Chapitre 21

Spain and Portugal : long chisels and perforated axes. Their context and distribution

Espagne et Portugal : longs ciseaux et haches perforées. Contexte et répartition

Ramon Fábregas Valcarce, Arturo de Lombera Hermida et Carlos Rodríguez Rellán

Abstract :
The find of long chisels and hoe-adzes has seemed for years an almost exclusive feature of the NW Iberian Neolithic closely linked to the final stages of the local megalithic phenomenon. Nowadays, we can insert the presence of those artefacts within a more widespread pattern both in time and space that would start at the Early Neolithic and extend over the Douro bassin, the Cantabrian coast and into the Center of Portugal, including not just the long axes but also the peculiar butt-perforated axes made from fibrolite.

From the 104 pieces catalogued, we can distinguish three main groups. The first comprises those axes whose raw material (green stone), high level of polishing and morphology could assign them to the Alpine set. Another group is made up of chisels or hoe-adzes whose raw material tends to be greenish, on these the polishing is not always so careful and there is a measure of typological variety. Finally, we could single out those axes, usually manufactured in finely polished fibrolite and having a hole in the butt end. Numerically, the second group is by far the most numerous, followed by the perforated axes (Cangas type) with just a few examples of Alpine-like pieces.

As for the context, our collection is very often composed of casual finds, a circumstance that could be due to different factors such as losses, intentional deposits, plundered tombs or even the contemporary antiques trade. In a number of cases, pieces come from burial contexts and among those we can distinguish two associative patterns : A) long axes + beads + fibrolite small axes + quartz prisms ; B) long axes + perforated tools (mace heads, battle axes, double adzes). In both instances, pottery seldom occurs. In the first case, contextual analysis and a few C^{14} dates might point to a Neolithic chronology, around the transition V-IVth millennia cal. BC, while in the second a IIIrd millenium temporal setting seems more plausible.

While in the case of some of the (presumably) Alpine samples a long-distance trade may be put forward as a hypothesis, most of the long axes from N and NW Iberia could well have had a more or less local manufacture, as the probable raw material and certain variety of morphologies would suggest, but nevertheless they are echoing customs or rituals found elsewhere in SW Europe.

Key-words : Iberian Neolithic, long axes, megalithic burial, trade route, variscite, Atlantic connections, Cangas

Résumé :
La découverte de longs ciseaux et lames d'herminette a été pendant des années considérée comme une caractéristique presque exclusive du Néolithique du nord-ouest ibérique, liée à la phase finale du phénomène mégalithique local. Aujourd'hui, nous pouvons inclure ces objets dans un schéma chronologique et spatial plus large, qui commencerait au Néolithique ancien ; il s'étend sur le Bassin du Douro, la Côte Cantabrique et le centre du Portugal, comprenant non seulement les grandes haches, mais également des haches perforées particulières en fibrolite.

Dans la série des 104 pièces inventoriées, on peut distinguer trois groupes principaux : celui des haches dont la matière première (roche verte), le haut niveau de polissage et la morphologie pourraient correspondre à une origine alpine ; un autre groupe, composé de ciseaux ou de lames d'herminette, avec une matière première verdâtre, un polissage moins soigné et une certaine diversité typologique ; enfin un groupe de haches, généralement en fibrolite, finement polies et à talon perforé. Numériquement, le second groupe est de loin le mieux représenté, suivi par les haches perforés (type Cangas) et enfin par les pièces de type alpin, avec quelques exemplaires seulement.

Quant au contexte, notre collection comprend surtout des découvertes fortuites, à l'occasion de pertes, dépôts volontaires, pillage des tombes ou encore commerce moderne d'antiquités. Dans certains cas, les pièces proviennent de contextes funéraires où l'on peut distinguer deux types d'associations : A) haches longues + perles + petites haches de fibrolite + prismes de quartz ; B) haches longues + outils perforés (des massues, des bipennes, des herminettes doubles). Dans les deux cas, la céramique est rare. Dans le premier cas, le contexte et quelques dates C^{14} pourraient indiquer une date à la transition des V^{e}-IV^{e} millénaires av. J.-C., alors que dans le second, le III^{e} millénaire semble plus plausible.

Pour certaines haches alpines (vraisemblables), une circulation à longue distance peut être proposée en hypothèse. Au contraire, la plupart des grandes haches du nord et du nord-ouest ibérique pourraient provenir d'une fabrication plus ou moins locale, comme le suggèrent les matières premières et une certaine variété morphologique ; néanmoins, ces haches sont l'écho de coutumes ou de rituels semblables à ceux du sud-ouest de l'Europe.

(traduction : Pierre Pétrequin)

Mots clés : *Néolithique ibérique, grandes haches, tombe mégalithique, voies d'échange, échange de variscite, connexions atlantiques, Cangas*

The question of the nature and origin of the green stone axeheads found in Western Europe is an old one, first put forward by Damour in the last third of the 19th century (see for instance Pétrequin *et al*. 2007 : 52-53 for the relevant references). In the Iberian Peninsula this debate was not followed up, no doubt because the number of ground stone axes potentially assignable to that group were very few (but some known for decades now, like those from Sádaba, Dima or Vilapedre) and also due to the lack of systematic studies on the technology and raw material of ground-stone axes. This situation has changed somehow from the last 20 years onwards, when programs of study of polished axes have been put forward in several Iberian regions with interesting results.

One of the first attempts in this line of research was that of Barrera *et al*. (1987) who working in a region of the SE Spain made a statistical analysis of the morphometric variables of the ground stone axes and also thin-section 58 pieces. They concluded that those tools more related to primary uses were done in local materials, while the allochtonous raw materials (i.e. fibrolite) were linked to more specialized instruments (very small adzes for instance). They observed, too, that settlements and tombs differ with respect to the intensity of use of the polished artefacts (significantly less so in funerary contexts).

In the Portuguese Extremadura, K. Lillios (1997, 2000) centered her effort on the amphibolite tools recovered from five Copper Age sites, showing that in spite of being a primary raw material for groundstone tools in all of them, the different proportions of tools made from amphibolite suggested an unequal access to the stone sources by the inhabitants of the sites. Geochemical analysis pinpointed the origin of this amphibolite to the inner region of Alentejo, about 150 km to the Southeast. The allochtonous amphibolite tools from the Extremadura sites had a longer life and were more prone to rejuvenation than their local counterparts.

In eastern Spain, the region of Valencia has seen a longstanding effort at classifying and provenancing ground-stone axes from the Early Neolithic to the Bronze Age (Orozco 2000) recurring to the thin-sectioning of 277 pieces, sometimes combined with the use of X-Ray Diffraction. One of the data thus obtained is that from the recent Neolithic there is a rise in the number of imported axes from outside Valencia, a trend that reaches its climax in Bell Beaker times. In a later work (Harrison and Orozco 2001), the authors detect an increase in the supply networks during the Copper Age and distant-sourced materials like fibrolite and cornubianite become more frequent than before, a trend that is also observed in Andalusia. For the purpose of this work it is also noteworthy that these authors consider that the exchange network of Alpine axes completely bypassed the Iberian Peninsula (*ibid*. : 114).

Another recent paper (Risch and Martínez 2008) deals with axeheads, most of them casual finds from Catalonia, 61 out of 67 made of cornubianite, a raw material quite widespread in NE Iberia. Interestingly, the manufacturers turned to river cobbles rather than quarrying this raw material. The authors record a number of workshops where the first stages of the manufacturing process were attested, with the apex of production and distant exchange taking place towards the local Middle/Final Neolithic (IVth millennium/beginning of the IIIrd BC).

Summing up, research on the production and exchange of Iberian ground-stone axes has seen significant advances although an investigation program on a scale larger than the regional is still absent. Also, the information about quarries or production centers is very scanty, with the exception of Catalonia and some other isolated spots. However, in the different Iberian areas under scrutiny we are able to observe some common trends, namely the growth of the exchange networks during the Final Neolithic and Copper Age and the social use of these artefacts beyond their primary role as tools.

Coming back to the main focus of our research, the survey of the relevant literature and subsequent visits to museums and private collections carried out in the years 2007-2009 have yielded a collection of more than 100 artefacts that more or less share the characteristics stated in the JADE project, namely a careful manufacture/polishing, large dimensions, use of jadeitite or similarly-looking raw materials and/or a typology akin to the varieties already defined within the Alpine set of ground-stone tools. The Iberian pieces are mostly found in an ample area that ranges from the Ebro basin to the shores of Central Portugal and from the Cantabrian coastal rim to the southern reaches of the Northern Meseta, although some examples come from Catalonia or, further to the South, from Andalusia.

Several limitations will affect our appraisal : to start with, the majority of the artefacts recorded come from unsecure contexts or casual finds. This is a condition not necessarily linked to the haphazard circumstances of their contemporary discovery/recording, for in some cases "isolated axe(s)" might be a result of an intended deposition (hoard, votive deposit, non-monumental tomb) in prehistoric times (to this respect see, for instance, Pétrequin *et al*. 2009a). It is true, nevertheless, that particularly in the case of some beautiful examples of long axes an origin in the antiques trade cannot be ruled out and the present location responding to such a circumstance (that is precisely the explanation offered for some jadeitite specimens from the Canary islands in Farrujia and Arco 2004). Therefore we shall pay special attention to those elements that come from controlled excavations and may have a precise or estimated chronology. A second restriction to our analysis comes from the fact that a number of pieces could not be recorded following the standard procedure, either because they had disappeared since they were first discovered or published (i.e. the long chisel from Vedro Vello, several components of the Rechaba and mound 229 from As Pontes) or because they could not be reached for practical reasons. Regrettable as they are, these losses should not alter significantly the patterns already observed in the recorded sample. And last but not least : the lack of petrographic identification for nearly all the artefacts recorded is a condition that severely limits the possibilities of tracing back to the sources of raw materials and, therefore, postulating with some firmness routes of procurement or exchange.

• 1. Body of evidence. Distribution areas

For economy of effort we have divided North Iberia into five main areas that roughly correspond with natural regions (fig. 1) : the Northwest, the Cantabrian Coast (subdivided into East and West), North Portugal, Northern Meseta and the Northern Mediterranean Coast-Ebro Basin.

The polished artefacts have been separated into groups too, first in local axes which are not directly ascribed to the Alpine types, such as chisels, gouges and hoe blades ; the second group consists of axes whose morphology and / or raw materials may associate them with French models. The latter were divided, in turn, into Northern, Southern, Ubiquitous and Carnacean Types according to the typology proposed by P. Pétrequin. Finally, those pieces of interest that could not be assigned to any of the above types were grouped in the category of "Others".

1. 1. Axe typology

Our study collection is made up of 104 specimens (85 of which were examined directly by us). These are composed mainly of chisels (28), followed by the Ubiquitous Types (25), Southern Types (17), hoe blades (12) and, finally, Carnacean Types (6), gouges (2) and Northern Types (only one example of doubtful atribution, a Chenoise Type axe) (fig. 2). At a more detailed level, apart from the aforementioned domain of chisels, the Puy axes are the most numerous (20), followed by the hoe blades (12) and then types with little representation (fig. 3).

If we look at the different regions we can see an uneven distribution of types (fig. 4 and 5). In the northwest, the "local" types (chisels and hoe blades) are the most numerous, the first amounting to the 60% of the artefacts of this type documented in the Peninsula, while approximately 75% of the hoes come from Galicia. As for the rest, Carnacean types (3) and Ubiquitous (2) have similar numbers, with just one example each of the Northern and Southern types. In Northern Portugal, on the other hand, Southern types are more prevalent (8), while the other groups are barely present, with the exception of the chisels (2). In the Northern Meseta there is equilibrium between the Southern types (4) (predominant in Portugal) and the Ubiquitous (4), the latter more frequent in the Bay of Biscay and the Mediterranean and the Ebro Basin. Actually, in the Cantabrian strip the Ubiquitous types are widespread (8), all concentrated in the Western section, followed by chisels (6). This distribution is also found in the Mediterranean and the Ebro Basin where the Ubiquitous (10) have a clear domination, coming from this territory the 40% of these pieces documented in the Peninsula.

With respect to the specific types, in the Northwest we have already mentioned the dominance of chisels and hoe blades, accompanied at a considerable distance by the Puy and Tumiac types (fig. 6). In northern Portugal Bernon and Bégude types are the most represented. Chisels, Durrington and Puy types are also present in the Cantabrian region. In the Northern Meseta the Puy and Bernon axes are dominant among a larger array of types. Finally in the Mediterranean there is an absolute rule of the Puy axes, followed distantly by Chelles.

Type variability shows a similar pattern to that observed in raw materials. The Cantabrian Coast is where we find greater diversity, followed by the Northern Meseta and Portugal, at the opposite side lies the Northwest, where the variability of types is by far the smallest. The correlation analysis between the different types presents a fairly clear division between the areas studied. The Northwest and the Cantabrian regions have very similar values but with some differences : in the first case there is a clear correlation with chisels and hoes, while in the second Puy and Durrington are favoured (i.e. Ubiquitous types). The link between both areas is given by the presence of Carnacean types (Tumiac). Meanwhile, the Northern Meseta and North Portugal are set as a unit, possibly linked through the Douro, characterized by the Gouge, Bégude, Bernon and Durrington models (i.e. Ubiquitous and Southern types). Finally a third cluster seems

FIG. 1
Main areas in which we have divided the Iberian Peninsula for the purposes of this study.

to be established solely by the Mediterranean and the Ebro Basin, where the dominant types would be Puy, Pauilhac and Chelles (i.e. Southern and Ubiquitous types).

1. 2. Raw-materials

As for raw material (fig. 7), there is a clear predominance of schist (28 ; 22.58%), followed by fibrolite (18 ; 17,30%) and amphibolite (16 ; 17,30%), while jadeitite and eclogite are tied for the third place. The regional distribution (fig. 8 and 9) shows that in the Northwest amphibolite and schist predominate, followed at some distance by fibrolite. In Portugal, schist has an even more marked dominance,

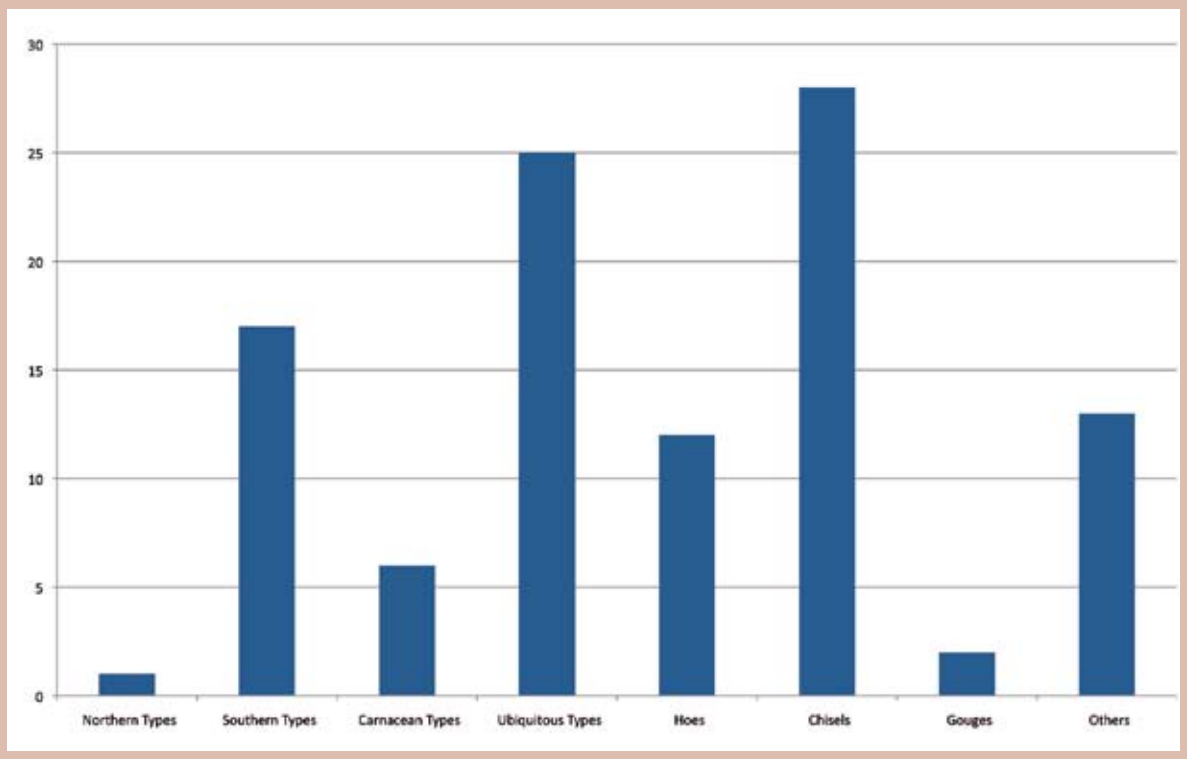

FIG. 2
Distribution of the axe's main types.

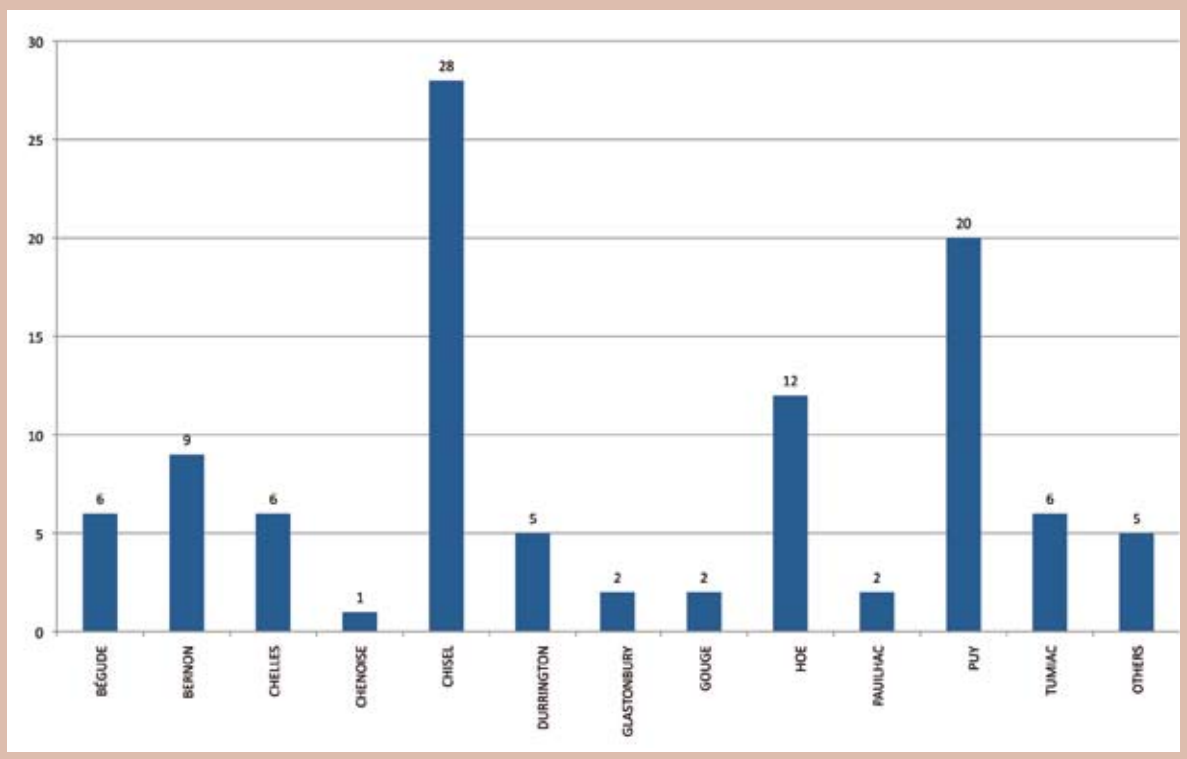

FIG. 3
Typology of the axes.

representing 58.3% of the tools considered. In the Northern Meseta schist is yet again more frequent, but closely followed by amphibolite and jadeitite. In the Cantabrian strip the fibrolite is most common, followed by schist, eclogite and quartzite. Finally on the Mediterranean coast and in the Ebro Basin eclogite is the dominant raw material followed by amphibolite and jadeitite.

The analysis of raw material variability (number of rocks used to make the axes) establishes the Cantabrian Coast as the place with the greater diversity in Iberia, while the Northwest is the region where it is lower, mainly due to

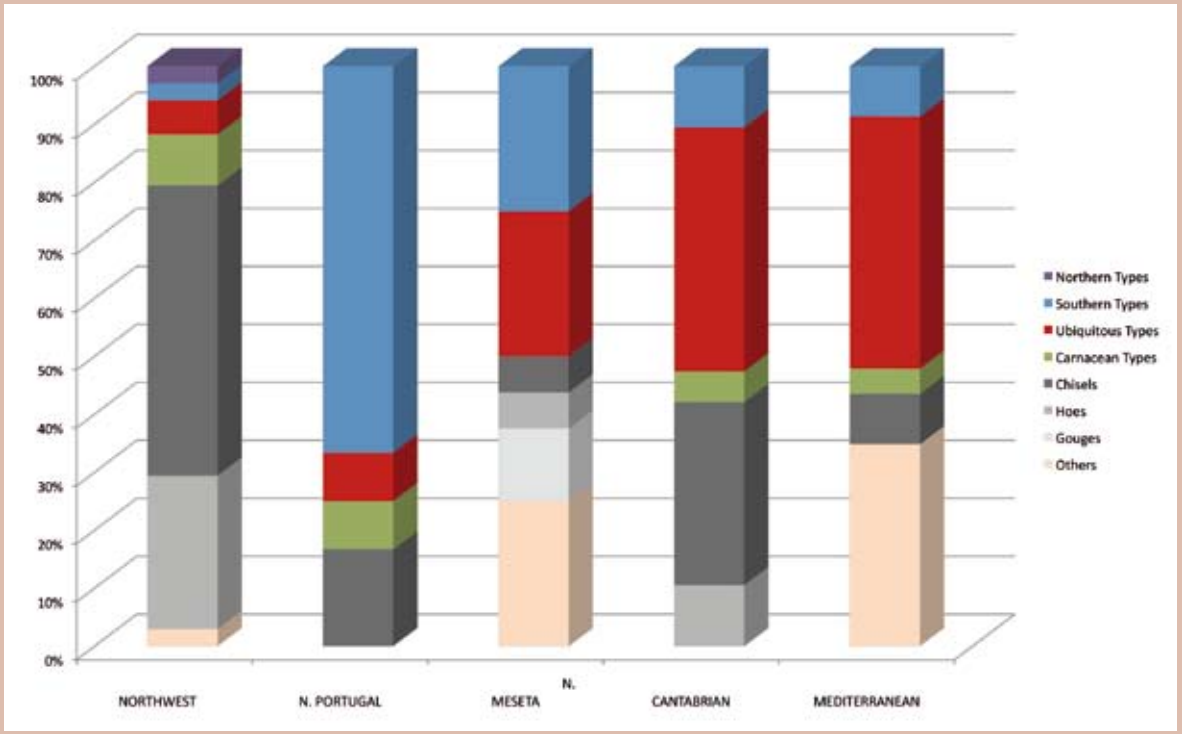

FIG. 4
Distribution of the main types of axes by region.

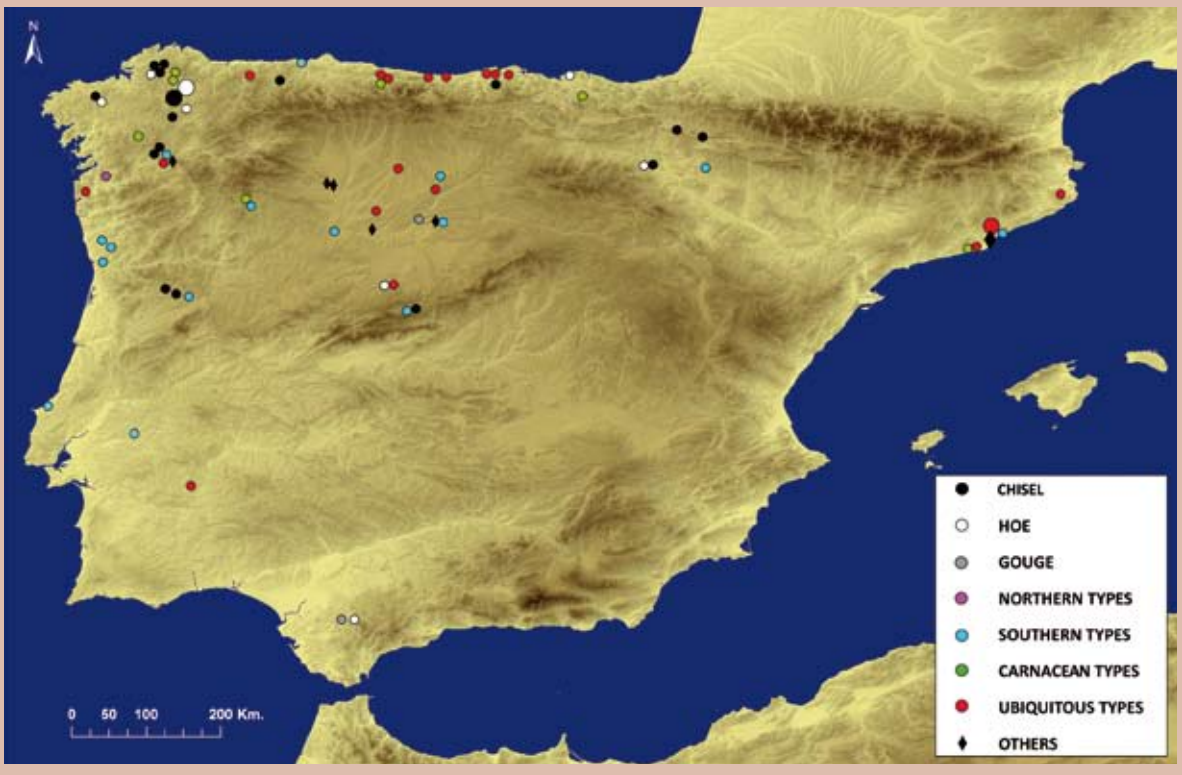

FIG. 5
Distribution of the main types of axes in the Iberian Peninsula (larger dots represent concentrations of more than five axes in the same area).

	NORTHWEST		NORTH PORTUGAL		NORTH MESETA		CANTABRIAN COAST		RANEAN COAST & EB	
CHISEL	17	50	2	16,67	1	6,25	6	31,58	2	8,69
HOE	9	26,47	-	.	1	6,25	2	10,53	-	-
GOUGE	-	.	-	.	2	12,5	-	-	-	-
BÉGUDE	-	.	4	33,33	-	-	1	5,26	1	4,35
BERNON	1	2,94	4	33,33	4	25	-	-	-	-
CHELLES	-	.	-	.	2	12,5	-	-	4	17,4
CHENOISE	1	2,94	-	.	-	-	0	-	-	-
DURRINGTON	-	.	1	8,33	1	6,25	3	15,79	-	-
GLASTONBURY	-	.	-	.	2	12,5	-	-	-	-
PAUILHAC	-	.	-	.	-	-	1	5,26	1	4,35
PUY	2	5,88	-	.	3	18,75	5	26,32	10	43,5
TUMIAC	3	8,82	1	8,33	-	-	1	5,26	1	4,35
OTHERS	1	2,94	-	.	-	-	-	-	4	17,4
TOTAL	34	100	12	100	16	100	19	100	23	100

FIG. 6
Main types of axes in the Iberian Peninsula.

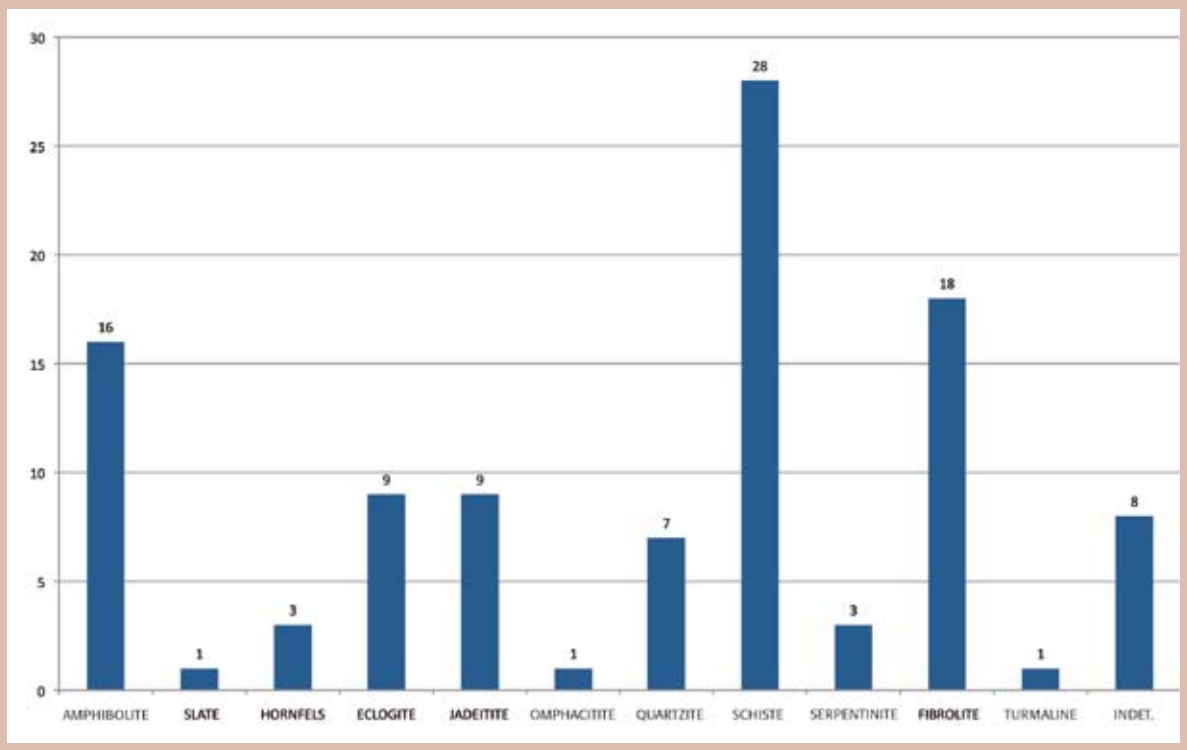

FIG. 7
Raw material of the axes.

the large number of axes made of amphibolite and schist. Nevertheless, despite those differences, we did not find any statistically significant correspondence between a particular raw material and any of the regions considered.

The "green stone" axes are unevenly distributed across the established regions : jadeitite has a greater spatial distribution and is associated with the Mediterranean and the Northwest, Northern Meseta and North Portugal, while serpentinite occurs exclusively in the Cantabrian and Mediterranean areas. With the latter is strongly related the eclogite, maybe due to the existence of local productions in the area where this rock was exploited for the manufacture of polished axes (Risch and Martínez 2008), as seems to happen in the Northwest with the amphibolite and schist, whose close relationship could also show a possible local source of raw material and thus, the polished pieces.

From these distributions some comments can be made. There is the strong personality of the artefacts in the Northwest, based on the types and local raw materials. This could be explained either by the fact that the groups in this region had a limited access to Alpine axes, hence the greater weight of local raw materials, or that this area became a production centre of its own, inspired by those French models (possibly arriving by sea from Brittany) which, in view of the dispersal patterns, tended to be distributed to the north of Portugal and the Spanish Meseta. It should be noted that the distribution within the Northwest is not balanced, because there is a strong focus on inland Galicia (Lugo Province and, to a lesser extent, Ourense), while in the western coast are far fewer finds ; this differentiation, already observed some years ago by Criado and Fábregas (1994), may simply point to a strong production of a regional nature, that has over-represented the weight of the schist axes.

The jadeitite, meanwhile, is clearly focused on the Mediterranean coast, although there are a few specimens in the Northern Meseta, one of them just 40 km to the North

of the variscite mines at Palazuelos. The fact that those pieces are more numerous in the geographical areas near the variscite producing centers (be that Palazuelos or Can Tintorer), may indicate that these green axes were distributed as part of the green beads trade, but unfortunately all these specimens are *hors contexte* and this forces us to be cautious.

The fibrolite, meanwhile, has a clear distribution in the Northwest quadrant of the Iberian Peninsula, being barely present in the Eastern Cantabrian Sea and the Ebro Basin. This would point to a possible source somewhere in the Meseta, the Cantabrian Coast, or, less likely, in the Northwest or North of Portugal. Yet it is precisely in these places where the fibrolite axes denote a distinctly "French character", well illustrated by most pieces of "Cangas type", seemingly inspired by the Tumiac group.

The eclogite is clearly linked to the northern Mediterranean coast, and might be evidence of a local production or an arrival across the Pyrénées ; it is possible that the pieces found in the eastern part of the Cantabrian had moved up from the Mediterranean coast through the Ebro Valley, as Cardial pottery had done before and as variscite and flint continued to do for some time. Finally, the serpentinite is clearly associated with the eastern Cantabrian.

The fact that the dominant types in the Northwest, together with local chisels are the imitations of Tumiac, as in the Cantabrian coast, gives some clues about the possible age of the contacts, around the fourth millennium or even the second half of the fifth, if we take into account the dates in Brittany for that type (between 4600 and 4300 BC) (Pétrequin *et al.* 2007a). This early chronology would also have some support if we consider the chisels as a kind of "variant" of the Begude axes, which are the oldest types ; a similar situation occurs in the Spanish Meseta and northern Portugal. However, the presence of evolved types in all these areas suggests the persistence of contacts and, on the other hand, the demonstrated presence of chisels in funerary contexts dating to the IIIrd millennium BC (such as Monte Campelos) points to a survival of axes that are sometimes virtually indistinguishable from those documented in contexts far more ancient.

1. 3. Technology

We must be cautious about the technological inferences extracted from this work since we dispose of a scarce sample and, mainly, we are dealing with finished artefacts without any contextual data or recovered from burials. Their absence from domestic contexts or the lack of workshops prevent us from reaching a good understanding about the production sequences of these objects. Also, the high level of polish present in many pieces conceals the evidence of previous tasks such as preparing the rough-out, sawing, pecking, etc... On the other hand, few experimental or technological works have been carried out on this topic and when available, they are focused on specific raw materials such as fibrolite or jadeitite (García *et al.* 2008, Pailler 2008, Pétrequin *et al.* 2008a).

When manufacturing domestic ground-stone tools, it was commun to use local resources, obtained from superficial deposits, such as alluvial fans or fluvial terraces. No prehistoric stone quarry has yet been identified in Iberia (Risch and Martínez 2008). As we have seen before, most of the axes catalogued in our study are made on local raw materials too, such as amphibolite, schist, hornfels, etc. depending on the geological substratum of each region. But we have to bear in mind the social value of these pieces that can imply long term use and long distance exchanges. That feature may explain the different patterns observed among the Iberian regions according

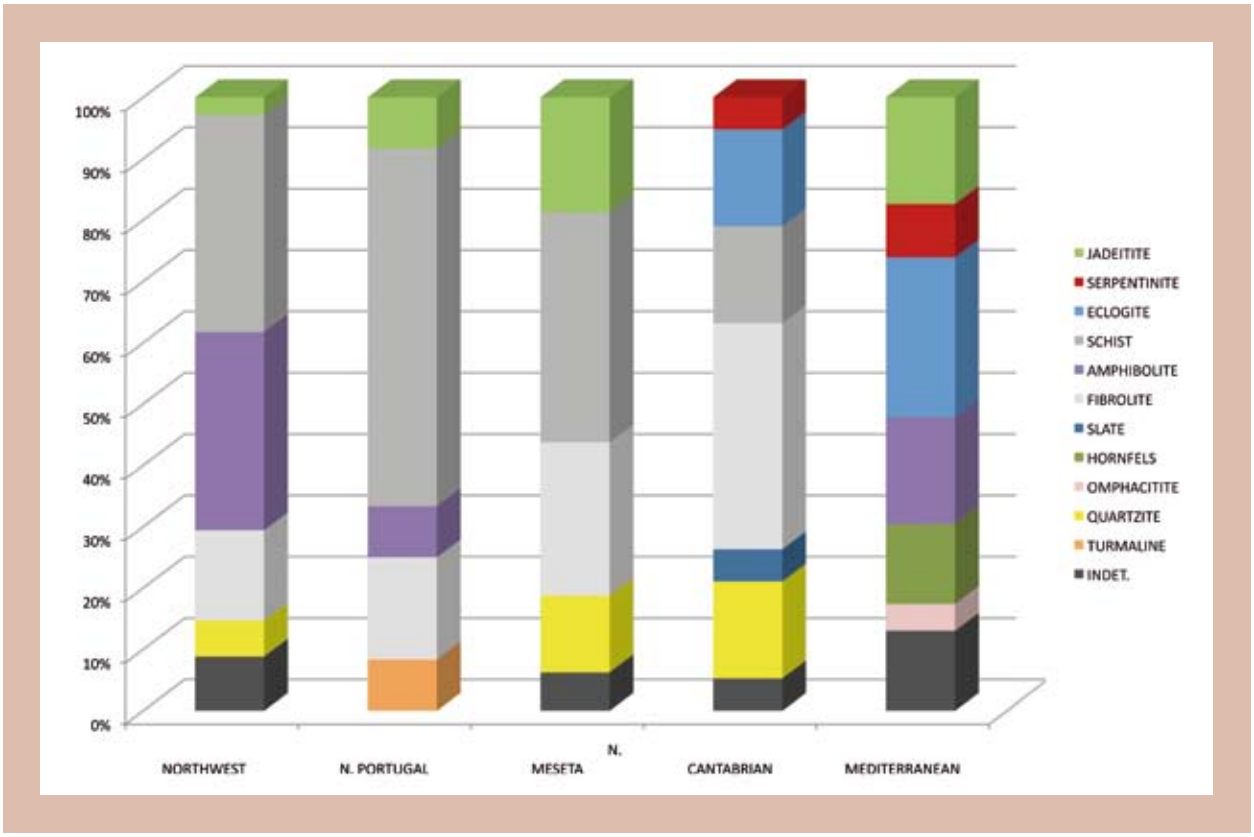

FIG. 8
Regional distribution of axes according to raw material.

to the social and trade networks developed or affecting each of them.

Concerning the production sequences, some features can be identified. The presence of half-sawed rough-outs on fibrolite tabular blocks, small lateral grooves on one or two faces of the finished pieces and the asymmetry of some chisels or hoe blades, strongly indicate the acquisition of tabular blocks, firstly pecked or half polished and then sawed into two or three blanks, then given its final shape with a last, finer polishing. Those features are more usual on fibrolite and amphibolite materials, as seen in other European contexts too (Pailler 2008).

The most important feature of the long green axes, no matter they are made on local or allochtonous raw materials, is the high degree of polishing, often in sharp contrast with the finish of "standard" ground-stone artefacts coming from the same context. As much as the 80,7% of the catalogued pieces display total surface polish, but only 53,84% a careful overpolish. Regarding raw materials, the highest percentages are reached on jadeitites, quarzites, fibrolites and eclogites (the "greenest" ones, around 55-80% of surpolissage), while the hornfels, omphacitite and slate show the lowest percentages. Alpine-like types achieve the highest level of careful overpolish (Tumiac or Pauilhac, nearly 100%), followed by the long chisels (77%). On the other hand, the Ubiquitous types (v.g. Puy) and others have lowest percentages of that high polish, ranging from 20% to 40%.

One important group in the Iberian catalogue is the Tumiac/Cangas, with a particularly high representation in NW Iberia and the Cantabrian Coast. Sixteen pieces (15,38% of the total) present a hole in the butt end for a pendant function and 56,25% of them are made on fibrolite. As to the perforation technique the drilling (biconical sections) is the most frequent and only three of them are made by rubbing (Castro de Pendía, dolmen de Santa Cruz and Ponteareas). The presence of small striae next to the hole on the dolmen de Santa Cruz specimen may indicate some kind of wrapping around the butt end of the piece, but more detailed analyses must be carried out to confirm that assertion.

• 2. Context and chronology

As stated earlier the vast majority of the finds of long axes have no context or this is rather dubious, either because we are dealing with an old find or one coming from an unpublished site. Only in a few cases (detailed below) can we have more or less reliable descriptions about the conditions of the discovery of these artefacts. As a result, our chronological and contextual interpretations are based on a very reduced number of sites. We must take into account that only 40,38% of the axes come from archaeological works, while the rest of the finds are *hors contexte* (20,19%), private donations (9,62%) or without any contextual information (29%). Thus, many of the chronological ascriptions of these artefacts have been done exclusively on typological grounds, and span from the Early Neolithic to the Chalcolithic. We must also point out that Catalonia is not considered here, as there is another contribution dealing specifically with this region (J. Vaquer *et al.*, in this book, chapter 15, p. 872).

Among the sites we have reviewed in this work, only six have yielded contextual information of variable quality for the long axe findings and all of them are burial contexts associated with mounds : Illade 0 ; Monte Campelos ; A Millarada ; Rio Fortes ; Alberite and Carapito 1. They have a long time-span, ranging from the V-IVth millennium to the IIIrd. Few radiocarbon dates are linked to these deposits and some of them are quite problematic : samples with

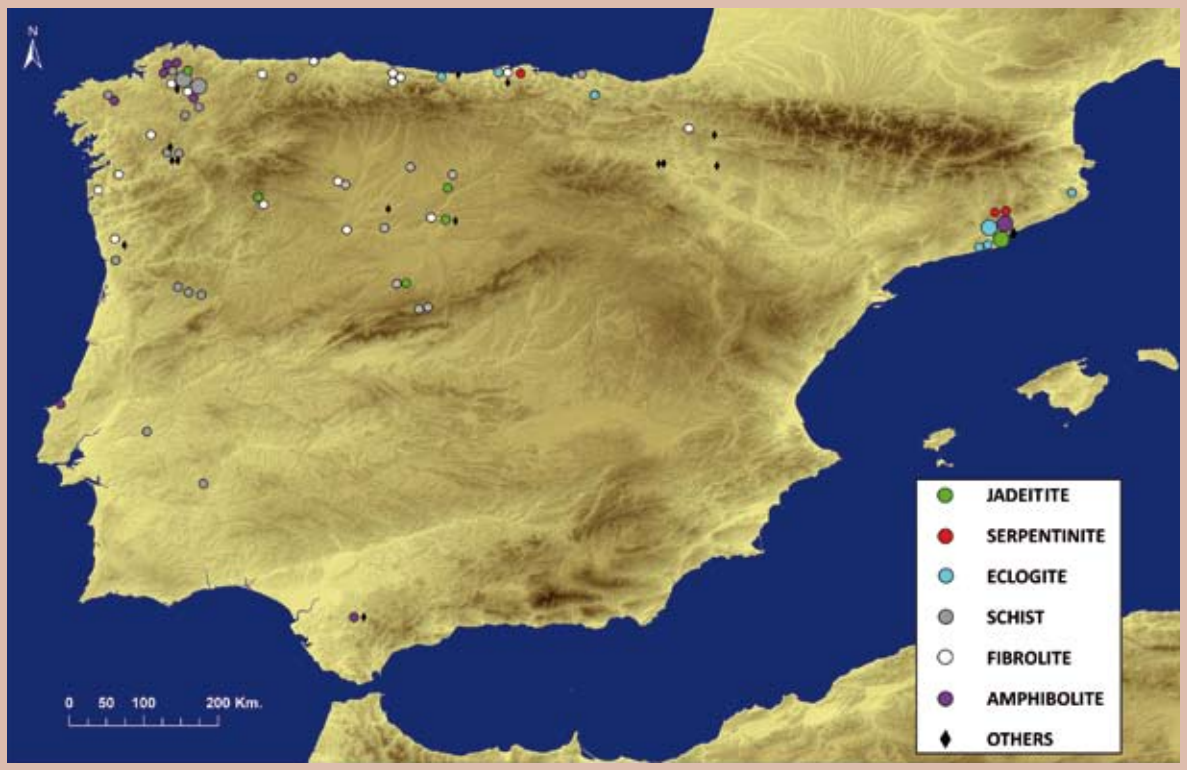

FIG. 9
Distribution of raw materials in the Iberian Peninsula (larger dots represent concentrations of more than three axes in the same area).

SITE	Lab Ref.	Radiocarbon age	Calibrated Age	Context	References
ILLADE 0	GrN-19211	6940± 200 BP	6172-5441 B.C.	Despite its high deviation, the author considers that these must be related to the burial.	Vaquero Lastres, J. (1999)
	Beta-51900	5820± 160 BP	5059-4345 B.C.		
	GrN-19208	5305± 50 BP	4314-3986 B.C	Charcoal contained in the "first deposit" (associated to the closing).	
	GrN-19210	5240± 60 BP	4228-3953 B.C.		
ALBERITE	Beta-80600	5110 ±140 BP	4245 -3640 B.C	Combustion structure	Ramos Muñoz, J, *et al.* (1996)
	Beta-80602	5320 ±90 BP	4345 – 3960 cal B.C	Combustion structure. Antechamber	
	Beta-80598	5020 ±70 BP	3970 – 3660 cal B.C		
CARAPITO 1	GrN.5110	4850 ±40 bp	3708-3627 BC (.72)	Chamber	Cruz, D.J. et R. Vilaça (1994)
			3590-3527 BC (.27)		
	Hv-s/n	4590 ±65 bp	3521-3096 BC		
	TO-3336	5120 ±40 bp	3989-3891 BC (.49)	Foundation pit	
			3884-3798 BC (.50)		
	OXa-3733	5125 ±70 bp	4052-3712 BC		
	Weighted mean of TO and OxA	5121 ±35 bp	3985-3895 BC (.50)		
			3881-3800 BC (.49)		
RIO FORTES	Beta-93013	3910 ±100 BP	2640-2040 B.C.	Ue 102 or Ue 105, circular structure	Estremera Portela, Mª. S. et Fabián García, F. (2002); Fabián (2006)
	Beta-164477	4970±80 BP	3960-3640 B.C.	burned layer, possibly related to closure of the first use of the tomb	

FIG. 10
Radiocarbon dates from excavated sites referred in the text.

no direct association to the goods, context not well defined or datings related to the construction or closure of the mounds but not to the burial. In spite of that, the archaeological context of these samples can provides some chronological information about the long axes in the Iberian Peninsula and compare them to those coming from old excavations or isolated finds without any radiocarbon dating (fig. 10 and 11).

Three of these sites are located in NW Iberia, two of them are negative structures, and the third is a polygonal megalithic chamber. At the site of Illade (A Coruña, Galicia) we find a concentration of seven mounds placed on a low ridge (Vaquero 1999). The mounds Illade 0, 2 and 3, share identical structural and locational patterns. In contrast with other Iberian contexts, Illade 0 is not a megalithic chamber, but a pit marked by a stone stela and a wooden passage (unique in the Iberian Peninsula). Although its archaeological materials are scarce, their quality and age (Vth millennium) make a good example of individual burial. Illade 0 has the oldest radiocarbon dates, but they show quite disparate values and their archaeological context and discussion are not well developed and clear in Vaquero's scanty references.

Taking into account these radiocarbon dates and the meagre archaeological record some considerations can be put forward. There is not any known/well defined stratigraphic association between these dates and the archaeological context, apart from the descriptions given at the figure. The only reference to these dates gives no correlative data on the lay-out of the mound digging : the "First deposit" is not defined, and it could be either the lower layer (Vaquero 1999 : planche 60, p. 167), or even the first burial. According to the author, the samples GrN-19211 and Beta-51900 must be related to the burial, despite its high standard deviation and unverified context. We must be cautious about these dates, taking into account their high deviation and the possibility of their coming from old wood. The dates that fit better the well known peninsular contexts (such as Carapito 1 or Alberite) are those of late Vth- early IVth millennium cal. BC (samples GrN-19208, GrN-19210) that would represent an slightly earlier moment than the first stage of Carapito 1. Somehow contradictory with his own statements, Vaquero seems to agree with our interpretation, for he says elsewhere that these kinds of structures in NW Iberia can be placed about the 5200-5000 BP, based on the samples GrN-19208-17 and Beta-51900-02 (Vaquero 1999 : 179, note 124). In our view, considering both the radiocarbon dates and the lithics, the site of Illade 0 may represent a burial from the V-IVth millennium BC transition. These data, as we shall see later, are in good agreement with other sites with a similar lithic assemblage (long axes, chisels, fibrolite micro-axes, beads and microliths), radiocarbon dates and the absence/scarcity of pottery.

The mound of Monte Campelos (Lugo, Galicia) was dug in the early 80´s in the context of a rescue archaeological excavation, since the tumulus had been partially destroyed by bulldozing (Rodríguez 1983). The excavation brought to light a secondary pit grave in the SE area of the mound. This pit, positioned on an E-W axis, was filled up with compact red earth with a different origin than the rest of the soil used in the construction of the tomb. All the materials, except a few sherds out of context, were discovered inside the pit. Although no radiocarbon dates are available, the archaeological context and artefacts seem to indicate a IIIrd millennium date.

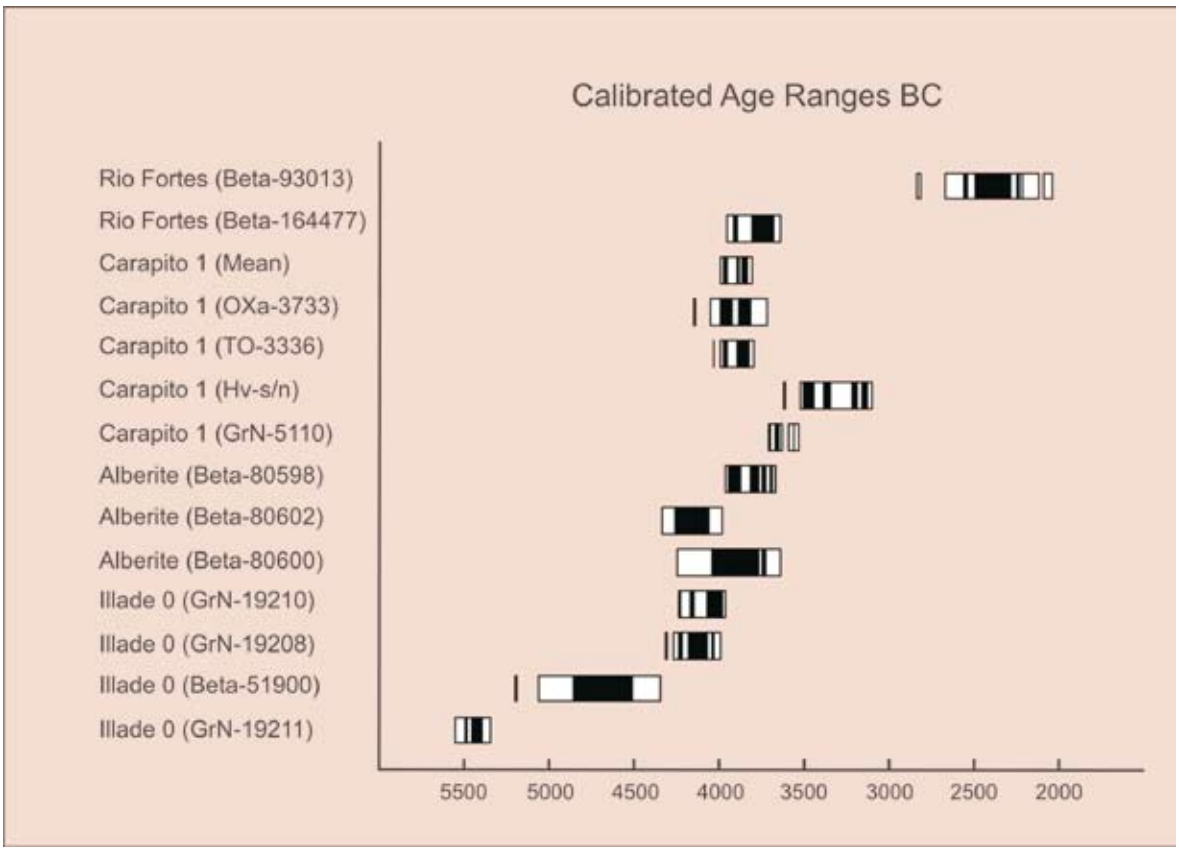

FIG. 11
Chronological span of the sites referred in the text.

Of the three sites in NW Iberia, A Medorra 1 de A Millarada (Lugo, Galicia) is the only megalithic chamber. In this locality there is a necropolis with 21 mounds close by a traditional pathway. Archaeological works were carried out in 2001 by an archaeological firm (Ambiotec) and yielded an important lithic assemblage within the burial chamber (Vidal 2001-2002). Several features were identified : mound, chamber uprights, a ring-shaped stone structure, one hearth, a closing structure (pit) and a significant amount of artefacts recovered (geometrics, quartz crystal, flint blades, ground stone tools and scarce pottery). Despite the bad preservation of this mound and the absence of radiocarbon dates, it provides us with high-resolution spatial information.

At the Northern Meseta, La Dehesa de Rio Fortes (Ávila, Castille) is placed on the top of a hill with a good command of the Amblés Valley (Estremera et Fabián 2002, Fabián 2006). The farming works that nearly reached the bedrock, had uncovered a large quantity of archaeological materials including a hoe, a mace, flint blades, arrow points and more than fifty beads. The subsequent excavation showed the existence of a tumulus almost completely destroyed, but part of the tumular mass and the remains of a polygonal chamber were discovered under the disturbed layers. The mound had evident signs of fire, interpreted by the archeologists as evidence of a ritual closure of the tomb (4970 ± 80 BP, 3960-3640 BC. cal 2 σ). Some artefacts, like the microliths, could be contemporary with this moment. Nevertheless, the mound continued to be used in the following millennia as indicated by the construction of a circular structure in the SE area, whose foundations involved the destruction of that sector of the tumulus and are apparently dated in the second half of the IIIrd millenium (3910 ± 100 BP, 2640-2040 B.C. cal. 2 σ). However, the provenance of this sample appears a bit confusing, because at first (Estremera et Fabián 2002) it is linked to a burned layer (Ue 102), but in a later publication, it is associated with another stratum (Ue 105) (Fabián 2006).

The second C^{14} date seems to suggest that the nature of the megalithic tomb changed in the second half of the IIIrd millennium, perhaps linked to the occurrence of the first Bell-beaker communities (unfortunately, the high deviation of this date prevents us from being more specific). Estremera and Fabián (2002) consider that the characteristics of part of the material discovered in Río Fortes, specially the set of polished tools, the Bell-beaker pottery and the metallic items, together with the recent C^{14} date obtained in the circular structure, would indicate that the final occupation of Rio Fortes belongs to a late facies of the Megalithic phenomenon.

In SW Iberia, the Alberite mound (Cádiz, Andalucía) is a spectacular pasage-grave with its entrance facing east and the inner space divided in several chambers separated by decorated orthostats (with motifs like "*The Thing*") (Ramos Muñoz *et al*. 1996, 1997). As in Rio Fortes, farming severely altered the mound, bringing to the surface archeological material including gouge, a hoe and 523 beads. The excavation discovered, under the disturbed layers, a burial level which was partially preserved by the collapse of the capstone. Almost all the grave goods were found in the burial chamber (the smaller and more internal section of the dolmen where the skeletons of two individuals were discovered) or in the immediately preceding area, interpreted as an antechamber.

We have three C^{14} dates for Alberite that, partly due to their high standard deviation, overlap each other. The first (5110 ± 140 BP / 4245-3640 cal. B.C) comes from a combustion structure which could be contemporary with the tomb closure. The other two dates come from another combustion structure discovered in the antechamber (5320 ± 90 BP / 4345-3960 cal. B.C and 5020 ± 70 BP /3970-3660 cal. B.C). The relationship between these fires and the burial of the two individuals is not clear. Like the burials themselves, they may have happened at the same time or in sequence. We must take into account the possibility of being a secondary burial, according to the archaeologist´s hypothesis. Bearing in mind the C^{14} dates and the characteristics of the materials, Alberite seems to be constructed in the final moments of the Vth millennium or maybe in the first century of the IVth and used during the first half of the IVth millennium and then closed sometime between the 3900 and the 3600 B.C. The artefacts, including the polished ones, were deposited in this moment and later were covered with ochre, as were the bodies, the soil and the walls of the tomb.

Carapito 1 is a large dolmen located in Casa da Moura, by the river Carapito (Aguiar da Beira, Portugal). It was dug in 1966 by V. Leisner and L. Ribeiro (1968) and afterwards reexcavated and restored in 1988 by Cruz and Vilaça (1990, 1994). Many archaeological materials were recovered during these excavations and some radiocarbon datings are available pointing to a primary use during the first half of the IVth millenium. Two radiocarbon samples were analysed after the 1988 excavation, both coming from the lowermost level of the foundation pit for the upright E, thus being considered as contemporary to the building of the monument. The results, statistically identical, show that it was raised by the first quarter of the IVth millennium cal. BC (weighted average of both dates : 5121 ± 35 bp : 3985-3800 BC). These can be compared to the oldest date obtained from the lower level of the chamber (4850 ± 40 bp : 3708-3627 BC [.72] or 3590-3527 BC [.27]). Cruz (1995 : 97-98) considers that the earlier date from the chamber could correspond to the first layer that yielded ground stone tools, microliths, beads and flint blades, while another might fit with a later use characterized by the presence of pottery.

2. 1. 1. Grave good associations

Though the quantity of artefacts in each site is quite diverse, we must pay attention to the chronology of the burials and the grave goods association so that some tendencies can be drawn. When spatial information is available (Carapito, A Millarada) we can identify some patterns that can also be seen in individual burials, like Illade 0. One remarkable thing is that at all sites the size and degree of polishing underline the special character of the Alpine-like axes as compared with other ground-stone pieces found in the grave.

At the site of Carapito (Aguiar da Beira, Portugal), Leisner et Ribeiro comment (1968 : 61) that the charcoal used in the earlier C^{14} date comes from the lowermost intact level of a fire area by the southern side of the chamber in which the callaite beads, the big axe, the small fibrolite axe and some microliths were laid. As to the later date, it would represent a reference point for the perduration of the grave use and it could be associated to some microliths, one triangular and others trapezoidal. From the inventory and the plans we can certify a close association between the following items : big schist axe, small fibrolite

axe, two trapezoidal microliths and one triangle, 320 disc-shaped schist beads and seven other beads, six of callaite and one of greywacke, the latter barrel-shaped (Leisner and Ribeiro 1968 : fig. 11 : 56-63, 70 and 72 ; fig. 10 : 12-14). As stated above, the earliest date (GrN.5110) comes from this context. To that deposit we could probably also link, taking into account the proximity in horizontal and the similar depth, two flint blades, one surpassed and another partially broken, 10 cm long (ibid. fig. 10 : 47 and 41), three trapezoidal microliths (ibid. fig. 10 : 15-17) and six more beads, three from callaite, two from schist and one from bone, barrel-shaped, mace-shaped or irregular (ibid. fig. 11 : 64-69).

The materials found in the antechamber of Alberite mound (Cádiz, Spain) are varied : variscite, amber, bone and shell (Dentalium) beads, flint blades, pounding tools with remains of ochre and an anthropomorphic idol. Meanwhile, in the burial chamber were found a palette and several tools employed for grinding ochre, a huge smoked-quartz prism, four flint blades, an idol and 1073 beads. The polished artefacts and the beads recovered by the farmers probably came from the burial chamber because they were covered with ochre, like the pieces in context. This set of polished tools is composed of a metatufite gouge and an amphibolit hoe. In Alberite we find again the co-occurrence of long ground-stone artefacts and beads, flint blades and quartz prisms. The artefacts, including the polished ones, were deposited during the first half of the IVth Millennium and later were covered with ochre, as were the bodies, the soil and the walls of the dolmen.

Illade 0 (A Coruña, Spain) can be considered as an example of individual burials. On the lower part of the stone structure the ghost of the first body was identified associated with several lithics. Its head was laid on a pillow made of a heap of slate and quartz cobbles. On the opposite extreme (feet ?) the long chisel was laid in a vertical position (Vaquero 1999 : 169, Planche 61). Beside the chest was laid a small fibrolite axe (broken), and next to the upper part of the body the geometrics (two of flint, one of hyaline quartz), some bladelets on hyaline quartz (six) and a broken flint blade were also recovered.

Slightly higher in level (4-5 cm above and displaced a little to the East), a second body outline was discovered. As in the first case, its head would have been lying on a stone pillow. The only associated archaeological remains were two beads and a pendant made of callaite (note 1). Neither pottery remains nor other lithic implements were recovered. This second burial and its grave-goods might imply a sexual or temporal differentiation. Although we can dispose of plans of the archaeological digging, no vertical information is available, preventing us from clarifying the lithic associations. The difference in height of the two burials seems to be of low significance, although the latter is displaced with respect to the first burial. Nevertheless, the association of the long chisel made of schist, the small fibrolite axe and the microliths is well attested. Its relationship to the callaite beads and pendant may be arguable, depending on the time span between the two burials.

At A Millarada mound (Lugo, Spain), 42 lithic artefacts were recovered, and there are only three pottery records. The lithic assemblage is composed of flint blades (five), microliths (33), a quartz crystal, one perforated slate, four stone axes, two micro-axes, three chisels and three hoes (Vidal 2001-2002). All the archaeological remains are lying directly on the ancient pavement or soil of the chamber (Level 11). There is no significant vertical variation in artefact distribution, pointing to a near or close synchrony. Regarding the spatial distribution of the artefacts, specially the big axes, there seem to be some clusters on the margins of the burial chamber (fig. 12). This kind of distribution is thought to be caused by the successive uses and cleanings of the funerary space, pushing aside the artefacts as new corpses were deposited. However we must also take into account the presence of post-depositional disturbances in the center of the chamber that may have influenced the present distribution of the archaeological remains :

In the North part of the chamber, we can distinguish a cluster of flint blades, microliths, a fibrolite micro-axe and a quartz crystal. Next to them, the long axe (CP-00-29), the hoe (CP-00-32) and a chisel (CP-00-22). The latter has clear-cut hafting marks on the mesial part of the piece, similar to those on the chisels found in not-far Monte Campelos.

In the East part of the chamber and next to the entrance, we find a chisel, a stone axe and a flint blade.

- Finally, in the SW part of the chamber we find some stone axes, small hoes (made of the same raw material than the hoe CP-00-32 and the chisels of Monte Campelos and Illade 0) and a flint blade. Apart from the flint blades and microliths, all the lithics are made on local raw material (schist and sandstone).

There are very few potsherds, probably belonging to only two recipients. We have no information on the spatial distribution of these, but the authors claim that there is no stratigraphic relationship between the pottery and the lithics (Vidal 2001-2002 : 19).

In the site of Rio Fortes (Ávila, Spain) the disturbed levels provide the great majority of the archaeological materials : 36 flint blades, 10 arrowheads, 33 microliths and two quartz prisms among others ; there are ceramics including Bell-beaker pottery ("Pointillé", "Ciempozuelos" and maybe "Maritime" types) which mainly appear near the circular structure. Copper artefacts, like an awl or an arrowhead, are present too. The group of polished artefacts in Rio Fortes is composed of a long axe with proximal perforation, a chisel, a grey sillimanite gouge, a hoe, a serpentinite mace head, two sillimanite broken axes and a crude axe of citrine quartz. Also there are 53 beads made of variscite, lignite and slate and another one allegedly made of jade. Other artefacts made on green material are a perforated sheet and a tubular piece also with four perforations which is thought to be a whistle.

Owing to the huge disturbance of the site, the information that Rio Fortes can provide us is quite limited. The mixture of materials and structures with different chronologies (Chalcolithic pottery with older artefacts like microliths belonging to the first occupation of the monument) caused by the farming works, makes very difficult the appraisal of the sequence of the site. At least some of the recovered materials, such as microliths, beads and maybe the blades, the butt-perforated axe and some ground-stone objects, would belong to the first occupation of the monument. The arrow points, Bell-beaker pottery and the polished artefacts would be linked to the final moments of Rio Fortes, whose main manifestation is the edification of the circular structure.

The grave goods of Monte Campelos (Lugo, Spain), composed only of lithics, consisted of four polished artefacts (a bipenne, two chisels, and a small hoe), two flint blades and ten quartz prisms. They seem to cluster in an 80 cm. area, a circumstance that, according to the excavator, would indicate that those items were placed around the corpse's head (Rodríguez 1983). According to its stratigraphy, Monte Campelos seems to provide us an unaltered context made up in the course of a single burial episode. This circumstance allows us to analyze the co-occurrence of the different elements that make up the grave assemblage ; this analysis shows a close connection (observed in other tumular contexts) between long axes (chisels or hoe blades) and artefacts like flint blades or quartz prisms and, at the same time, the correlation between the appearance of these artefacts and the absence of pottery.

Artefacts like green beads or microliths are also part of the grave assemblage in other mounds (v.g. Carapito 1, Illade 0 or Alberite) and the lack of these elements in Monte Campelos could represent an indication of a comparatively later chronology for Campelos. No radiocarbon dates are available but, as we saw before, the presence of a bipenne makes it clear that the burial must have been laid in a period significantly more recent than that proposed for Carapito 1, Alberite or Illade 0, no earlier than the beginning of the IIIrd millennium cal. BC.

2. 2. Chronological proposals

Summing up, the chronology and the material culture from these sites can attest to the presence of two different artefact associations in both of which long axes play an important role. In spite of the deficient preservation at A Millarada, the structure of the chamber (polygonal), the association of long axes, chisels, blades, microliths, a small fibrolite axe, the crystal quartz and its dissociation to the scarce pottery found, could be traced to an early period of the Galician megalithic phenomenon, most possibly dated in the first half of the IVth millennium cal. B.C. Carapito 1 and Alberite seem to share the same characteristics with long axes, callaite beads, microliths, quartz crystals, fibrolite microaxes and

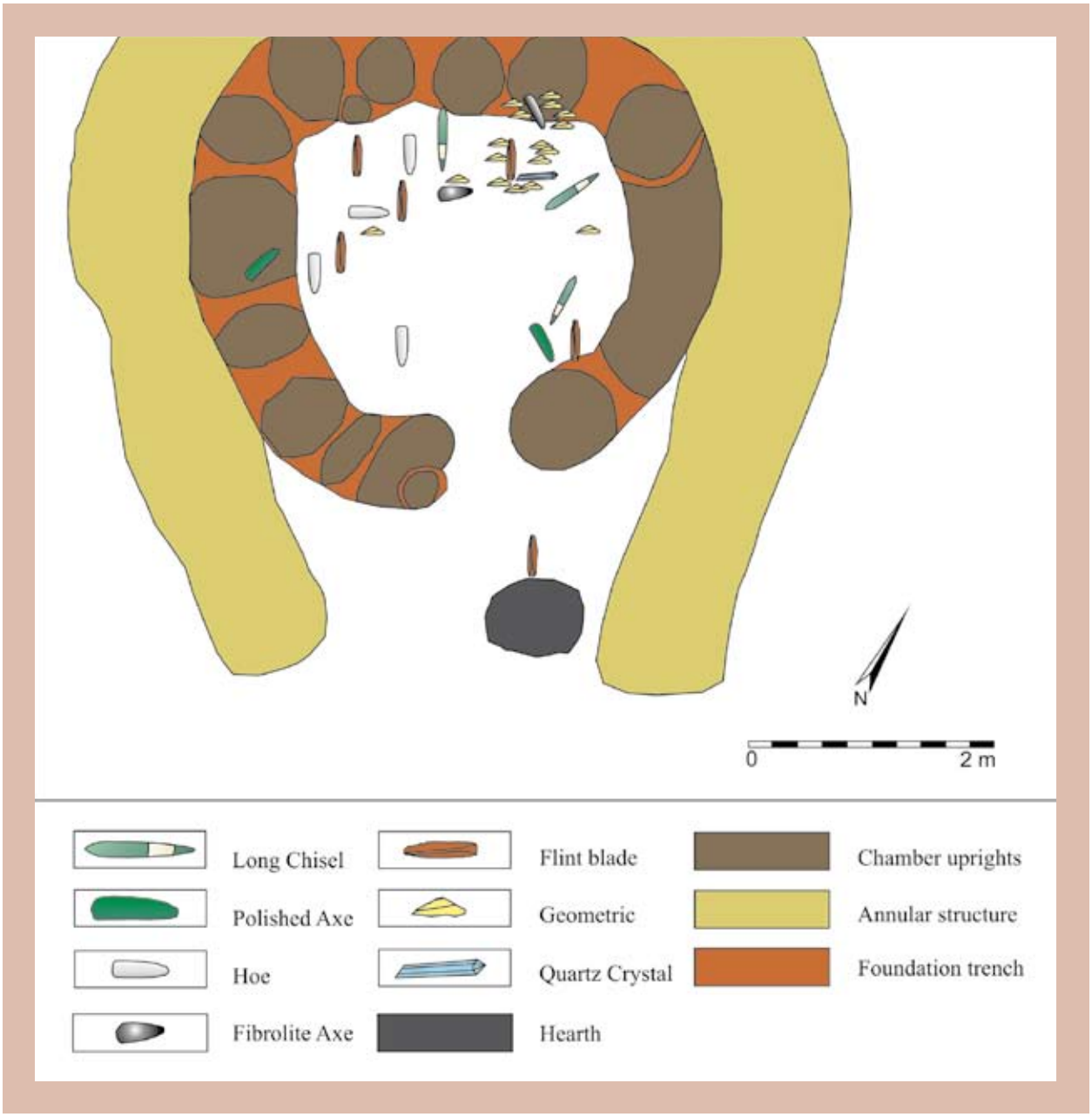

FIG. 12
Structures and spatial distribution of the grave goods in A Millarada.

none or scarce pottery and their radiocarbon dates bear out that ascription. Illade 0, although not a standard megalithic chamber, can be placed in this first group.

On the other hand, as we have postulated in the case of Monte Campelos, we may assume the synchronic character of the deposition in some other, not well recorded, finds, namely the eponymous site of Rechaba (A Coruña), the mounds of Veiga das Mámoas and Mariñaos (Lugo) and the tumulus #229 of As Pontes (A Coruña), all of which contained long axes too (Fábregas 1992a). In all those cases, we are dealing either with rather small stone cists or other indeterminate structures inside the mounds, strongly suggesting an individual burial or in any case a very limited use of the tomb. A further characteristic of this type of funerary context is the conspicuous presence beside the long axes of other ground-stone items (fig. 13) such as mace-heads or double adzes and at least in one case a double axe that, if the hypothesis of a short-timed use of these tombs is correct, would push forward their chronology to the IIIrd millennium cal. BC. In that respect the later date of Rio Fortes and its presumed structural and artefact associations would fit perfectly well in this second group.

As a result, an image of two quite different periods of use of the long axes seems to emerge in Iberia : one, quite early, represented by some finds of Catalonia in the so-called "Sepulcres de Fosa" (v.g. Bóbila Padró, Ripoll et Llongueras 1963, 1967) and several megalithic tombs in the Western half of the Peninsula, that would go back to the Vth millennium cal. BC and a second period, centered around the IIIrd millennium cal. BC, that either represents a persistence of old Neolithic practices incorporated in a rather different ritual context, or a reenactment, after perhaps more than a millennium of oblivion, of the special significance of certain types of axes, characterized by their large size, careful polishing and, very often, the selection of particular types of rocks, with a frequent tendency towards the choosing of a variety of green stones. The raw material similarity of Illade 0 and Monte Campelos´ chisels plus A Millarada´s hoes, in spite of their different chronologies, would substantiate the notion of persistence, also endorsed by the vertical lay out of the long chisels either at Illade 0 or in Monte Campelos.

2. 3. Context of the Axe Distribution : trade routes within and outside the Iberian Peninsula

2. 3. 1 External connections

Much has been said for nearly a century about so-called *Atlantic relationships*, meaning by that a varied range of poorly understood contacts between the Western part of Iberia and the NW of France and the British Isles (López Cuevillas and Bouza 1929, MacWhite 1951). These connections were particularly intense in the Copper Age/Early Bronze Age (also in the Late Bronze Age but this is irrelevant to our paper) and the evidence employed to support the argument, emphasised formal coincidences in the material culture, namely metallic items, such as the Palmela arrowheads, the halberds, certain types of daggers or the jewellery (Peña 2003 : 70-72). Other similarities were found in other arenas, like the open-air rock art in its geometric variety, with remarkable coincidences in formal aspects but also specific patterns as to its location in both the British and Galician landscapes (Bradley 1997, Fábregas and Bradley 1999). A recent paper dealing with Bell Beakers in Galicia and Brittany (Prieto and Salanova 2009) looks not just at the formal aspects of this ware but also to the technological and contextual issues, with the result of endorsing the existence of contacts between these regions that keep, nevertheless, a personality of their own. This combination of local and extralocal lies probably behind the presence of a number of perforated weapons (double axes or adzes, mace heads) found in Galicia in a chronology not far from the Beaker's (Fábregas 1992b, De Blas and Corretgé 2001).

One might wonder why the emphasis on the Atlantic connections has been placed, at least on the Galician side, from the IIIrd millennium onwards, in spite of this area having a large number of megalithic mounds, some of them carved or painted, that go back to the later part of the Vth millennium BC. In fact, beyond some tantalizing evidence, such as two exceptional petroglyphs like Porto Ventura (Poio, Pontevedra) or Coto da Braña 3 (Cotobade, Pontevedra), which show iconographic bonds with the megalithic art of Gavrinis, Knowth or Newgrange (Sartal 1999, Costas and Pereira 2006) and a paper dealing with a concrete motif (*the Thing*) found in NW Iberia and Brittany (Cassen and Vaquero 2000), not much had been said lately with regard to Atlantic relations in Neolithic times. Fortunately, in the last ten years new data are being brought to light suggesting the existence of those links, making up an increasingly significant body of evidence that, by the way, may help explaining the presence and spread of certain types of stone axes like those being dealt with in this paper.

Going back to the IVth millennium BC or even before, the chemical analysis of green beads located in several Breton megalithic sites such as Kervilor or Josselière has identified variscite from the Spanish province of Zamora, among other Iberian sources (Herbault and Querré 2004, Querré *et al.* 2008). This is not unusual in Brittany where the association in burials of variscite beads with long axes of Alpine origin, is similar to that seen in Iberian funerary mounds like Carapito or Illade 0, as commented elsewhere in this text.

FIG. 13
Ground-stone tools with central perforation, from left to right : Double adze from Veiga das Mámoas (Lugo, Galicia). Double axe from Monte Campelos (Lugo, Galicia). Double axe from Monte da Assunção (Santo Tirso, Portugal). Mace-head from Veiga das Mámoas (Lugo, Galicia).

Another thread of evidence we can possibly follow regards certain types of Neolithic pottery. Some years ago, Suárez (1997) put forward the hypothesis that some pots from a coastal site (O Regueiriño, Pontevedra) and the passage-grave of Dombate (Cabana, A Coruña) showed shapes or decorative traits that related them to Villeneuve-Saint-Germain pieces and other examples from the Early Neolithic of Western France. Later on, an excavation of the first site confirmed the existence of a Neolithic horizon there although some of the allegedly neolithic pots would be ascribed by Prieto *et al.* (2005) to the Bell Beaker phenomenon. Other excavations and surveys in Galicia and N. Portugal have allowed a first glimpse of the material culture of the groups inmediately preceding the inception of the megalithic burial. Among the pottery collections some intriguing sherds show traits (garlands, herringbone patterns) that may recall the Breton Neolithic, namely the Castellic tradition and the Armorican Chasséen (Cassen 2000). Of course, we are dealing with purely formal traits that, besides, are inserted in larger assemblages of pottery linked with traditions derived from the Epicardial to the South (note 2). But this is more than coincidence and, as indicated by the C^{14} dates in Monte dos Remedios, Prazo or Lavra (Sanches 1997, Rodrigues 2000, Fábregas *et al.* 2007), we are dealing with chronologies roughly similar (V^{th} millennium BC) to those in Brittany. Moreover the Castellic ware clusters in the very area (Morbihan gulf) where we have already seen common traits in the long axes or the variscite with the Iberian area, therefore making more plausible the idea of a connection between both Atlantic regions.

As for the possible routes of entry of the Alpine polished axes into the Iberian Peninsula, several possibilities can be taken into account. This question is related to the existence of contacts tested archaeologically through the presence of exotic materials (e.g. possible Castellic pottery in neolithic sites of Northwest Spain) or stylistic similarities between art in Galician and Breton megaliths (Cassen and Vaquero 2000). Of all these routes, perhaps the most controversial (if only by the risks assumed by those early sailors) is that implying direct maritime contacts between the northern part of the Iberian Peninsula and Brittany. The origin of this hypothesis lies on the above mentioned similarities to which could be added others, such as the habit of depositing vertical axes in the burials, showing a common set of beliefs that may have been reinforced by these contacts. As said elsewhere, further evidence of long distance connections in the Neolithic is shown by the presence of variscite of Palazuelos de las Cuevas (to the West of the Spanish Meseta) in the western coast of France. That evidence opens the possibility of a sea pathway, since chemical analysis of Iberian variscite dispersions apparently shows that all green beads from NE Iberia (on a possible land route out of the Peninsula) come from the Can Tintorer mines (Gava, Catalonia), while beads of Palazuelos do not move beyond the eastern edge of the Spanish Meseta, suggesting perhaps some sort of frontier/barrier between the two centres of production. Notwithstanding, we cannot categorically reject the possibility of an eventual trade over the Western Pyrénées of the variscite from Palazuelos.

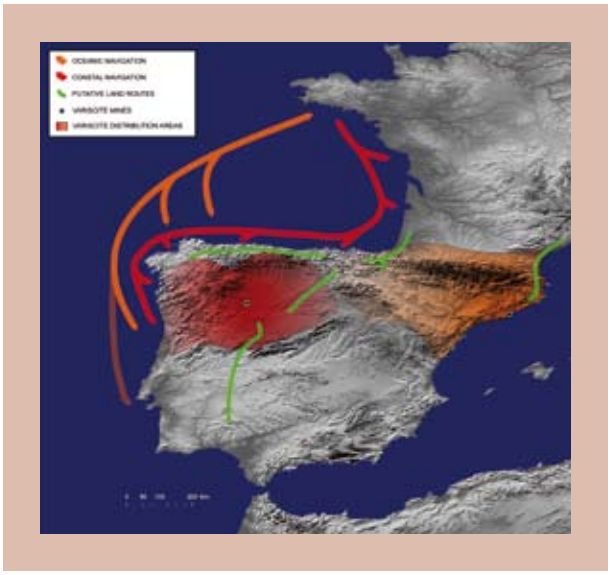

FIG. 14
Possible entry and distribution routes of Alpine axes in the Iberian Peninsula. Shaded areas represent the spread of variscite from the mines of Palazuelos de las Cuevas (Zamora, Castille) and Can Tintorer (Barcelona, Catalonia), respectively (from Edo *et al.* 1997).

Sailing by the prehistoric peoples of the Northwest Spain has been tested indirectly by the recent discovery of rock art on a small island off the west coast of Galicia. Certainly a trip along one of the most dangerous coasts of Europe, justly named as "Costa da Morte" (The Coast of Death) would have been no easy matter. But, as the presence of Alpine axes shows, Neolithic groups in Western Europe were capable of making these journeys.

Another important issue in this regard would be the navigation method (fig. 14) : ocean shipping seems very risky in the context of a shipping technology not very developed, probably based on small boats, but should not be ruled out, especially in North-South direction when use could be made of the currents that pass in front of the coasts of both Brittany and Galicia. For a trip in the opposite direction, it would be wiser to follow a coastal route along the Bay of Biscay, taking advantage of the so called Rennell Current. However, some authors (Cunliffe 2001) have stressed the difficulty and danger posed by the coast of Aquitaine and the strong seasonality of the sailing conditions. All in all, a coastal navigation seems more reasonable, at least during the first exploratory phases of these contacts and that would be more in line with the pattern of later navigators like the Phoenicians.

This account of two different navigation methods is not without significance for it implies important considerations affecting the role of NW Iberia in such an interaction sphere : if we take into account only the direct maritime contacts between "Finistères", then we must assume that at least a significant portion of the Alpine axes in the Peninsula (except those near the Pyrénées) would be introduced from specific points located at the coasts of Galicia and the Western Cantabrian and possibly Northern Portugal (Duero river mouth), then following a kind of "reflux" to the East. On the other hand, if we consider the existence of coastal shipping, the contacts made at each of the scales would have served to explain the present dispersion in this area, and the entire northern coast of the peninsula would become a potential way for introduction of the axes as well as an outsource for variscite, fibrolite or other objects.

The main entrances to the Iberian Peninsula of these products would be, obviously, across the Pyrénées, witnessed by the presence of certain materials on both sides of the mountain range. These connections would

take place mainly along the Western and Eastern shore platforms : through the Gulf of Leon, on the Mediterranean side, relationships have been documented among groups of Catalonia and populations of the Chassey Culture, evidenced through the pottery and pre-heated flint (Lea 2005), probably following the same route as that proposed for Cardial pottery. in addition, this would be the way northwards for the variscite of Can Tintorer, as apparently indicated by the compositional analysis of the beads from southeast France (Edo *et al*. 1997). In the western sector of the Pyrénées, there is evidence of contacts along the Bay of Biscay shores since the Mesolithic, as shown by the presence of La Chalosse flint (Aquitaine) in the eastern Cantabrian (Tarriño 2006).

We must therefore consider the possibility of contacts in two ways, one by land through the Pyrénées and another by sea to the west of the Peninsula. These two routes could be the reason behind the divergences in typology and raw material that seem to exist in different regions. The presence of jade axes in Northeast necropolis sites such as Bóbila Padró and Bóbila Madurell may evidence a more continuous and/or intense contact typologically reflected by the dominence of "Ubiquitous types" such as Puy, precisely those that have a greater presence in the territories immediately to the north of the Pyrénées. Meanwhile, in the Northwest and in the Cantabrian Coast there is an apparent predominance of local raw materials : schist and amphibolites as well as fibrolite (although the local character of the latter is not so clear) and types like chisels or hoe blades, some of which could be considered as reinterpretations or local imitations of Alpine models like Bégude or Bernon. This circumstance seems quite clear in cases such as Carapito I (Guarda, Portugal) (fig. 19).

2. 3. 2. Internal connections

As to distribution routes within the Iberian Peninsula, these have been divided according to their apparent nature. First we take into account the exchange networks from the great production centers of variscite beads, Palazuelos de las Cuevas and Can Tintorer. Second, the routes that we have called "Putative Land Routes" or "contacts of unknown relevance" marked by the occasional presence of certain materials in specific areas of the Peninsula.

Regarding the former, the analyses made on a large number of green beads have brought to light two great networks, somewhat independent, for the Catalonian and Northwest variscite (Edo *et al*. 1997). On the one hand the beads whose source is Can Tintorer would have a main distribution from the Ebro River Valley, reaching the Cantabrian, as well as north and south along the Spanish Mediterranean coast. For its part, the variscite extracted from the formation of Palazuelos de las Cuevas would be mainly distributed in the Spanish Meseta and Douro Valley (fig. 14), spreading towards Galicia and the Cantabrian Coast (Añabusti, Vizcaya) (*ibidem*) in the North, and perhaps sporadically southwards through the "Via de la Plata", until sites like dolmen de Alberite (Cádiz, Andalucia) where a long chisel and a hoe blade are accompanied by many beads with that origin (Dominguez et Morata 1995). Through the distribution of these beads vast networks were created that undoubtedly would have been used for the movement of other objects or raw-materials, a good example could have been the Mediterranean evaporitic flint found in the Cantabrian coast, which would travel through the Ebro valley (Tarriño 2006), possibly as a side product of the distribution of the variscite.

To those variscite centres others must be added whose ranges and/or production intensity are not yet well studied, among them the flint mines of Casa Montero (Madrid) that apparently start during the Neolithic (Consuegra *et al*. 2004). In the III[rd] millennium BC appear other centres in Southern Iberia dedicated to the manufacture of amphibolite axes (Lillios 1997) or long pressure-flaked flint blades (Martínez and Morgado 2005), some of the last of which may have indeed reached Galicia.

As for the (apparently) more sporadic contacts, there are indications of middle to long distance trade along the Cantabrian Coast, as evidenced by the presence of a kyanite battle axe in Marabiu (Asturias) whose source is in the Santiago de Compostela area (A Coruña, Galicia) (De Blas *et al*. 2001) (fig. 15). These exchanges between Galicia and Cantabria were probably two-way, as attested by the recent find of amber beads in Chousa Nova (Pontevedra, Galicia) whose most likely provenance would be the important Cantabrian sources, exploited since the Paleolithic (Peñalver *et al*. 2007). Also the likely origin of the jet recovered in the passage-grave of Dombate (A Coruña, Galicia) and other dolmens of Galicia could lie in Asturias. Our proposal of an Eastern "reflux" of the Alpine axes presumably arrived to Galicia by direct sea connections with Britanny, would be in the context of these more or less sporadic contacts between Galicia and the Cantabrian coast.

The great Western rivers like the Tagus and the Douro, are worth mentioning as natural routes to introduce coastal elements into the inland, as seems evident in the case of the cardial pottery and can also be seen in subsequent millennia through other elements, including variscite (in the case of the Douro). "Via de la Plata" may have been the main route south for the variscite from Palazuelos or the spectacular quartz crystal in the Alberite dolmen, whose hypothetical origin would be in the mountains of Madrid, according to the analytical results (Dominguez and Morata 1995).

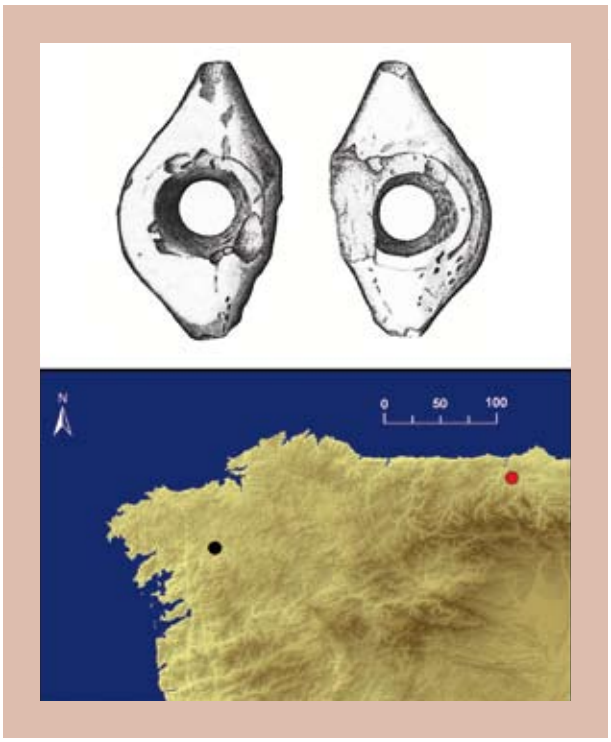

FIG. 15
Double axe from Marabiu (Asturias), find spot (red dot) and raw material source (black dot).

Also noteworthy is the apparent Pyrenean origin of several axes found in the Spanish Meseta (Orozco 2005) indicating a possible gateway to the interior of Spain across the northern part of the "Sistema Central" (a mountain chain that runs to the southwest side of the Ebro Valley). This was also employed in Medieval times by the French pilgrims going to Santiago de Compostela. This observation grows in importance, since near this pilgrimage road were found two of the decontextualized jade axes (fig. 14), opening thus the possibility that they arrived into the North Spanish Meseta following the path just described.

The arrival of Alpine axes via any of the mentioned trade routes is a clear indication of the interest by local communities in the possession of pieces of considerable size and a beautiful appearance, marked by extreme polish giving them a glossy look (fig. 16 and 17). This interest is likely to have unleashed a process of emulation of the Alpine models employing local materials ; this inspiration will be materialized into pieces of morphologies and dimensions similar to those of the reference models and, like these, heavily polished (fig. 18 and 19). One of the clearest examples are the butt-perforated flat axes of the so-called "Cangas type" (fig. 20), very similar to the Tumiac type (Pétrequin *et al.* 2007a). They are usually made of fibrolite ranging from pearly white to different combinations of dull gray, but on occasion amphibolite or shale are used too.

A special case is posed by chisels, since some of them, made of schist or amphibolite, have a close resemblance in form and dimensions with the "Bégude type" axes (Pétrequin *et al.* 2007b). Some, like those from Vilamarín (Ourense, Galicia) (fig. 21) or Bóbila Padró (Barcelona, Catalonia) have also a very intense polishing. Accepting the hypothesis that they are local imitations of Alpine models (endorsed by the documented custom of vertical positioning in both areas) would imply the existence of contacts since Early Neolithic times as these pieces are among the oldest within the Alpine catalogue. Furthermore, the fact that these pieces appear mainly in Northwest Iberia would give support to the notion that the first contacts were made by sea. However, the simple morphology of these pieces do not allow us to rule out the possibility of an autonomous development of axes similar in form. Only further research on their petrography and cultural contexts shall let us choose between one or another explanation.

- **3. Ritual**

Through the study of these axes, their context and grave associations some clues about the ritual or symbolic sphere can be brought to light. The specific context of some finds, especially those Alpine-like, their vertical lay out and the presence of non-functional grooves can be seen as indications of the special character of those objects.

As stated before, most of the pieces have appeared as isolated finds, or come from old excavations or collections. Nevertheless, that lack of context can be interpreted as a context itself : isolated Alpine and/or Alpine-like axes could be part of votive deposits, as has been recorded in other European regions. One such circumstance might happen to the axe from Dima (Bizkaia, Spain), of Alpine origin, discovered in 1908 during agricultural works.

FIG. 16
Examples of Alpine axes found in the Iberian Peninsula. From left to right : Palencia (Castille), Diego Álvaro (Ávila, Castille), Bragança (North Portugal), Bóbila Padró (Barcelona, Catalonia).

It was supposed to be buried 50 cm from the surface and other materials were not recovered at the same spot but at a distance of 150 m (de Arriaga 1910, Fernández 1982). In a similar case, the chisels from La Miloquera (Tarragone, Spain) (Vilaseca 1970) were also on a hill side. Although they might be classified as intentional deposits, their location, compared to other West European examples, is unusual since, unlike some of the latter, they are not related to waterlogged areas (Pétrequin *et al.* 2009a, Cassen *et al.* 2010, Wentink 2008). One possible Iberian exception could be the axe from Obidos (Portugal), found at approximately 9 m. deep at the bottom of the opening of the Obidos lagoon, alone on the superficial sediments mixed with numerous shells, but archaeologists consider it a result of natural erosion (Lillios 2000 : 8). Other discoveries in the course of ploughing are related to disturbed or altered megalithic chambers and stone cists, as is the case with the Alberite chisels, so that they can no longer be considered as intentional deposits.

FIG. 17
Possible examples of Alpine axes found in the Iberian Peninsula. From left to right : Viñas de Abajo (Valladolid, Castille), Cueva del Mazo (Camargo, Cantabria), Bóbila Padró (Barcelona, Catalonia).

FIG. 18
Possible local imitations of Alpine models. From left to right : Barasoain (Navarra), Valladolid (Castille), Liébana (Cantabria), Pozuelos del Rey (Palencia, Castille).

Most of the known contexts for the axes are tombs that can be related to individual burials, such as the sites of Illade 0, Monte Campelos or, possibly, other examples like the mounds of Rechaba (A Coruña) and #229 of As Pontes (A Coruña), or Veiga das Mámoas and Mariñaos (Lugo). In other cases a variable number of individuals would have be interred at the same chamber as in the Alberite mound, or, maybe in A Millarada. One of the best examples of funerary context for these pieces is the "Sepulcros de Fosa" culture in Catalonia (Ripoll and Llongueras 1963, 1967). In such cases, the long green axes seem to follow the same pattern of Alpine axes in the Gulf of Morbihan, where they are associated to the burial of important individuals (Pétrequin *et al.* 2009a : 424). As we saw before, these objects are associated to variscite beads and other prestige items underlining the high status of the dead (fig. 22).

FIG. 19
Possible local imitation : Carapito I (Guarda, Portugal) (left) and an Alpine model : Dima (Bizkaia) (right).

Some pieces present technical features such as longitudinal grooves that have no obvious functional purpose. One such case is the axe of Obidos, for it has a "V" shaped groove at the mesial part on both faces. On one face, its disposition with respect to the butt-hole indicates that it was made before the perforation. If we consider that groove as a ritual feature, the only known parallel is the axe from Ostheim, found vertically placed with the edge upwards in a waterlogged area, that had a longitudinal V shaped and asymmetric groove on one face that has been related to ritual gestures (Pétrequin and Logel 2009). Other two examples are those form Imarcoain (Navarra, Spain) (González Sainz 1980) and Carapito 1 (Beira Alta, Portugal) both showing a longitudinal groove, the former on both faces, and the later only on one. Nevertheless their section is "U" shaped, smooth and partially covered by the surface polish, so we think that they could be accounted for the manufacturing processes, such as the (unfinished) sawing of these blades (fig. 23).

Another peculiar feature consists in the vertical setting of the axes, usually with the active edge upwards, a custom that has been recorded quite often in Brittany and elsewhere in Europe since early Neolithic times (see Cassen *et al*. 2007). In one of the few cases of stone axes recorded in context, that of Monte Campelos (Lugo, Galicia), two very long chisels were found lying in a more or less vertical position, one with the cutting edge upwards (as usual) while the second was laid the other way around (Rodríguez 1983) (fig. 24). It is noteworthy that one of those chisels should contravene what seems to be the norm, while the other, having the blade upwards,

FIG. 20
Perforated Bernon or Tumiac Types. From left to right : Río Fortes (Ávila, Castille), Vilalba (Lugo, Galicia), Monte das Cabras (Pontevedra, Galicia), Vilapedre (Lugo, Galicia), Dolmen de Santa Cruz (Cangas de Onís, Asturias).

was laid nearly on top of a double axe. The latter, should it have been deposited while still hafted would have the handle set vertically too.

Some years after, the excavation of the mound 0 from Illade (A Coruña, Galicia) provided more insights into this issue in spite of the fact of not being properly published (Vaquero 1999). In a pit where a presumably inhumated corpse had been laid, a long chisel was set vertically beside its feet (the excavator is not more specific about the actual position of the object) (Vaquero 1999 : 169). The chronology of this interment, as said elsewhere in this text, is rather contentious but unlike Campelos, seems to be well in the last third of the Vth millennium BC. A further clue to the chronology of this particular custom in the NW Iberian Neolithic comes from the mound 6 from Os Campiños (A Coruña, Galicia) : in its SE quarter under the stone cuirass, an axe was found upright, though leaning sideways, with the tranchant pointing up (Fábregas and Fuente 1991/1992). We have a C^{14} date for the blocking of the entrance leading into the passage-grave (GrN-14328 : 4300 ± 60 bp) which, after calibration, points out to 3096-2856 BC as the most probable time range for that event, therefore placing a terminus ante quem for the deposition of the axe. Taking into account that the absolute chronologies for Galician passage graves generally show their construction taking place at the beginning of the IVth millennium BC (3900-3700 BC) (Steelman *et al.* 2005, Fábregas and Vilaseco 2006), we can have a probable date for the building of the tomb at Os Campiños and the laying out of the polished axe.

Therefore, in Galicia we can trace back at least to the end of the Vth millennium BC the vertical setting of axes, but taking into account the association of two long chisels with a double axe in a pit at Monte Campelos, the persistence of this custom is assured at the earliest in the central part of the IIIrd millennium. Such chronological spam matches the other known cases regarding to Alpine pieces such as those in Brittany (Cassen *et al.* 2007), the rough-out of Lugrin (Pétrequin *et al.* 2009b), Ostheim (Pétrequin and Logel 2009), Vendeuil (Pétrequin *et al.* 2005), or the flint axes associated to the Trichterbecherkultur in Northern Netherlands, dated around late IVth/early IIIrd millennium (Wentink 2008) as in other cases (Bordreuil 1966). Although our own examples are neither of classical Alpine typology nor origin, their context, longitudinal grooves and especially their vertical position suggest a common symbolic background with other Neolithic sites of Western Europe. It was not just raw materials or artefacts that were circulated in extensive networks, but also beliefs and rituals.

• 4. Conclusions

Our survey in a large number of museums and private collections of Northern Spain and Portugal has yielded an assemblage of a little over 100 polished pieces more or less fitting in the JADE requirements. Unsurprisingly, most of these pieces come from old finds or unpublished excavations and therefore lack a precise context while those that do have it come from burials. Taking into account the latter's absolute dates and other contextual information we can put forward a chronology for the Iberian long axes that would span from the late Vth millennium cal. BC until sometime into the IIIrd, but presently we are not able to

FIG. 21
Chisel from Vilamarín (Ourense, Galicia).

FIG. 22
Ideal reconstruction of the Chousa Nova burial (Pontevedra, Galicia) according to the position of the artefacts in the megalithic chamber (C. Rellán et M. Bóveda).

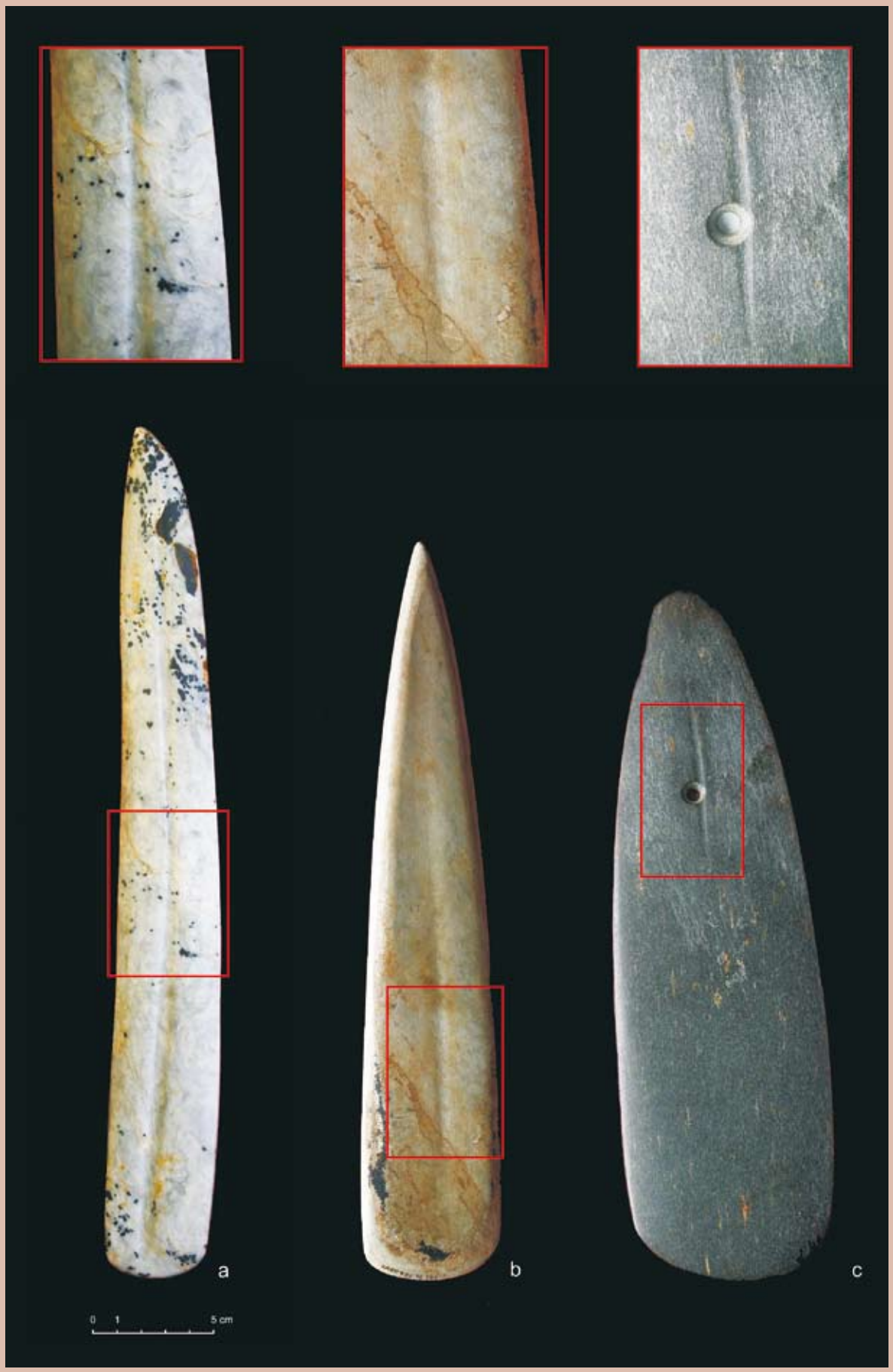

FIG. 23
Long axes with longitudinal grooves. a) Imarcoain (Navarra, Spain) ; b) Carapito I (Beira Alta, Portugal) ; c) Óbidos (Leiria, Portugal).

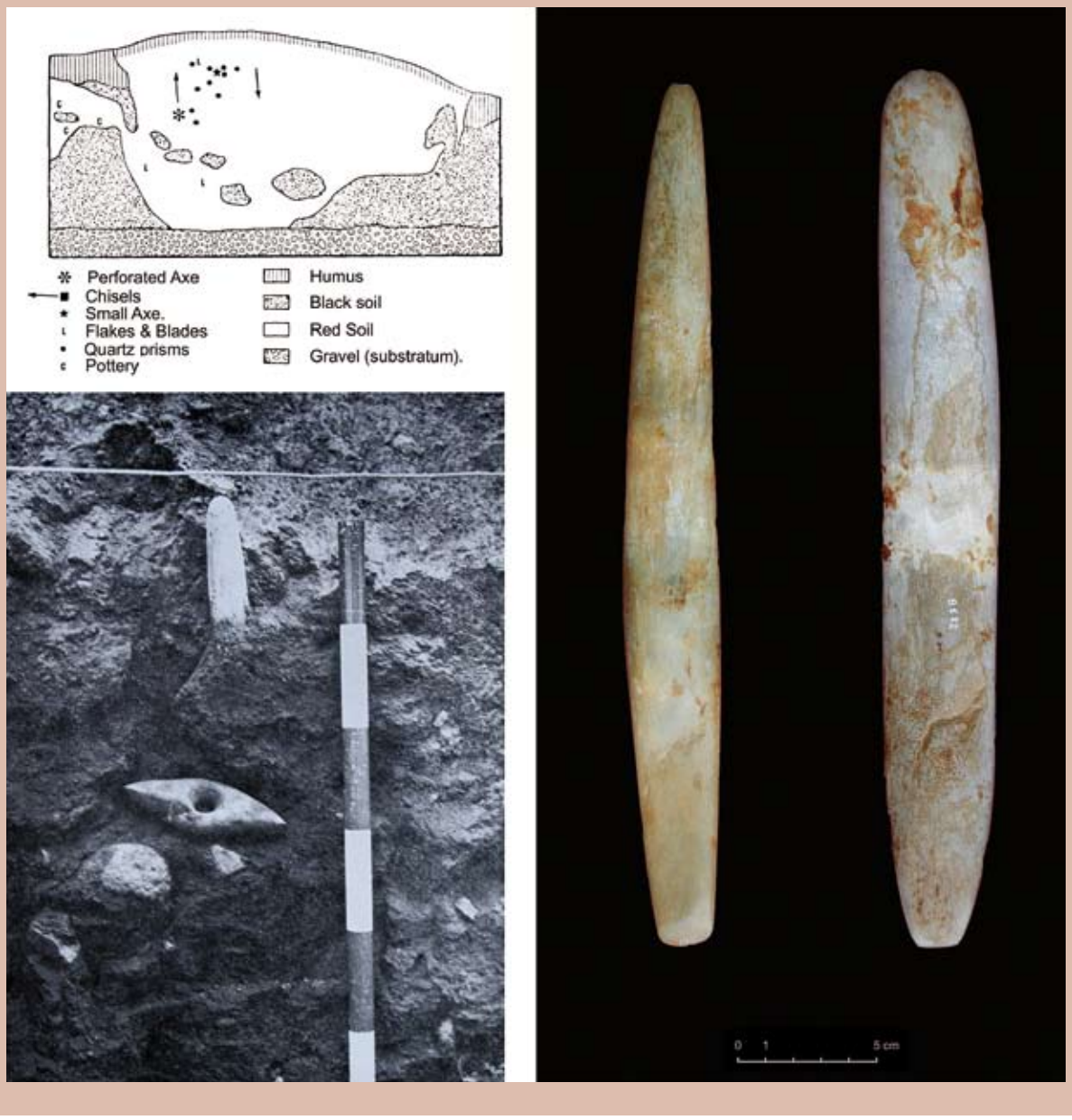

FIG. 24
Section of the secondary pit in the mound of Monte Campelos (Lugo, Galicia), after A. Rodríguez Casal.
Excavation in progress : the double axe and one of the chisels can be distinguished (*photo : A. Rodríguez Casal*).
The chisels found in Monte Campelos, reproduced in the position in which they were laid out ; note the hafting traces on the middle of both pieces.

ascertain whether there is a continuous development all through that time-span or, alternatively, after its Neolithic inception there is a later revival of the importance of such kind of stone tools during the Copper Age.

The lack of provenance analysis gravely impair our comments on the crucial issue of the raw material, but two main patterns can be put forward : first, a noticeable variability exists among the different Iberian regions on account of the choice of the stones and, secondly, those rocks (and presumably the pieces manufactured with them) of probable Alpine origin make up only a tiny minority of our sample. That said, there is some evidence suggesting the existence of exchange networks covering the SW European area, either across the Gulf of Biscay or by land that would have played a key role in the spread of axe designs and related rituals that having its primary source in the Alpine region and Brittany, were then emulated in Northern Iberia.

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Notes :
(1) Later reviews consider this pendant to be made of jadeitite, not callaite, implying a direct evidence for the Alpine green stones. There are no petrological analyses, so that we should be cautious about this attribution.
(2) Also, it is worth mentioning the find of a broken jar decorated with impressed and incised garlands, coming from an individual burial dated in the last third of the 6th millennium BC from the site of La Lampara (Soria), placed in the Upper Douro, an area well connected with the regions to the South, West and North (Rojo and Estremera 2000 : 88).

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Annexe 1

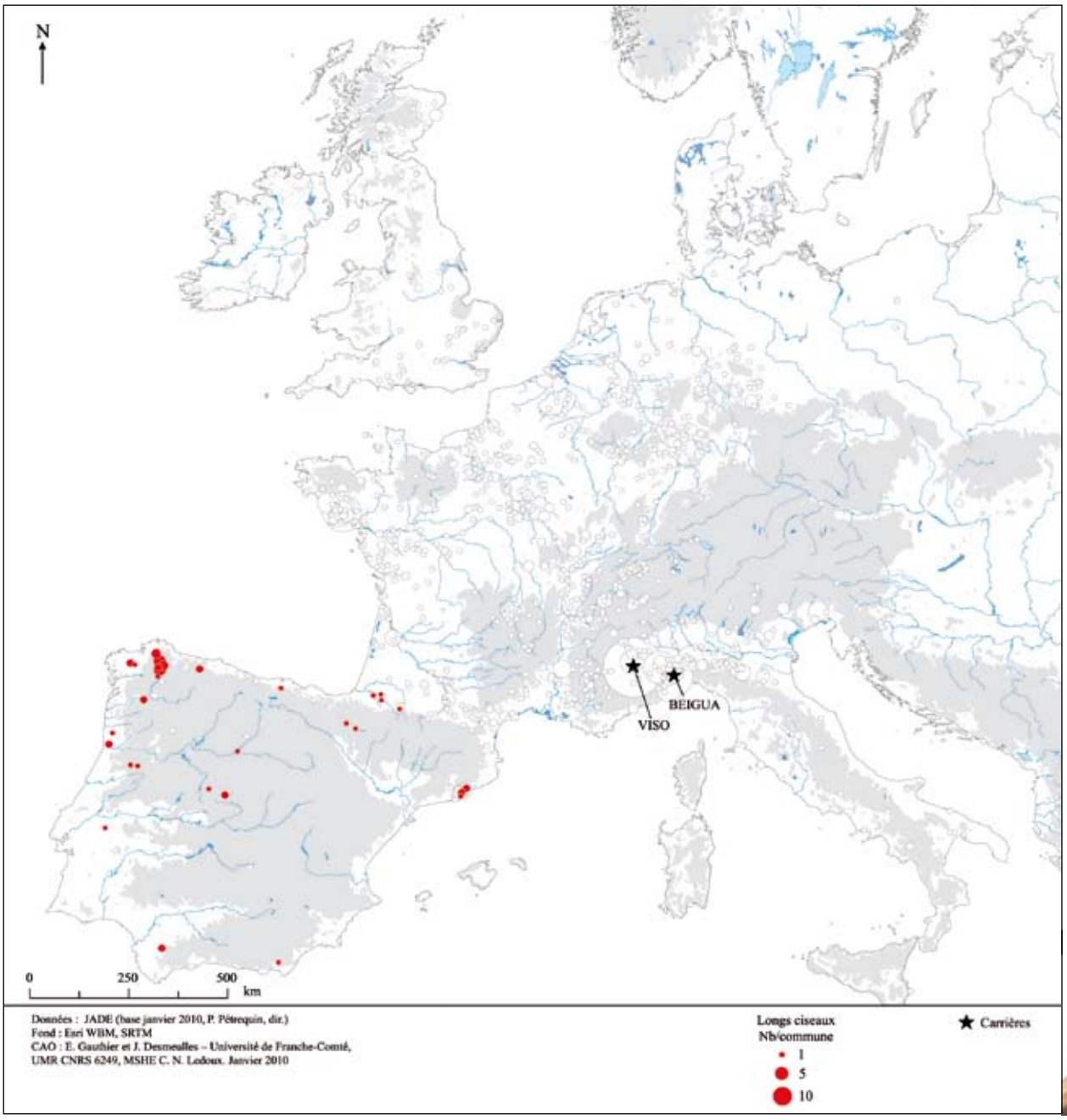
Inventaire des haches-ciseaux

(Ramon Fábregas Valcarce, Serge Cassen, Nicolas Le Maux et Pierre Pétrequin)

	COMMUNE	PAYS, PROVINCE	LIEU-DIT	CONTEXTE	COUPE	SCIAGE	LONG.	LARG.	EPAIS.	ROCHE	DESCRIPTION DE LA ROCHE	MUSÉE	N° INVENTAIRE	BIBLIOGRAPHIE
1	AGUIAR DA BEIRA	PORTUGAL	Carapito I	fouille	I F	OUI	31,5 cm	6,1	13,7	schiste	gris, homogène, avec veines obliques	Lisboa, Museo Arqueologico Nacional	987 96 149 2158	LEISNER et RIBEIRO 1968
2	AS PONTES DE GARCIA RODRIGUEZ	ESPAGNE, Galice	Illade 0	tombe en fosse sous tertre	II B	OUI	19,4 cm	3,4	2,3	schiste	couleur blanche, inclusion noire dans la partie proximale	As Pontes, Laboratorio Investigacións Arqueolóxicas	IL0 LIA OA1 ILO 27	VAQUERO LASTRES 1999
3	AS PONTES DE GARCIA RODRIGUEZ	ESPAGNE, Galice	229 Veiga dos Mouros	tombe sous tertre	I D	OUI	21,9 cm	2,8	2,8	amphibolite	vert foncé, granulométrie moyenne, avec de plus grands grains (1 mm), plans de sédimentation perpendiculaires aux faces	Santiago de Comspotela, Dpto. Historia I Universidade		FABREGAS VALCARCE 1992
4	AS PONTES DE GARCIA RODRIGUEZ	ESPAGNE, Galice	229 Veiga dos Mouros	tombe sous tertre	I D	OUI	22 cm	3,6	2,4	amphibolite	vert foncé, granulométrie moyenne, avec de plus grands grains (1 mm), plans de sédimentation perpendiculaires aux faces	Santiago de Comspotela, Dpto. Historia I Universidade		FABREGAS VALCARCE 1992
5	ÁVILA	ESPAGNE, Castille et Leon	Rio Fortes	fouille	II C	OUI	21,5 cm	2,8	1,2	schiste	grisâtre, homogène	Ávila, Museo	2001/62/B2/10 1/25-173-174	
6	ÁVILA	ESPAGNE, Castille et Leon	Rio Fortes	fouille	I D		21,2 cm	2,9	2,2	schiste ?	grisâtre pâle, homogène, veine noire longitudinale	Ávila, Museo	2001/62/33/10 1/113	
7	BALANSUN	FRANCE, Pyrénées-Atlantiques	plateau de Pont-Long, Bounehée	tumulus, fosse avec 3 haches en schiste, un croissant en silex (poignard ?)	II A		18,5 cm env.	3	2	schiste ?				RAYMOND 1879, ROUSSOT-LAROQUE 1987
8	BEGONTE	ESPAGNE, Galice	Tumulo de Monte Campelos, Sta Maria de Castro	tombe sous tertre	II G	OUI	29,5 cm	3,2	2,2	schiste	vert pâle, veines marron	Lugo, Museo	8573 A118	FABREGAS VALCARCE 1992
9	BEGONTE	ESPAGNE, Galice	Tumulo de Monte Campelos, Sta Maria de Castro	tombe sous tertre	II A	OUI	31,0 cm	4	2,3	schiste	vert pâle, veines marron	Lugo, Museo	8573 A118	FABREGAS VALCARCE 1992
10	COSPEITO	ESPAGNE, Galice	A Millarada	tombe sous tertre	I D		18,6 cm	3,7	3,7	amphibolite	vert clair, granulométrie fine, plans de sédimentation marqués, inclusions de points vert-sombre de petit format (1-2 mm)	Lugo, Museo	CP-00-32	VIDAL LOJO 2001-2002
11	COSPEITO	ESPAGNE, Galice	A Millarada	tombe sous tertre	I D		23,7 cm	3,3	3,7	amphibolite	vert clair, granulométrie fine, inclusions points vert foncé (un <1 mm) écrasés et parallèles aux plans de sédimentation	Lugo, Museo	CP-00-22	VIDAL LOJO 2001-2002
12	COSPEITO	ESPAGNE, Galice	A Millarada	tombe sous tertre	II I	OUI	15,8 cm	3,7	1,2	roche sédimentaire ?	gris clair d'une granulométrie très fine, sans inclusions, plans de sédimentation parallèles aux faces très homogène. Roche sédimentaire proche de celle d'Illade 0 (??)	Lugo, Museo	CP-00-32	VIDAL LOJO 2001-2002
13	DIEGO ÁLVARO?	ESPAGNE, Castille et Leon		inconnu	II A		32,1 cm	6,4	5,6	schiste ?	grisâtre, veines rouges irrégulières	Avila, Museo	417	
14	ESLES	ESPAGNE, Cantabrie	Pieza de Esles	trouvaille isolée	II A		23,3 cm	3,4	3,1	schiste	couleur blanche verdâtre très homogène, avec plans de sédimentation marqués perpendiculairement aux faces, granulométrie très fine	Museo de Prehistoria y Arqueología de Cantabria	12073	
15	GER	FRANCE, Pyrénées-Atlantiques	Taillan	tumulus B, avec poteries et un poignard en silex	section carrée		22 cm env.	2,7	2,4	"diorite" ?				POTHIER 1881 et 1900, ROUSSOT-LAROQUE 1987
16	GONDOMAR	PORTUGAL	Monte Choriz (Gondomar)	inconnu	IIA		35,9 cm	6	4,4	schiste	vert, homogène	Mudeo Martins Sarmento	MSA -686 (C)	

	COMMUNE	PAYS, PROVINCE	LIEU-DIT	CONTEXTE	COUPE	SCIAGE	LONG.	LARG.	EPAIS.	ROCHE	DESCRIPTION DE LA ROCHE	MUSÉE	N° INVENTAIRE	BIBLIOGRAPHIE
17	GONDOMAR	PORTUGAL	Monte Choriz (Gondomar)	inconnu	II A		34,1 cl	5,5	4,1	schiste	vert clair et marron, homogène	Mudeo Martins Sarmento	MSA- 685 (C)	
18	GUNTÍN	ESPAGNE, Galice	Veigadas Mamoas, Entrambas Aguas		II G	OUI	22,6 cm	2,6	2	schiste	vert grisâtre	Lugo, Museo	2267	FABREGAS VALCARCE 1992
19	IMARCOAIN	ESPAGNE, Navarre	Puñal de Imarcoain	trouvaille isolée	II G	OUI	34,9 cm	4,5	2	sillimanite	couleur blanche, texture fibreuse, inclusions noires de 3mm-1 cm dans la partie proximale et distale, petites fissures dorées	Museo Arquerológico de Navarra		GONZALES SAINZ 1980, BARANDIARAN et VALLESPI 1984
20	LAGOR	FRANC, Pyrénées-Atlantiques	Bazans	trouvaille isolée	ovalaire épaisse		25,8 cm	4,1	2,9	famille des gneiss, spectro Lago_000 et _001		coll. P. Gouandères, Lagor		PETREQUIN *et al.* 2007a
21	LUMBIER	ESPAGNE, Navarre		trouvaille isolée	II A		8,6 cm	2,4	2	quarztite	couleur vert foncé, granulométrie fine	Museo Arquerológico de Navarra		GONZALES SAINZ 1980
22	GRANOLLERS	ESPAGNE, Catalogne	Bobila d'En Joca, date BJ oxa-8776, 4600 +- 70 BP = 3639- 3014 av. J.-C.	sépulture riche	II C		34,2 cm	4,7	1,9		légèrement mouchetée	Musée de Granollers		MUNOZ 1965
23	GRANOLLERS	ESPAGNE, Catalogne	Bobila d'En Joca	sépulture riche			27,0 cm		2		légèrement mouchetée	Granollers, Museo		MUNOZ 1965
24	ORDENES	ESPAGNE, Coruna		inconnu		OUI	22 cm env.	3 env.		sillimanite ?		Madrid, Museo Arqueologico	450	renseignement N. LE MAUX
25	OURENSE	ESPAGNE, Galice	Villamartín	fouille, tombe sous tertre ?	II A	OUI	27,2 cm	3,4	2	amphibolite	gris vert	Ourense, Museo	496	
26	OURENSE	ESPAGNE, Galice	Villamartín	fouille, tombe sous tertre ?	II A	OUI	22,0 cm	2,3	2	amphibolite		Ourense, Museo	501	
27	OUTEIRO DE REI	ESPAGNE, Galice	Pago de la Matela	tombe sous tertre	III	OUI	17 cm	2,2	2,1	amphibolite	vert clair, granulométrie très fine	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 771	FABREGAS VALCARCE 1981 et 1992, LUENGO 1974-75
28	OUTEIRO DE REI	ESPAGNE, Galice	Pago de la Matela	tombe sous tertre	I F	OUI	22 cm	2,7 cm	1,5 cm	amphibolite	vert clair, granulométrie très fine	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 774	FABREGAS VALCARCE 1981 et 1992, LUENGO 1974-75
29	OUTEIRO DE REI	ESPAGNE, Galice	Pago de la Matela	tombe sous tertre	I E	OUI	21,7 cm	3,6 cm	1,5 cm	amphibolite	vert clair, granulométrie très fine	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 775	FABREGAS VALCARCE 1981 et 1992, LUENGO 1974-75
30	OUTEIRO DE REI	ESPAGNE, Galice	Pago de la Matela	tombe sous tertre	I F	OUI	14,5 cm	4,5 cm	1,8 cm	amphibolite	vert clair, granulométrie très fine	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 776	FABREGAS VALCARCE 1981 et 1992, LUENGO 1974-75
31	OUTEIRO DE REI	ESPAGNE, Galice	Pago de la Matela	tombe sous tertre	I D	OUI	16,7 cm	3,4 cm	2,1 cm	sillimanite	des veines noires blanchâtre avec des inclusions fibreuses de silice	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 777	FABREGAS VALCARCE 1981 et 1992, LUENGO 1974-75
32	PONTE DE SÔR	PORTUGAL	Montargil (Ponte de Sôr)	inconnu	II A		29,9 cm	4,8	4,1	schiste	vert et marron, zonation irrégulière	Museo Martins Sarmento	MSA - 687 (C)	
33	RIPOLLET	ESPAGNE, Barcelona	Bovila Padro	sépulture en fosse, début IV^e^ millénaire	circulaire		22,2 cm	3,2	2,3	spectro Barc_049		Sabadell, Musée d'Histoire	2733	MUNOZ 1965
34	RIPOLLET	ESPAGNE, Barcelona	Bovila Padro	sépulture en fosse, début IV^e^ millénaire	circulaire		17,8 cm	2,3	2,1	spectro Barc_055, amphibolite		Sabadell, Musée d'Histoire	2733	MUNOZ 1965
35	SALIES-DE-BEARN	FRANC, Pyrénées-Atlantiques	zone artisanale du Herre	trouvaille isolée	II A		19,5 cm cassée			roche vert foncé schisteuse		coll. part. M. Casteras, Cauneille (Landes)		PETREQUIN *et al.* 2007
36	SAN JOAN DESPI	ESPAGNE, Barcelona	Sant Joan Despí	sépulture en fosse	II B		17,3 cm	3,7		amphibolite				MUNOZ 1965
37	TINEO	ESPAGNE, Asturies	Campiello (Túmulo 16)	sépulture mégalithique	II A		19,2 cm	2,7	2,1	schiste	gris verdâtre, granulométrie très fine et homogène, petites veines perpendiculaires	Oviedo, Museo Arqueológico	3160	FABREGAS VALCARCE *et al.* 1982, DE BLAS 1979
38	TINEO	ESPAGNE, Asturies	Campiello (Túmulo 16)	sépulture mégalithique	II C		14,6 cm	2,7	1,4	schiste	couleur blanche verdâtre, homogène, granulométrie très fine, roche sédimentaire	Oviedo, Museo Arqueológico	3161	FABREGAS VALCARCE *et al.* 1982, DE BLAS 1979
39	TORDOIA	ESPAGNE, Galice	Rechaba	tombe sous tertre						schiste ?				
40	TORDOIA	ESPAGNE, Galice	Rechaba	tombe sous tertre	II A	OUI	19,4 cm	3,4	2,3	amphibolite	gris clair, granulométrie fine, des plans de schistosité marqués dans la partie proximale	Santiago de Compostela, Dpto. Historia I Universidade		FABREGAS VALCARCE 1992
41	VILALBA	ESPAGNE, Galice	Marinaos, San Simon da Costa	trouvaille isolée	I F	OUI	19,5 cm	4,8	1,2	schiste	vert et marron	Lugo, Museo	A 179	FABREGAS VALCARCE 1992
42	VILALBA	ESPAGNE, Galice	San Xoan de Alba	tombe sous tertre	III	OUI	27 cm	2,6 cm	24,4 cm	schiste	vert opaque avec une granulométrie fine et de petits éléments vitreux noirs (micas ?)	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 810	FABREGAS VALCARCE 1982 et 1992

	COMMUNE	PAYS, PROVINCE	LIEU-DIT	CONTEXTE	COUPE	SCIAGE	LONG.	LARG.	EPAIS.	ROCHE	DESCRIPTION DE LA ROCHE	MUSÉE	N° INVENTAIRE	BIBLIOGRAPHIE
43	VILALBA	ESPAGNE, Galice	San Xoan de Alba	tombe sous tertre	I B	OUI	29 cm	3 cm	1,9 cm	schiste	vert clair, granulométrie fine, plans de sédimentation veinés horizontaux, très similaire à MAC 810	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 811	FABREGAS VALCARCE 1982 et 1992
44	VILALBA	ESPAGNE, Galice	San Xoan de Alba	tombe sous tertre	II A	OUI	20,3 cm	3,2 cm	1,9 cm	matériel métamorphique cimenté, granulométrie fine	vert opaque veiné, granulométrie fine	Museo Arqueológico Castillo de San Antón, A Coruña	MAC 812	FABREGAS VALCARCE 1982 et 1992
45	VILALBA	ESPAGNE, Galice	Marinaos, San Simon da Costa	trouvaille isolée	I A	OUI	16,7 cm	4	2,7	schiste	vert, homogène, une veine noirâtre	Lugo, Museo	1263	FABREGAS VALCARCE 1992
46	VILA NOVA DE FAMALIÇAO	PORTUGAL	Monte de San Miguel de Custoias (Calendário)	inconnu	III	OUI	19,3 cm	5	2,7	sillimanite	blanc nacré et grisâtre, zonation irrégulière	Museo Martins Sarmento	MSA 647 (C)	
47	VALLADOLID	ESPAGNE, Castille et Leon		inconnu	II H		10,6 cm	1,9	1,3	sillimanite	blanc nacré et gris foncé, veine longitudinale	Valladolid, Museo	R 10651	
48	VILLAMARTIN	ESPAGNE, Andalousie	Alberite	tombe à couloir		OUI	36,0 cm	3,1	1,4	amphibolite		Cadiz, Musée archéologique	18.590	RAMOS et PACHECO 1996
49	VILLAMARTIN	ESPAGNE, Andalousie	Alberite	tombe à couloir		OUI	26,0 cm	2	0,8	métatuffite		Cadiz, Musée archéologique	18.589	RAMOS et PACHECO 1996



JADE

Grandes haches alpines du Néolithique européen. Ve et IVe millénaires av. J.-C.

sous la direction de Pierre Pétrequin, Serge Cassen, Michel Errera, Lutz Klassen, Alison Sheridan et Anne-Marie Pétrequin

Tome 2

PAO, conception et réalisation : Claude Schmitt - Arcom

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UFR des Sciences du Langage, de l'Homme et de la Société
47, rue Mégevand - 25030 Besançon cedex

69, Grande Rue - 70100 Gray

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