semi-rotational perforation (6.4x) and b: very worn bovid incisor, perforated by bifacial semi-rotation (layer 4b).

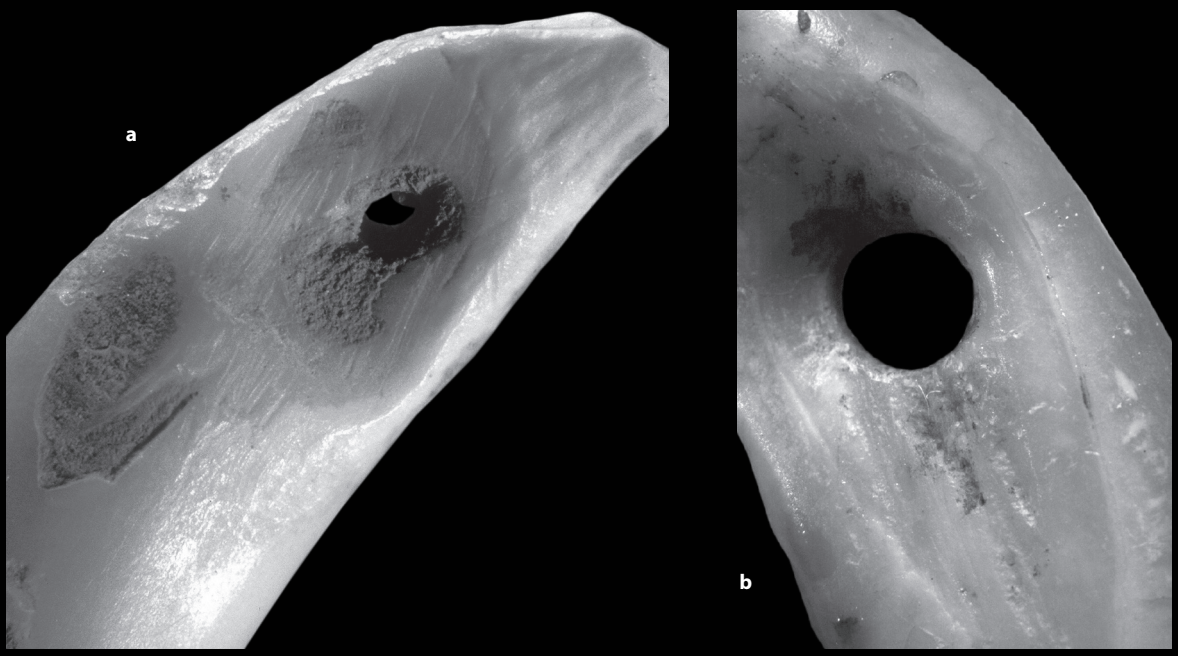


Figure 3 - a: fox canine thinned by fine abrasion, then prepared by bifacial scraping to open a perforation. Note the heavy working of the lateral edge of the root (6.4 ×). b: fox canine thinned by very deep carving, followed by scraping and bifacial semi-rotational perforation (6 ×).

The bovid teeth are generally heavily worn. In a number of cases, the animals were very old, in others, the teeth appear to have been subject to strong artificial modification by abrasion. In these cases, the enamel surface was intensively reduced by rubbing and the proximal extremity of the root and the lateral edges of the tooth were also transformed by abrasion. In these cases, the teeth display the same characteristics as the blanks used for making cylindrical beads. Indeed, there are two cylindrical ivory beads with very similar shapes to those of the worked bovid teeth.

B - Does the choice of mammal teeth used for personal ornaments remain stable during the course of the Aurignacian?

As we have seen, most of the personal ornaments from the recent excavations at Isturitz are made up of perforated mammal teeth. Figure 4 shows the distribution of these teeth by taxon[6] and by stratigraphic unit. Bovid teeth are predominant, but the situation is somewhat more complicated and more interesting, as the proportions of bovid teeth display marked chronological variations. They are more frequent in the lower stratigraphic units (especially C 4b) attributed to the Early Aurignacian.

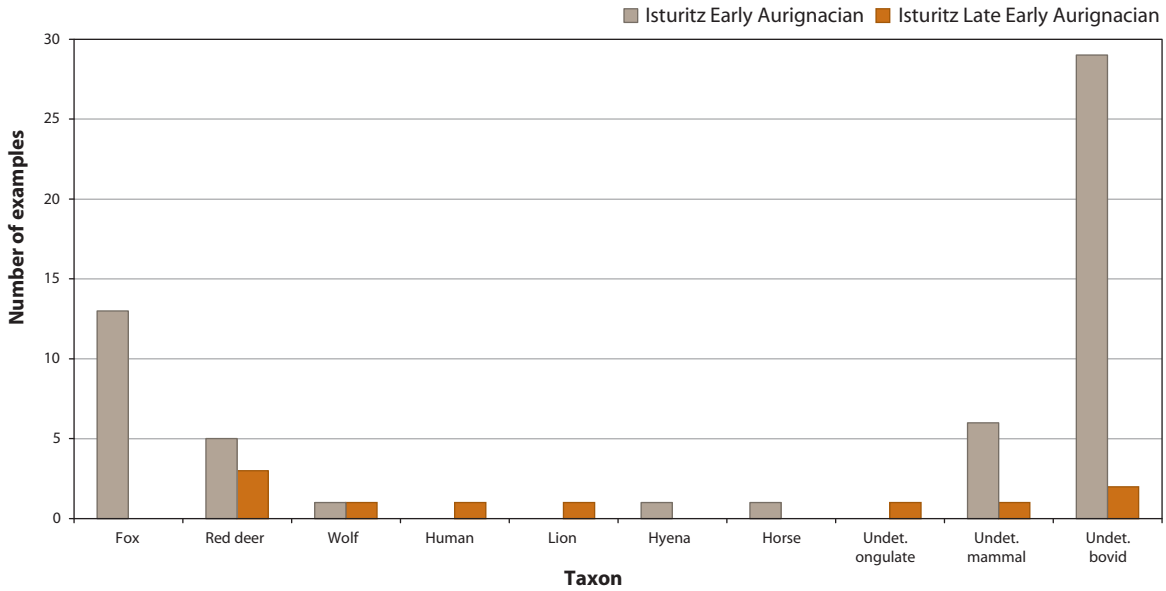


Figure 4 - Worked teeth, frequency of species in the early Aurignacian layers (layers 4Ia, b, c and d then 4a, 4b [4b, 4b1 and 2], 4c1, 4c2, 4c3) and the recent early Aurignacian layers (layers 3 a, b-base and b-summit).

Indeed, mammal species in personal ornaments display fascinating chronological variability. Over the past few years, we have observed important differences in "ornamental" species between Brassempouy (galérie des Hyènes) and Isturitz, which are only about 60 km apart. One of us (R.W.) advanced several hypotheses to explain these differences, which consist in a dominance of bovid teeth at Isturitz and their total absence from Aurignacian personal ornaments at Brassempouy. This variability is either random, which does not appear to be very plausible given the sample sizes; or it points to the existence of a border between two regional groups, marked by teeth from particular species; or it is linked to hitherto non-identified chronological shifts in the choice of ornamental species, within the Aurignacian in Aquitaine.

6. Identifications until the end of the 2002 season by S. Costamagno.

Figures 5 and 6 illustrate the consequences of a methodology with no control over the chronostratigraphic context, combining Aurignacian complexes spread out over several millennia. Taken as a whole, the personal ornaments from Isturitz display strong differences with those from the levels from complex 2 at Brassempouy, from a more restricted chronological context. However, when the ornaments from level 3 at Isturitz (recent Early Aurignacian) are separated from those from levels 4a to c and 4Ia to c (Early Aurignacian), a dramatic shift in the relative frequencies of the selected species is observable.

This change in behavior, from a dominance of bovid teeth to a dominance of other species (fox, deer, human), bears no relation to possible environmental changes. At Isturitz, bovids are as abundant in the recent Early Aurignacian fauna as in the Early Aurignacian.

At Castanet (Castel, 1998) and Brassempouy (Letourneux, 2003), as well as Isturitz (Costamagno in Normand *et al.*, 2006), the remains of reindeer, horse and bovids, taken collectively, dominate the fauna. It is thus surprising to observe the total absence of worked teeth from these taxa in the early Aurignacian at Brassempouy and Castanet. The consumed animals and the "worn" animals appear to be mutually exclusive.

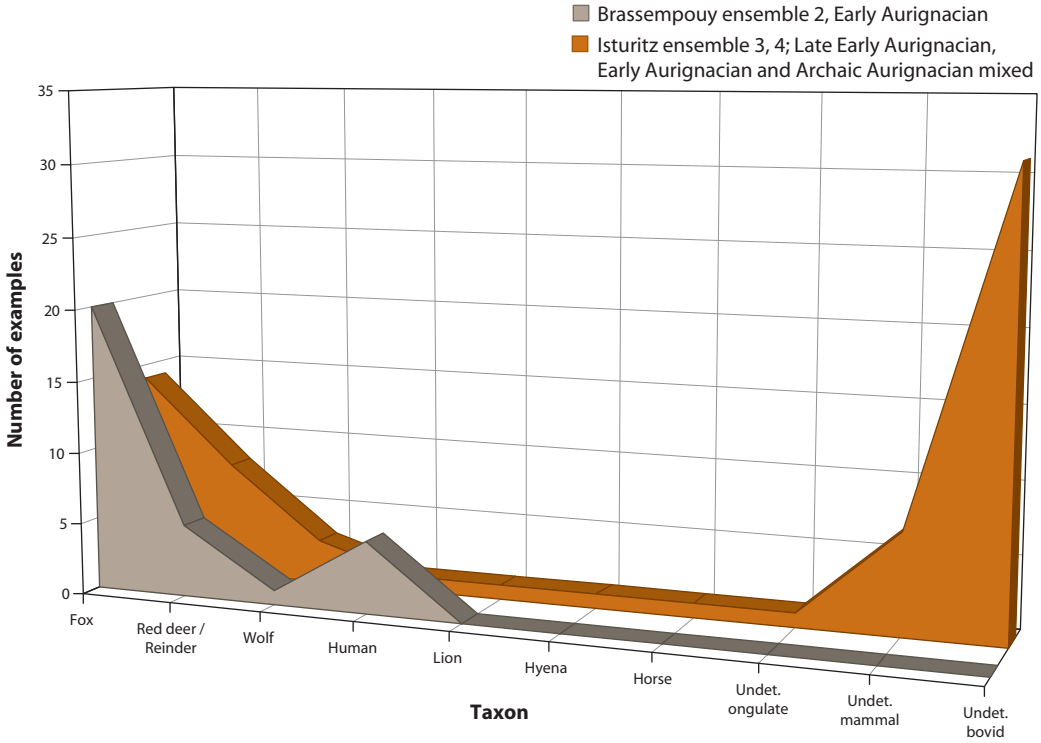


Figure 5 - Inter-site comparison of mammal teeth used for making personal ornaments by species; between Brassempouy and Isturitz (with no stratigraphic distinction for Isturitz).

The example of Isturitz (figure 6) shows the repercussions that sample construction may have on interpretations. Grouping objects without taking into consideration their exact stratigraphic origin is likely to lead to biased or totally erroneous interpretations.

At the scale of the entire Aurignacian, which lasts for several millennia, and given the resolution level of radiometric dates, it is very difficult to interpret inter-site differences (figure 7) related to the choice of species, as these can reflect regional differentiation as well as chronological evolution. The conclusions of Vanhaeren and d'Errico (2006) in favor of the stable and structured regional variation (of Aurignacian personal ornaments) across Europe are thus invalidated.

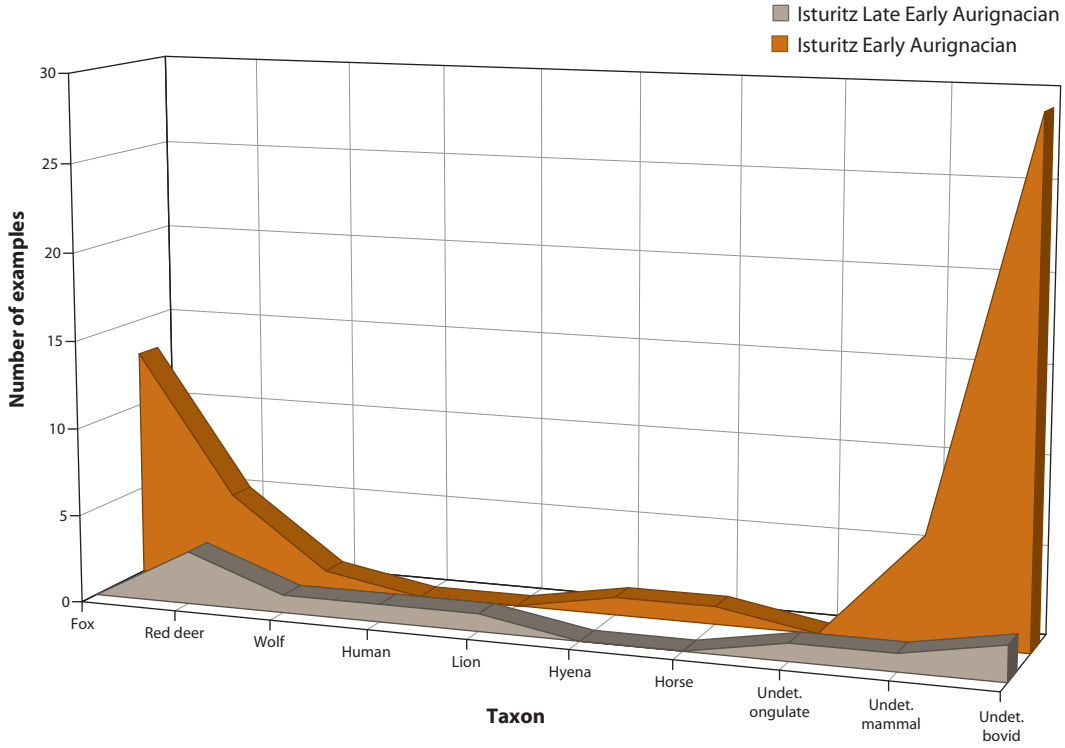


Figure 6 - Differences in mammal teeth used for making personal ornaments by species, between the Early Aurignacian (layers 4la, b, c and d then 4a, 4b [4b, 4b1 and 2], 4c1, 4c2, 4c3) and the recent Early Aurignacian (layers 3 a, b-base and b-summit) at Isturitz.

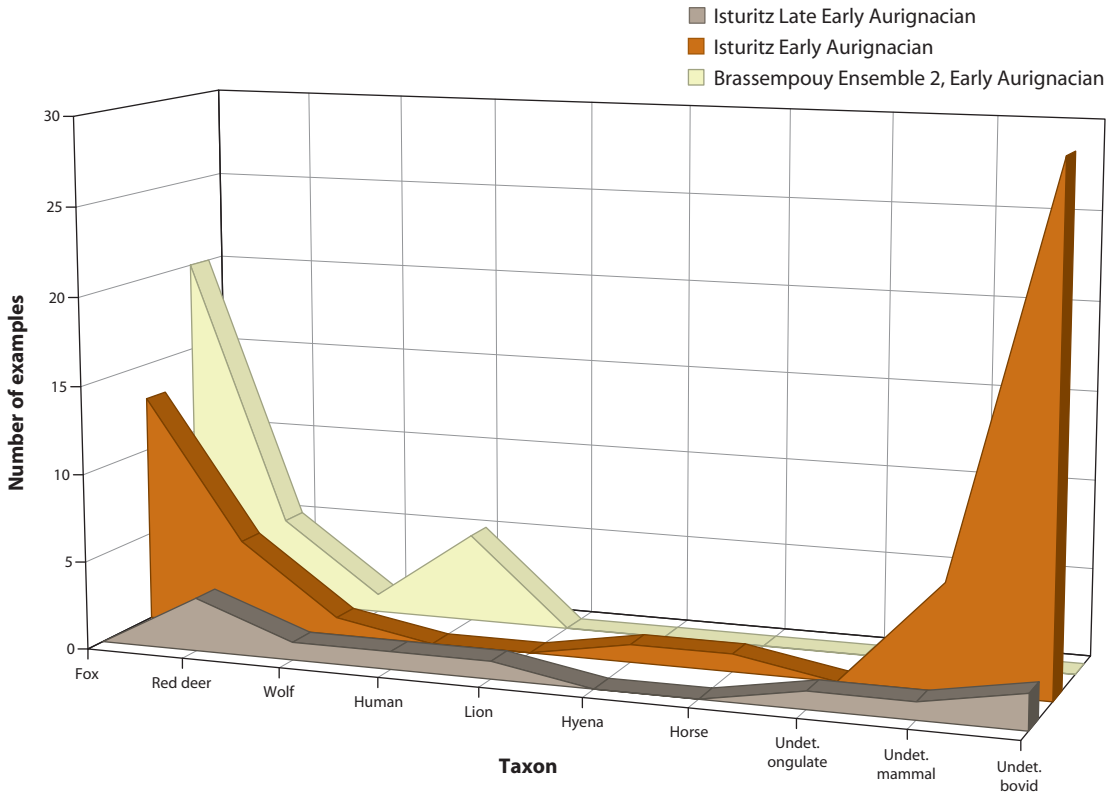


Figure 7 - Differences in mammal teeth used for making personal ornaments by species, between the Early Aurignacian (layers 4la, b, c and d puis 4a, 4b [4b, 4b1 and 2], 4c1, 4c2, 4c3) and the recent Early Aurignacian (layers 3 a, b-base and b-summit) at Isturitz and the Early Aurignacian (complex 2) from Brassempouy.

On a much smaller scale, the observation of fluctuations in the frequency and proportions of worked teeth by species in an Early Aurignacian sequence, as at Brassempouy (White, 2007a), confirms the necessity of detailed site by site analyses in order to record and understand the observed variations.

At Isturitz, this variability also has a non-negligible spatial aspect. The "section" sector only yielded eight worked mammal teeth (half of them in 4Ib), including just three bovid teeth. In sum, for now, the "section" sector yields a higher proportion of beads in relation to worked teeth (figure 8). However, it is clear that the excavation of a small surface runs the risk of yielding non-representative samples.

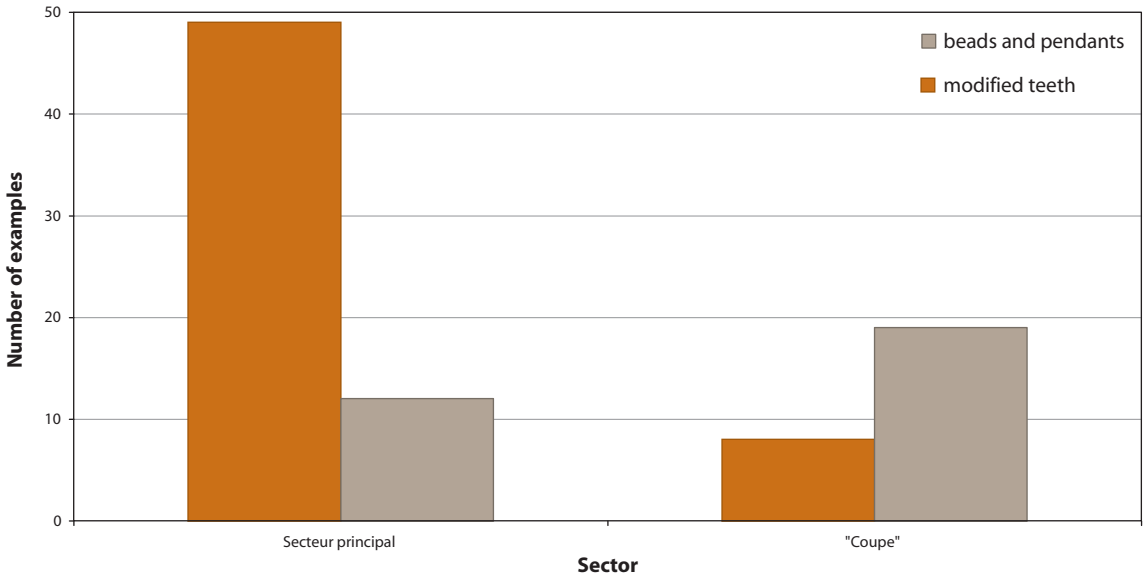


Figure 8 - Complex 4. Bead / worked tooth ratio in both sectors of the excavations.

C - The perforated human tooth

The only perforated human tooth (lower left M2 or 3) is intact (figure 9). It is part of a growing number of such ornamental objects in the French Aurignacian (Henry-Gambier *et al.*, 2004). It bears clear bifacial semi-rotational perforation (figure 9), made with a rather blunt tool, as is the case for certain bovid teeth from Isturitz. The rotation marks are not very visible (figure 10), given the very worn and glossed surface of the piece. For now, it is impossible to know whether this results from use-wear caused by refining the hole by fine abrasion or by wearing the object for a long period of time.

It is important to underline that human teeth worked for suspension are limited to four sites attributed to the early Aurignacian in the Aquitaine Basin: La Combe; Brassempouy; Isturitz and Tarté (White *et al.*, 2003; Henry-Gambier, White, 2006; Henry-Gambier *et al.*, 2004).[7] Some of these teeth bear scraping marks, apparently to remove flesh, showing that they were taken from corpses. The Charente Aurignacian sites of Rois and Fontechevade both contained a mandible with cut marks (Gambier, 2000), which may possibly be linked to tooth extraction procedures for transformation into personal ornaments.

7. Note that the specimen from Tarté comes from the backdirt of a site also containing Gravettian occupations.

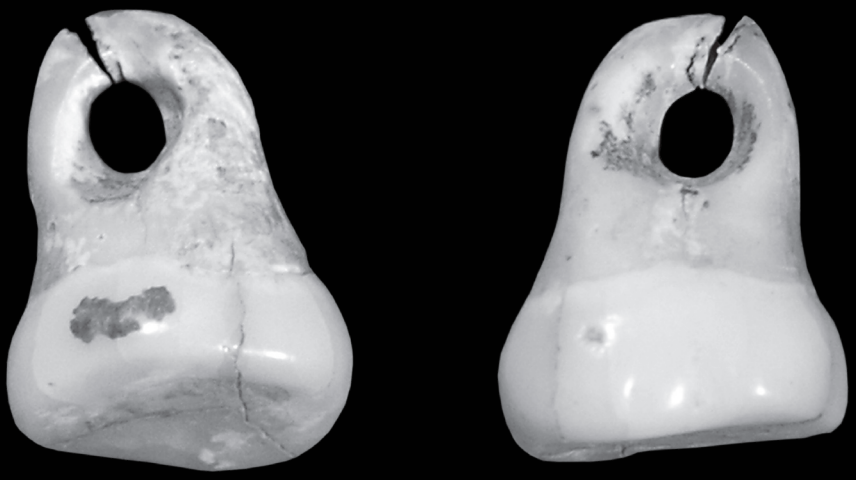


Figure 9 - Isturitz 2001, C 3b base. The perforated human tooth.

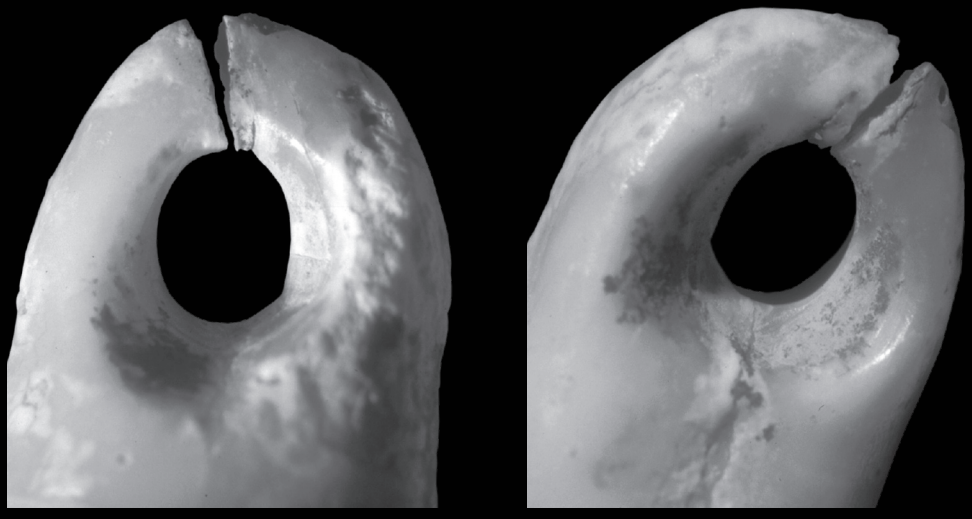


Figure 10 - Both sides of the perforation of the human tooth. The tooth was perforated by semi-rotation, but the rotation rings are not very visible due to marked use (6.4 ×).

D - Raw materials used for making beads

The Aurignacian beads and pendants from complex 2 at Brassempouy are made in ivory, chlorite, talc, calcite, bone, hematite and lignite. Roughly the same raw materials were used at Castanet and Isturitz, with several subtle but significant differences. For example, the proportions of beads in ivory compared to the beads in soft stone (figures 11-13) are very different at Brassempouy and Castanet (as well as for the other Aurignacian sites of Castel-Merle – La Souquette and Blanchard). We could conclude that the geographic location of Brassempouy, situated nearer Pyrenean talc outcrops, would explain the higher percentages of beads in this material. This would be a classic example of focusing on a certain raw material in relation to the distance from its geological origin.

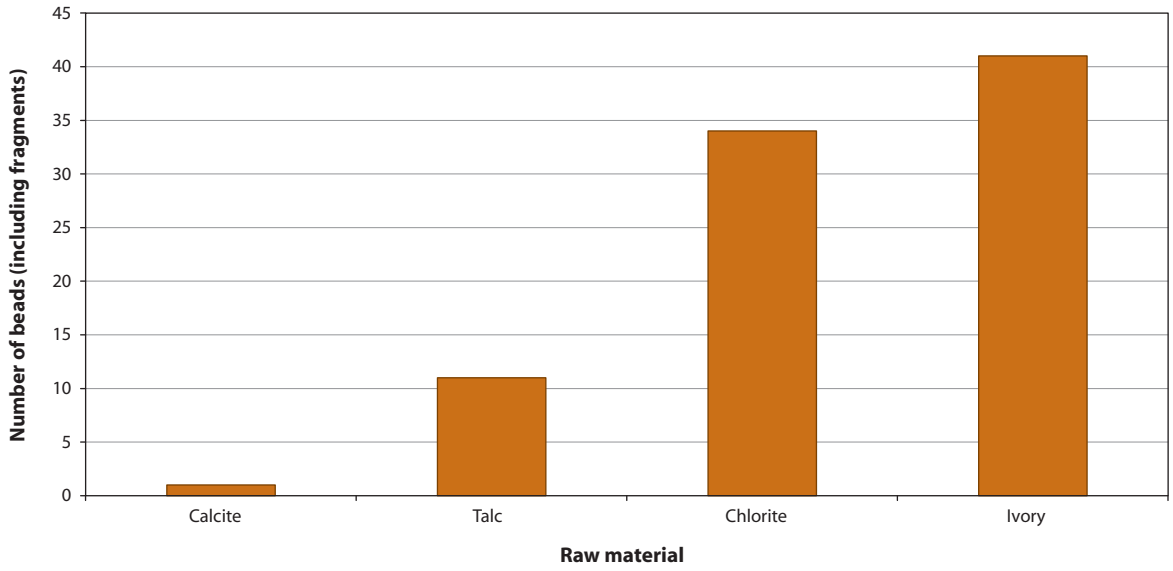


Figure 11 - Proportions of basket-shaped beads by raw material, complex 2, Brassempouy.

Nonetheless, there is a surprising aspect in the choice of raw materials for basket-shaped beads at Isturitz. Unlike Brassempouy (figure 11), where approximately half of the basket-shaped beads are in soft stone, at Isturitz most of these beads are in ivory or bone. The quantitative data for Isturitz are thus similar to the proportions observed in the Périgord sites (figures 12-13). This is even more surprising, given that Isturitz is located near Pyrenean talc outcrops.[8] Could this be explained by links with Aurignacian populations further north? Were the basket-shaped beads from Isturitz brought to the site from the north as finished products? Or is this merely the result of a non-representative sample due to the small excavated surface? Once again, we are faced with variability that cannot be explained by a simple regional model. It will be interesting to see how this question progresses over the coming excavation seasons.

8. This said, uncertainty remains as to the availability of talc in the western part of the Pyrenees. Prospections and bibliographic research by one of us (C.N.) did not lead to the discovery of talc in this part of the Pyrenees, in the same form as it was used to make these beads.

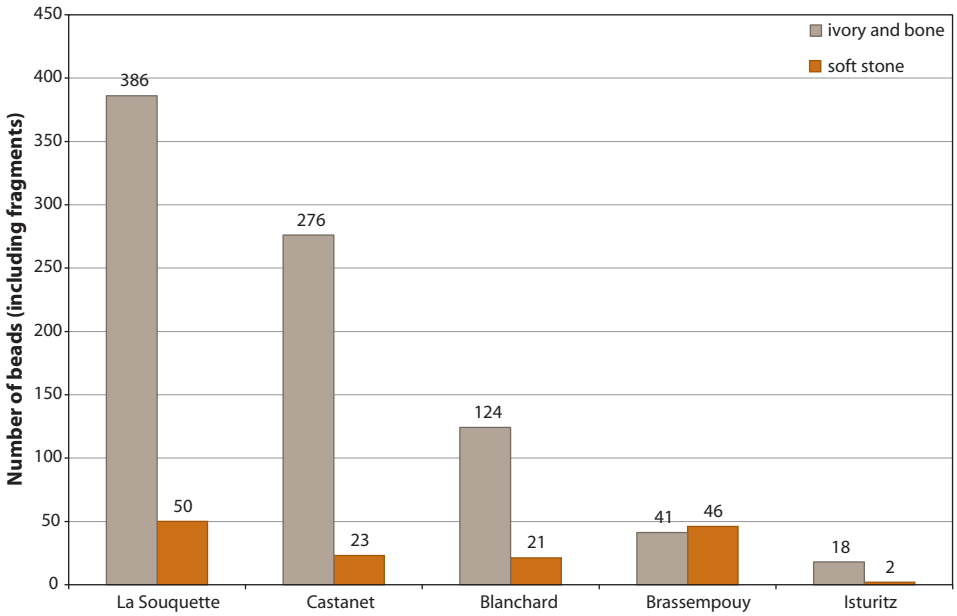


Figure 12 - Comparison of the proportions of ivory and soft stone beads from the sites in the Vézère Valley (Dordogne), Brassempouy (Landes) and Isturitz (Atlantic-Pyrenees).

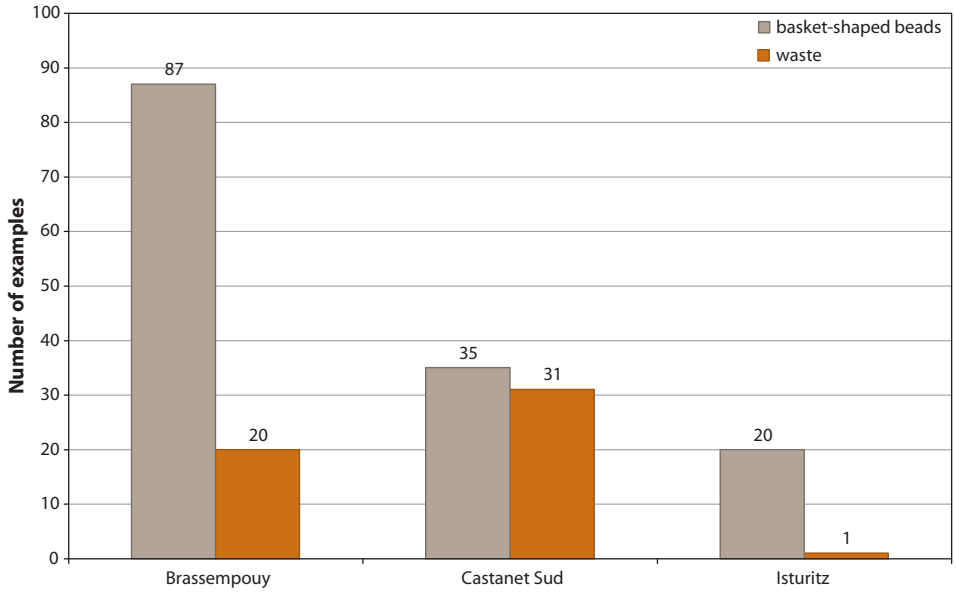


Figure 13 - The ratios between basket-shaped beads and waste (unfinished beads) for Brassempouy, the recent excavations at Castanet and Isturitz.

E - On-site production or allochthonous bead production?

Basket-shaped beads are relatively rare at Isturitz in comparison with other, recently excavated Aurignacian sites. After nearly ten years of excavation, traces of the production of these beads are practically absent. The only possible exception was a large cylindrical bead identified in 2003 (2.1 cm long), which could be a rough out of a globular or "basket-shaped" bead. The blank could be in ivory, but it is more likely that it is the root of a large tooth, the proximal end of which appears to be preserved (figure 14).

Figure 14 - Isturitz 2003, C 4l. Rough out of a bead in dentine or ivory.

A small quantity of fabrication waste, as well as several unfinished beads and unfinished perforated teeth (figure 13) provide evidence of the on-site fabrication of at least some of the beads and perforated teeth at Castanet and Brassempouy. In contrast, in spite of the presence of about twenty basket-shaped beads and fragments in levels 3 and 4a (Early Aurignacian) at Isturitz, only one unfinished bead was identified and no fabrication waste was found in the excavated sector.

The systematic recovery and quantification of fabrication waste enables us to observe a rather interesting pattern (figure 13). The new excavations at Castanet confirm the idea of intensive personal ornament production, particularly of basket-shaped beads. At this site, we find as much waste and rough outs as finished beads. Complex 2 of Brassempouy shows much more limited production activity, implying that this context is one of clothing repair and personal ornament replacement. Certain very clear use-wear marks inside the perforations also point to on-site use / loss.

Lastly, in the recently excavated sector at Isturitz, evidence of fabrication is practically absent, with one exception: the production of personal ornaments in amber, a phenomenon limited to levels 4b, 4c and 4d.

A comparison of the intensity of activities linked to bead making at Brassempouy, in the Aurignacian sites of Castel-Merle (Dordogne) and at Isturitz (Pyrénées-Atlantiques), enables us to outline a model for ornament fabrication within a regional system of seasonal movements and activities. This model remains extremely fragile, given the paucity of available data and the above mentioned spatio-temporal correlation problems between the sites. Nonetheless, it is important to underline that the skeletal-chronological data point towards a summer occupation at Brassempouy (Letourneux, 2003) and Isturitz (Rendu in Normand *et al.*, 2006) and a winter occupation at Castanet (Pike-Tay, 1998). We hope that isotopic analyses (Heckel *et al.*, 2014) will in time help to better assess this question.

F - Personal ornaments in amber (and lignite)

The recovery of much amber waste, from the first excavation season onwards, ranging from millimetric splinters (figure 15) to large pieces (figure 16) (2.9 × 2.3 cm), supports the hypothesis of on-site fabrication of personal ornaments in amber. It is important to recall that the Saint-Périer excavations (R. and S. Saint-Périer, 1952)[9] yielded an amber pendant attributed to layer SIII (figure 17). The discovery of amber pendants during the course of the 2004 excavation was thus predictable (figure 18). They represent, for now, the oldest known personal ornaments in amber.

To date, the recent excavations at Isturitz have only yielded amber objects in the main excavation sector (table 3). They are absent from the "section" sector.

Stratigraphic unit	Number of amber fragments
US 4b	11
US 4c	14*
US 4d	2
US 4l	0
US 4la	0
US 4lb	0
US 4lc	0
US 4ld	0
Total	**27**

* (including two pendants)

Table 3 - Stratigraphic and spatial distribution of the amber remains, 1996-2005.

The question immediately arises as to the origin of this amber, given that in Cantabrian Aurignacian sites, this raw material comes from local Cretaceous outcrops (Álvarez Fernández *et al.*, 2005a). The same applies to the recently found Paleolithic amber in La Garma (Peñalver *et al.*, 2007).[10] Field investigations carried out by one of us (C. N.) confirmed the presence of an outcrop at Saint-Lon-les-Mines to the south of Dax, already cited by the Saint-Périers (1952) as a possible source for the Isturitz amber. In this case, as in others, the amber is associated with lignite, which is all the more interesting as the Isturitz Aurignacian (Saint-Périer collection in the MAN, Saint-Périer spoil) contains personal ornaments in this material. Unfortunately, unlike amber, lignite waste cannot be identified during sieving, as it cannot be distinguished from other carbonized organic matter, such as burnt bone.

We contacted *The Center for Amber Studies* in Vassar College in the United States. The director of the center, Professor Curt Beck, agreed to participate in a spectral characterization project of the Isturitz amber and samples from the known outcrops in the Landes and along the French Basque coastline. Professor Beck had already undertaken this type of research in collaboration with Dominique Sacchi on the amber from the Magdalenian site of Aurensan (Beck *et al.*, 1987). Maria Rosa, a student directed by Curt Beck, carried out infrared spectrometry (Beck, 1997) and chromatography of seven samples from the Aurignacian at Isturitz (Rosa, 2007). Her results rule out a Baltic origin (Passemard, 1913; de Saint Périer, 1930). The spectrometric characteristics of the amber are consistent with a Saint-Lon-les-Mines origin (Rosa, 2007).

9. They had already found Magdalenian amber pieces at Isturitz, including a zoomorphologic sculpture (de Saint-Périer, 1930, 1935, 1936).

10. The early Aurignacian from Cueva Morín and El Pendo (Álvarez Fernández *et al.*, 2005a, 2005b), Gatzarria (Sáenz de Buruaga, 1991) and Labeko Koba (Arrizabalaga, 2000; Arrizabalaga *et al.*, 2003) also yielded pieces of amber, some of which were worked (see also Moncel *et al.*, 2012).

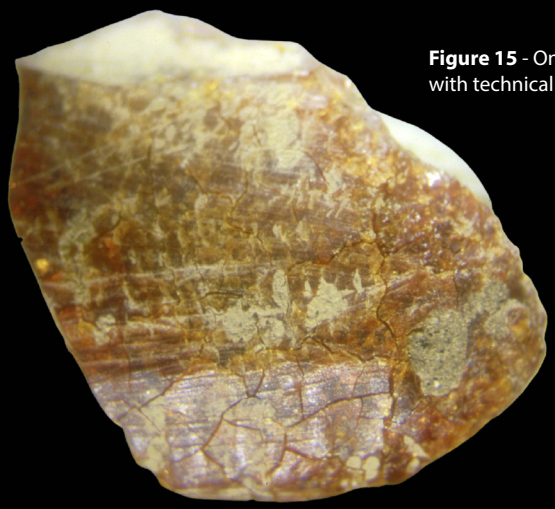


Figure 15 - One of the two (refitting) amber fragments with technical marks (l: approx. 3 mm)

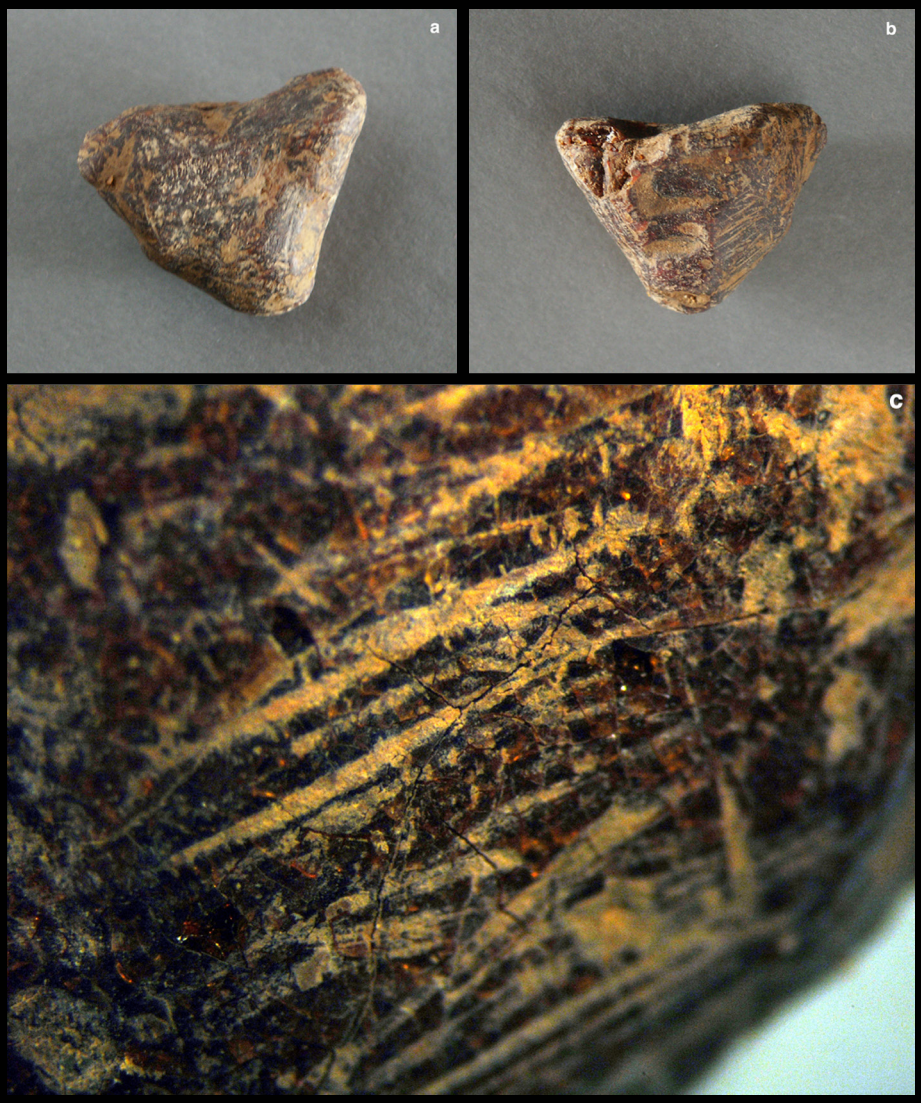


Figure 16 - Isturitz 2003, C 4c2. Large piece of amber (length = 2.9 cm) with (at the bottom at 18 ×) heavy scraping marks indicating probable on-site amber ornament fabrication.

Figure 17 - MAN 83894 884, amber pendant from layer SIII (Aurignacian), Saint-Périer excavations.

Figure 18 - Isturitz 2004, C 4c6. Amber pendant with technical marks.

G - Tubular beads

Lastly, it is important to underline the discovery in 2003 (probably in layer 4b) of a series of six beads (figure 19), made on small bird-bone tubes. These beads are about 5 mm long, with fine decoration, made by grooves running around the circumference of the tube. The ends of these beads are generally quite worn. Identical beads were found in the site of Cottés (Rigaud *et al.*, 2014), but were unfortunately discovered in the backdirt. There are also five decorated pieces and two without decorations in the early Aurignacian (layer Cbci-Cbf) of Gatzarria (Sáenz de Buruaga, 1991: 147 and 163).

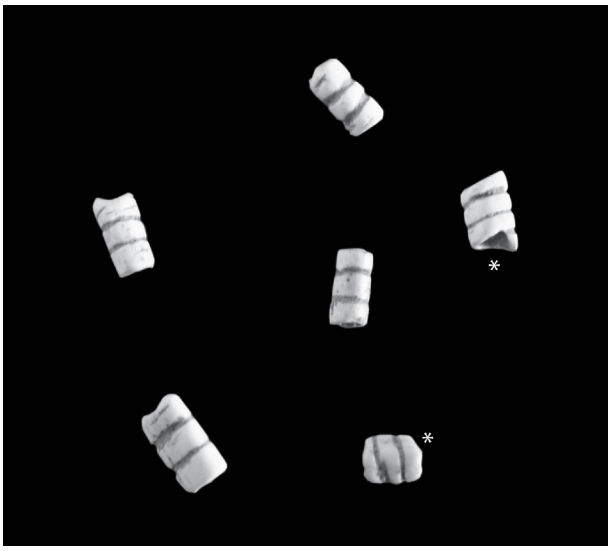


Figure 19 - Isturitz 2003, C 4b probable. Beads decorated by circum-incised grooving (average length 4 mm). The two beads marked by an asterisk refit.

H - A major discovery: personal ornaments from layer 4d (Archaic Aurignacian)

During the course of the 2004 and 2005 seasons, layer 4d (Archaic Aurignacian) yielded an important series of ornamental objects including fifteen perforated shells (*Littorina obtusata*) and a pendant in soft stone which can be interpreted as a zoomorphic or anthropomorphic figure (figures 20-22). This pendant is made by bifacial semi-rotation and is 5.25 cm long with many technical traces, mainly on sides I and IV (figure 21).

Although several interpretations are probable, we are struck by the potentially female characteristics of this ornament. In a Gravettian context, we would easily accept the interpretation of a feminine figure. Yet, this piece comes from a context attributed to the Archaic Aurignacian, and if we opt for this interpretation, it is one of the oldest anthropomorphic representations in the European Paleolithic.

Apart from the interest of these ornamental objects as artefacts, they also play an important role in the current debate on the nature of the Middle to Upper Paleolithic transition. Recently, certain authors (Zilhão and d'Errico, 1999, 2003) denied that art and ornaments were present from the beginning of the Aurignacian in Europe. According to these authors, the so-called absence of symbolic objects leaves the door open to the possibility of a separate invention of ornaments by Châtelperronians-Neanderthals and Aurignacians-modern humans. For these authors, this absence precludes the idea of a "symbolic revolution" at the beginning of the Aurignacian. For us, their position cannot be defended given the symbolic archaic Aurignacian objects in layer 4d, dated by ^{14}C well beyond 37 000 BP and thus among the oldest objects of this kind in Europe.

Figure 20 - Isturitz 2004, C 4d1. Four sides of the pendant in soft stone (talc or calcite) with an anthropomorphic or zoomorphic form from layer 4d1 (photo: R. White).

Figure 21 - Isturitz 2004, C 4d1. Pendant in calcite or talc. a: Technical marks on side IV; b: groove in the continuity of the perforation on side I; c and d: details of the perforation, sides I and III; e and f: black marks (dendrites?) on side I (photo: R. White).

Figure 22 - Isturitz 2004, C 4d1.
Pendant in calcite or talc *in situ* (photo: C. Normand).

Conclusion

Over the past few years, the origin of personal ornaments has been acknowledged as one of the fundamental events in the evolution of humanity. Due to the abundance, originality and reliable context of the Aurignacian personal ornaments from Isturitz, they play an important role in discussions on the origin of modern humans and the Middle to Upper Paleolithic transition (Hublin *et al.*, 2012; Peresani *et al.*, 2011, 2013).

On a more modest, but no less important scale, the personal ornaments from Isturitz are beginning to provide precious details concerning the chronological, geographic and even spatial variability within the Aquitaine Aurignacian. The stratigraphic sequence at Isturitz enables us to demonstrate the chronological evolution of personal ornaments during the course of the Aurignacian in Aquitaine, as well as its intra-regional variability. We emphasize that this chronological and intra-regional variability considerably complicates the hypothesis of regionalized personal ornaments, marking ethnic entities that last for more than 10 000 years.

Acknowledgements

We wish to thank the members of the Castanet, Brassempouy and Isturitz teams for their care and patience in recovering objects linked to ornaments. Randall White also thanks Henri Delporte, Dominique Buisson, Dominique Gambier and François Bon for their support and trust during the study of the remarkable ornaments from Brassempouy and Isturitz, without forgetting the precious help of Joëlle Darricau for Isturitz. Raphaëlle Bourrillon and Solange Rigaud kindly read this manuscript and their comments improved the final version. Research on Aurignaican personal ornaments and the excavations at Castanet was generously funded by the National Science Foundation of the E.-U. (project number SBR-9806531), the Partner University Fund, the LSB Leakey Foundation, New York University, the Service régional de l'Archéologie pour l'Aquitaine and the Direction régionale des Affaires culturelles d'Aquitaine.

References cited

Álvarez Fernández E., Peñalver Mollá E., Delclòs X., 2005a - Presencia de ámbar local en los niveles auriñacienses de Cueva Morín y El Pendo (Cantabria, España), *Monografías*, 20, Museo de Altamira, Santander, 385-395.

Álvarez Fernández E., Peñalver Mollá E., Delclos X., 2005b - La presencia del ámbar en los yacimientos prehistóricos (del Paleolítico superior a la Edad de Bronce) de la Cornisa Cantábrica y sus fuentes de aprovisionamiento, *Zephyrus*, LVIII, 159-182.

Arrizabalaga A., 2000 - Los technocomplejos líticos del yacimiento arqueológico de Labeko Koba (Arrasate, País Vasco), in Arrizabalaga A., Altuna J., *Labeko Koba (País Vasco) Hienas y Humanos en los albores del Paleolítico superior*, Munibe (Antropologia-Arkeologia), 52, 193-343.

Arrizabalaga A., Altuna J., Areso P., Elorza M., García M., Iriarte M.J., Marriezkhurrena K., Mujika J., Pemán E., Tarriño A., Uriz A., Viera L., Straus L.G., 2003 - The Initial Upper Paleolithic in Northern Iberia: New Evidence from Labeko Koba, *Current Anthropology*, 44 (3), 413-421.

Bar Yosef Mayer D., 2005 - The Exploitation of Shells as Beads in the Palaeolithic and Neolithic of the Levant, *Paléorient*, 31, 176-185.

Beck C. W., 1997 - Détermination de la provenance des résines fossiles par l'analyse spectrale en infrarouge, in Leesch D. (dir.), *Hauterive-Champréveyres 10 : Un campement magdalénien au bord du lac de NeuchIatel*, Archéologie Neuchâteloise, 19, Musée Cantonal d'Archéologie, Neuchâtel, 105-107.

Beck C.W., Chantret F., Sacchi D., 1987 - L'« Ambre » paléolithique de la grotte d'Aurensan (Hautes-Pyrénées), *L'Anthropologie*, 91, 259-262.

Castel J.-C., 1998 - Résultats de l'étude paléontologique. Les fouilles du nouveau secteur de l'abri Castanet : Contexte géographique, historique et problématique, in Pelegrin J., White R. (dir.), *Abri Castanet : Fouilles du nouveau secteur 1994-1998*, Rapport de fouilles programmées, non publié, déposé au SRA Aquitaine.

Cristiani E., Farbstein R., Miracle P., 2014 - Ornamental traditions in the Eastern Adriatic: The Upper Palaeolithic and Mesolithic personal adornments from Vela Spila (Croatia), *Journal of Anthropological Archaeology*, 36, 21-31.

Gambier D., 2000 - Aurignacian Children and Mortuary practice in Western Europe, *Anthropologie*, 38 (1), 5-21.

Heckel C., Müller K., White R., Floss H., Conard N.J., Reiche I., 2014 - Micro-PIXE/PIGE analysis of Palaeolithic mammoth ivory: Potential chemical markers of provenance and relative dating, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 416, 133-141.

Henry-Gambier D., Maureille B., White R., 2004 - Vestiges humains des niveaux de l'Aurignacien ancien du site de Brassempouy (Landes), *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, n.s., 16, 49-87.

Henry-Gambier D., White R., 2006 - Modifications artificielles des vestiges humains aurignaciens de la grotte des Hyènes et de la galerie Dubalen. Quelle signification, in Cabrera V., Bernaldo de Quiros F. (dir.), *El centenario de la cueva de El Castillo: el ocaso de los Neandertales, Madrid, Ministerio de Educacion y Ciencia*, 72-88.

Hublin J-J., Talamo S., Julien M., David F., Connet N., Bodu P., Vandermeersch B., Richards M., 2012 - Radiocarbon dates from the Grotte du Renne and Saint-Césaire support a Neandertal origin for the Châtelperronian, *Proceedings of the National Academy of Sciences*, 109, 18743-18748.

Laplace G., 1966 - Les niveaux Castelperronien, Protoaurignacien et Aurignaciens de la Grotte Gatzarria à Suhare en Pays-Basque, *Quartär*, 17, 117-140.

Letourneux C., 2003 - *Devine qui est venu dîner à Brassempouy ? Approche taphonomique pour une interprétation archéozoologique des vestiges osseux de l'Aurignacien ancien de la grotte des Hyènes (Brassempouy, Landes)*, Thèse de doctorat, Paris, Université Paris 1 – Panthéon Sorbonne.

Maíllo Fernández J.M., 2003 - Archaic Aurignacian lithic technology in Cueva Morin (Cantabria, Spain), in Bar-Yosef A., Zilhao J. (eds.), *Towards a définition of the Aurignacian*, Lisbon, IGESPAR, IP, 111-130.

Moncel M.-H., Chiotti L., Gaillard C., Onoratini G., Pleurdeau D., 2012 - Non-utilitarian lithic objects from the European Paleolithic, *Archaeology, Ethnology and Anthropology of Eurasia*, 40, 24-40.

Normand C., de Beaune S.A., Costamagno S., Diot M.F., Henry-Gambier D., Goutas N., Laroulandie V., Lenoble A., O'Farrell M., Rendu W., Rios Garaizar J., Schwab C., Tarriño Vinagre A., Texier J.P., White R., 2007 - Nouvelles données sur la séquence aurignacienne de la grotte d'Isturitz (communes d'Isturitz et de Saint-Martin d'Abreroue : Pyrénées-Atlantiques), in Évin J. (dir.), *Congrès du centenaire de la Société préhistorique française : Un siècle de construction du discours scientifique en Préhistoire, 26e Congrès préhistorique de France.* Aux Conceptions d'Aujourd'hui, vol. 3, Société préhistorique française, Paris, 277-293.

Passemard E., 1913 - Fouilles à Isturitz (Basses-Pyrénées), *Bulletin de la Société préhistorique française*, 10, 647-649.

Peñalver E., Álvarez-Fernández E., Arias P., Delclòs X., Ontañón R., 2007 - Local amber in a Palaeolithic context in Cantabrian Spain: the case of La Garma A, *Journal of Archaeological Science*, 34, 843-849.

Peresani M., Fiore I., Gala M., Romandini M., Tagliacozzo A., 2011 - Late Neandertals and the intentional removal of feathers as evidenced from bird bone taphonomy at Fumane Cave 44 ky BP, Italy, *Proceedings of the National Academy of Sciences*, 108, 3888-3893.

Peresani M., Vanhaeren M., Quaggiotto E., Queffelec A., d'Errico F., 2013 - An Ochered Fossil Marine Shell From the Mousterian of Fumane Cave, Italy, *PLoS ONE*, 8 (7), e68572.

Pike-Tay A., 1998 - Seasonality of reindeer teeth, in Pelegrin J., White R. (dir.), *Abri Castanet : Fouilles du nouveau secteur 1994-1998*, Rapport de fouilles programmées, non publié, déposé au SRA Aquitaine.

Rigaud S., Roussel M., Rendu W., Primault J., Renou S., Hublin J.-J., Soressi M., 2014 - Les pratiques ornementales à l'Aurignacien ancien dans le Centre-Ouest de la France : l'apport des fouilles récentes aux Cottés (Vienne), *Bulletin de la Société préhistorique française*, 111, 21-40.

Rosa M., 2007 - *Analysis of archaeological fossil resins*, Mémoire, Bachelor of Arts, Vassar College, Department of Chemistry.

Sáenz de Buruaga A., 1991 - *El Paleolítico superior de la Cueva de Gatzarria, Zuberoa, País Vasco*, Anejos de Veleia, Series Maior, 6, Instituto de Ciencias de la Antigüedad, Universidad del País Vasco.

Saint-Périer (de) R., 1930 - *La grotte d'Isturitz I. Le Magdalénien de la salle Saint-Martin*, Éditions Masson, Paris, Archives de l'Institut de Paléontologie humaine, 7.

Saint-Périer (de) R., 1935 - Sculpture paléolithique en ambre, *L'Anthropologie*, 45, 365-368.

Saint-Périer (de) R., 1936 - *La grotte d'Isturitz II. Le Magdalénien de la Grande salle*, Éditions Masson, Paris, Archives de l'Institut de Paléontologie humaine, 17.

Saint-Périer (de) R. et S., 1952 - *La grotte d'Isturitz III. Les Solutréens, Les Aurignaciens et les Moustériens*, Éditions Masson, Paris, Archives de l'Institut de Paléontologie humaine, 25.

Sanders J.M., 2002 - Ethnic Boundaries and Identity in Plural Societies, *Annual Review of Sociology*, 28, 327-357.

Stiner M., 2013 - Early Upper Paleolithic shell beads at Üçagzili Cave I (Turkey): Technology and the socio-economic context of ornament life-histories, *Journal of Human Evolution*, 64, 380-398.

Szmidt C., Normand C., Burr G., Hodgins G., LaMotta S., 2010 - AMS ^{14}C dating the Protoaurignacian/Early Aurignacian of Isturitz, France. Implications for Neanderthal–modern human interaction and the timing of technical and cultural innovations in Europe, Journal of Archaeological Science, 37, 758-768.

Texier J.-P., Lenoble A., 2005 - Isturitz. Rapport sur les travaux géologiques, étude complémentaire 17, 12 p. in Normand C. *et al.* (dir.), *Grotte d'Isturitz ; salle de Saint-Martin (commune de Saint-Martin-d'Arberoue)*, rapport final de fouilles programmées triannuelles 2003-2005 et projet de recherche 2006-2008, Bordeaux, SRA Aquitaine, 136 p.

Turq A., Normand C., Valladas H., 1999 - Saint-Martin-d'Arberoue ; Grotte d'Isturitz, in Bilan scientifique 1998, Direction régionale des Affaires culturelles Aquitaine, Service régional de l'Archéologie, Bordeaux, 133.

Vanhaeren M., 2002 - *Les fonctions de la parure au Paléolithique supérieur : de l'individu à l'unité culturelle*, Thèse de doctorat, Université Bordeaux 1.

Vanhaeren M., d'Errico F., 2006 - Aurignacian ethno-linguistic geography of Europe revealed by personal ornaments, *Journal of Archaeological Science*, 20, 1-24.

Vanhaeren M., d'Errico F., van Niekerk K., Henshilwood C.S., Erasmus R.M., 2013 - Thinking strings: additional evidence for personal ornament use in the Middle Stone Age of Blombos Cave, South Africa, *Journal of Human Evolution*, 64, 500-517.

White R., 1989a - Production complexity and standardisation in early Aurignacian bead and pendant manufacture: Evolutionary implications, in Stringer C., Mellars P. (eds.), *The Human Revolution: Behavioural and Biological Perspectives on the Origins of Modern Humans*, Edinburgh, Edinburgh University Press, 366-390.

White R., 1989b - Toward a contextual understanding of the earliest body ornaments, in Trinkaus E. (ed.), *The Emergence of Modern Humans: Biocultural Adaptations in the Later Pleistocene*, Cambridge, Cambridge University Press, 211-231.

White R., 1992 - Beyond art: Toward an understanding of the origins of material representation in Europe, *Annual Review of Anthropology*, 21, 537-564.

White R., 1993a - A social and technological view of Aurignacian and Castelperronian personal ornaments in France, in Cabrera Valdès V. (dir.), *El Origen del Hombre Moderno en el Suroeste de Europa*, Madrid, Ministerio de Educacion y Ciencia, 327-357.

White R., 1993b - Technological and social dimensions of "Aurignacian-age" body ornaments across Europe. in Knecht H., Pike-Tay A., White R. (eds.), *Before Lascaux: The Complex Record of the Upper Paleolithic*, Boca Raton: CRC Press, 277-299.

White R., 1997 - Substantial Acts: From Materials to Meaning in Upper Paleolithic Representation, in Stratmann D., Conkey M., Soffer O. (eds.), *Beyond Art: Upper Paleolithic Symbolism*, San Francisco, California Academy of Sciences, 93-121.

White R., 1998 - Objets de parure et témoins esthétiques à l'Abri Castanet, nouveau secteur, in Pelegrin J., White R. (dir.), *Abri Castanet: Fouilles du nouveau secteur 1994-1998*, Rapport de fouilles programmées, non publié, déposé au SRA Aquitaine.

White R., 1999 - Integrating Social and Operational Complexity: The Materal Construction of Social Identity at Sungir, in Averbouh A., Cattelain P., Jullien M. (dir.), *L'Os : Festschrift pour Henriette Camps-Fabrer*, Aix-en-Provence, Université de Marseille, 120-137.

White R., 2000 - Un big bang socioculturel : Une nouvelle façon d'apprehender le monde est née voici 40 000 ans, *La Recherche*, hors série 4, 10-16.

White R., 2001a - Les objets de parure provenant de la grotte d'Isturitz : fouilles 2000-2001, in Normand C. (dir.), *Isturitz (Salle de Saint-Martin)*, Rapport de fouilles programmées année 2001 et projet de recherche année 2002, non publié, déposé au SRA Aquitaine.

White R., 2001b - Personal ornaments from the grotte du Renne at Arcy-sur-Cure, *Athena Review*, 2 (4), 41-46.

White R., 2002a - Les objets de parure provenant de la grotte d'Isturitz : fouilles 2000-2002, in Normand C. (dir.), *Isturitz (Salle de Saint-Martin)*, Rapport de fouilles programmées 2000-2002 et projet de recherche 2003-2005, non publié, déposé au SRA Aquitaine.

White R., 2002b - Observations technologiques sur les objets de parure, in Schmider B. (dir.), *L'Aurignacien de la grotte du Renne. Les fouilles d'André Leroi-Gourhan à Arcy-sur-Cure (Yonne)*, Paris, Supplément à *Gallia Préhistoire*, XXXIV, 257-266.

White R., 2003 - Les objets de parure provenant de la grotte d'Isturitz : fouilles 2003, in Normand C. (dir.), *Isturitz (Salle de Saint-Martin)*, Rapport de fouilles programmées 2003 et projet de recherches 2004, non publié, déposé au SRA Aquitaine.

White R., 2007a - Parures aurignaciennes en Aquitaine : quelques observations, in Floss H., Rouquerol N., (dir.), *Les chemins de l'art aurignacien en Europe*, actes de la table ronde d'Aurignac, 16-18 septembre 2005.

White R., 2007b - Systems of Personal Ornamentation in the Early Upper Palaeolithic: Methodological Challenges an New Observations, in Mellars P., Boyle K., Bar-Yosef O., Stringer C. (eds.), *Rethinking the human revolution*, McDonald Institute Monographs, Cambridge, 287-302.

White R., à paraître - La parure aurignacienne de la grotte des Hyènes, Brassempouy, in Henry-Gambier D., Bon F. (dir.), *L'Aurignacien et le Châtelperronien de la grotte des Hyènes à Brassempouy (Landes)* Supplément à *Gallia Préhistoire*.

White R., Henry-Gambier D., Normand C., 2003 - Human-tooth ornaments from the French early Aurignacian: implications for early Upper Paleolithic treatment of the dead, Annual Meetings of the Paleoanthropology Society, Tempe, Arizona, Published abstract, *Journal of Human Evolution*.

Yentsch A., 1995 - Beads as silent witnesses of an African-American past: social identity and the artifacts of slavery in Annapolis, Maryland, *Kroeber Anthropological Society Papers*, 79, 44-60.

Zilhão J., d'Errico F., 1999 - The chronology and taphonomy of the earliest Aurignacian and its implications for the understanding of Neanderthal extinction, *Journal of World Prehistory*, 13 (1), 1-68.

Zilhão J., d'Errico F., 2003 - The chronology of the Aurignacian and Transitional technocomplexes. Where do we stand?, in Zilhão J., d'Errico F. (eds.), *The Chronology of the Aurignacian and of the Transitional Technocomplexes. Dating, Stratigraphies, Cultural Implications*, Lisboa, Trabalhos de Arqueologia, 33, Instituto Português de Arqueologia, 313-348.

Randall WHITE
Professor, Center for the Study of Human Origins
Director, UMI 3199 CNRS-NYU, New York University
25 Waverly Place, New York, NY 10003, USA
randall.white@nyu.edu

Christian NORMAND
CNRS, UMR 5608 - TRACES, Maison de la recherche
Université Toulouse Jean Jaurès, Campus Mirail
5 allées Antonio Machado, 31 058 Toulouse Cedex 9, FRANCE
cpjnormand@wanadoo.fr

P@LETHNOLOGY
Bilingual review of prehistory