THE UPPER PALEOLITHIC SETTLEMENT OF NORTH-CENTRAL SPAIN

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INTRODUCTION

There is a danger in the context of this project of concentrating on those areas where Upper Paleolithic human settlement is abundantly known : i.e., in Vasco-Cantabria (the central & eastern stretch of the north coast of Atlantic Spain, from central Asturias to Guipúzcoa). Here, human occupation seems to have been continuous and fairly abundant from Mousterian through Azilian times (at least relative to the upland mesetas of Castile and León, as well as to the upper Ebro drainage in Alava, Navarra, Rioja & Aragón), albeit with a major increases in settlement (and actual population?) density beginning during the Last Glacial Maximum and early Tardiglacial, stabilizing at even higher levels in the late Tardiglacial and early Postglacial.

But what about the empty (or apparently empty) areas of northern Iberia in the Upper Paleolithic ? Are they the result of 1.) geological/geomorphological circumstances (e.g., a relative scarcity of caves in some areas such as Galicia, high erosion rates on slopes and on ancient, tilted tableland surfaces, deep burial in entrenched river valleys), 2.) a lack of (systematic) archeological exploration and/or 3.) a real absence of prehistoric human settlement due to harsh environmental conditions and relatively scarce resources in the Iberian interior and shield rock northwest region relative to the situation along many of the coasts? Until recently, there had been major "gaps" in the distribution of Upper Paleolithic sites in Galicia (extreme NW Spain), Old & New Castile, León, the bulk of Navarra (i.e., all of that region except the northern end touching the French and coastal Spanish Basque Country) and Aragón, while the Spanish record was heavily dominated by sites in the Cantabrian, Catalán & Valencian coastal areas. Similar gaps existed in much of Andalucia, which are now also being filled by intensive research, as is also the case throughout much of Portugal.

The question is whether the environments of NW Spain, the mesetas and upper Ebro Basin were in fact too difficult (at least relative to the more shelter- and resource-rich coastal zones) to be occupied much or at all by humans during the late Upper Pleistocene or is the apparently distribution pattern just (or mainly) an artifact of site visiblity, differential preservation and/or the intensity of archeological activity ? Unfortunately, hand-in-hand with the scarcity or lack of Upper Paleolithic sites in Galicia and Castile, is the scarcity of paleoclimatic evidence there for isotope stages 3 and 2. However, even in Vasco-Cantabria (at or near sea level) and from off-shore marine cores, all indications demonstrate

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very rigorous glacial conditions along the coast. Thus logic would suggest the existence of even worse conditions at higher elevations and in the more continental contexts of the Iberian interior (as well as intense storminess in Galicia) (see STRAUS 1992 with references).

The irony is that Acheulean and Mousterian sites have long been known & are relatively abundant in Galicia and Castile, although dating and correlation with specific climatic phases are generally problematic at best (e.g., SANTONJA & VILLA 1990; VILLAR 1997; MOURE *et al.*, 1997; GARCÍA 1997; ALCOLEA *et al.*, 1997). Temperate periods (interglacials and interstadials) would logically be the best times for substantive human occupation of the interior and uplands, however. Early Paleolithic sites seem to be better represented, at the present time at least, in the Iberian interior than are those of the Upper Paleolithic.

In this brief overview, first we ask what is the record from the Cantabrian region, where prehistoric archeological research has been done more or less continuously since the mid-1870s (beginning with the discovery and excavation of Altamira by Marcelino Sanz de Sautoloa). Then we seek to deal with the scanty records from adjacent regions, keeping in mind that the situation is very much in flux and that as research increases in Aragón, Navarra, Rioja, Castilla-León and Galicia, the numbers of Upper Paleolithic sites are certain to continue to grow, even if the question remains as to whether and when some or all of these regions were too poor and inhospitable (relative to the Atlantic and Mediterranean coasts) to harbor large, permanent human populations---as opposed to transient visits, "raids" or "crossings".

VASCO-CANTABRIA

This region is a narrow, east-west oriented strip centered on 43 deg.20 min. north latitude, with a width of only about 25-50 km between the Cantabrian Cordillera/Picos de Europa and Cantabrian Sea (Bay of Biscay). It has extreme relief (0-2600 m. above present sea level) and a steep shoreline that was only 6-12 km north of its present position during pleniglacials. Its present climate is heavily influenced by the Gulf Stream, with very marked differences in temperature, precipitation & seasonality between the north face of the the Cordillera (Vasco-Cantabria) & the south face (Castilla-León, Alava, Rioja & Lower Navarra).

We stress the karstic, mountainous, coastal nature of Cantabrian Spain---at least as far west as the Río Nalón in central Asturias. There are many caves, but almost no open-air sites in the record. This is probably due to massive erosion as a consequence of slope instability and short, steep, swift rivers that fall into the sea, and because of deep footslope colluviation with burial of most of the open-air sites that might have survived the erosion. Even considerable excavation for construction (including major recent highway and road building programs) has failed to locate hardly any Upper Paleolithic open-air sites, while it has yielded several new cave sites, including the important rupestral art location of Covaciella in the mountains of eastern Asturias (FORTEA *et al.*, 1995). Some

recent claims for open-air sites in colluvial deposits may in fact consist of materials that have washed downslope from adjacent caves (e.g., BOHIGAS *et al.*, n.d.). This (like many others) is also a region where, until fairly recently, the known distribution of sites was largely a product of where the few practicing archeologists tended to look : i.e., within usually rather limited radii of provincial capital cities and/or their own home towns (e.g., the notable, but far from exclusive, effect of site discoveries and excavations by the Conde de la Vega del Sella within a 40 km. radius of his palace in Nueva, Asturias, between 1913-1922 [MÁRQUEZ 1974]). Roads and other communications were bad, so it is surprising and ironic that some of the earliest explorations and "digs" (e.g., by VEGA DEL SELLA, L.SIERRA, H.ALCALDE DEL RIO, H. OBERMAIER, c. 1900-1920) did in fact take place in montane areas, so often underrepresented among more recent excavations. However, in those early days (as shown by photos in such works as *Les Cavernes de la Région Cantabrique* [ALCALDE DEL RÍO *et al.*, 1911]) sheep/goat pastoralism kept the upper slopes rather bare of trees, so that montane area caves were more visible and accesible than they became later (with the replacement of ovicaprines by milk cows and with the spread of Monterrey pine & eucalyptus siviculture in the steeper, higher slopes--ironically the latter tree having been introduced to the region by Sanz de Sautuola). There are a <u>few</u> genuine or possible Upper Paleolithic and Mesolithic open-air sites, some of which are associated with flint or other appropriate lithic raw material outcrops on the narrow coastal plain (e.g., around Kurtzia near Bilbao, Pedernales near Guernica, Jaizkibel near San Sebastián, Liencres near Santander, Oyambre near the Cantabria-Asturias border).

Recent prospection has yielded new cave and rockshelter sites in areas that had been poorly represented in the record up to now : the Nalón River drainage of central Asturias (FORTEA 1981), the Cares-Gueña intermontane valley along the northern flank of the Picos de Europa in eastern Asturias (ARIAS & PÉREZ 1995), the Nansa River drainage (including the Liébana valley in the heart of the Picos de Europa [DIEZ 1996]), the Asón River Basin in eastern Cantabria (GONZÁLEZ MORALES 1990; STRAUS & GONZÁLEZ MORALES 1998), small basins in the hilly north coastal Basque Country (such as the Urdubai valley of Vizcaya [LÓPEZ & RUIZ 1997]), and even its Ebro-drained southern areas beyond the Cordillera (e.g., ALDAY 1997). Some townships (e.g., Camargo in Cantabria [MUÑOZ & MALPELO 1992]) and provinces (e.g., Guipúzcoa [ALTUNA *et al.*, 1982]) have rather comprehensive archeological inventories. So archeological coverage of Vasco-Cantabria is now fairly good, despite continued biases toward cave sites (which is inevitable) and those near certain major cities or other archeologist "home-bases".

THE CLIMATIC RECORD FOR OXYGEN ISOTOPE STAGES 3 & 2

The bases for the Vasco-Cantabrian regional record are sedimentology and--beginning with the Hengelo oscillation--palynology. The former is marked by disagreements between Butzer (e.g., 1971, 1980, 1981) vs. Laville and Hoyos (e.g., 1984; HOYOS & LAVILLE 1982; LAVILLE 1986; HOYOS 1995) in regard to how close a set of correlations one can make with the Périgord sequence. The latter is

also marked with disagreements between Arlette Leroi-Gourhan & her disciples (e.g., LEROI-GOURHAN 1971, 1980, 1986, 1994; LEROI-GOURHAN & RENAULT-MISKOVSKY 1977; RENAULT-MISKOVSKY & LEROI-GOURHAN 1981; BOYER-KLEIN 1984; DUPRÉ 1988; see also GONZÁLEZ SAINZ 1994) vs. Sánchez Goñi (1993, 1994, 1996) in regard to the existence (or not) of moderating oscillations within stage 2. In both cases, differences of opinion also concern the environmentally interpretive limitations, as well as the chronological correlation possibilities of the respective methods.

While of critical importance to paleo-subsistence studies, mammalian paleontology is not very informative either chronologically or environmentally in this region and time period except in very general terms, due to the climatic "banality"& modernity of regional faunas. Significant exceptions to this generalization are the minor, fleeting appearances of reindeer & Nordic vole during the coldest episodes of the Last Glacial and the local extinctions of some archaic forms (rhinos & mammoth) early in the Upper Paleolithic and final extinctions (notably of cave bear) at the end of the Pleistocene. Archeozoological research in Vasco-Cantabria has been almost single-handedly the work of Jesús Altuna (e.g., 1972, 1986, 1989, 1995; ALTUNA & MARIEZKURRENA 1988). Red deer and ibex were the mainstays of Upper Paleolithic human diets, with secondary inputs from horse, bovines, chamois, and, especially during interglacial times, roe deer and boar. With the exception of the latter two, these ungulates can all live in open grass- and heathlands, with or without stands of trees. Red deer, horse & bovines had already been the chief sources of Cantabrian Mousterian subsistence, despite considerable changes in regional climate and vegetation throughout isotope stages 4 and early 3.

There is considerable controversy as to whether moderating oscillations in stage 2 ("Laugerie", "Lascaux", "Angles", "Prebölling") were real, whether they were simply more humid, whether there was actually any warming before Bölling, whether the presence of arboreal pollens in caves actually translates into trees in the local environment, whether cryoclasty in caves can actually be used to monitor region-wide cold spells (such as "Dryas II"), etc. None of the traditional paleoenvironmental proxy measures has yet been able to provide very great precision concerning the nature of extinct Last Glacial Cantabrian landscapes, witness considerable variability & ambiguity in representations of this region on pan-European maps for the late Upper Pleistocene. Differences in signal sensitivity at relatively low latitudes, as well as problems of scale & resolution may be responsible for inconsistencies among the various paleoenvironmental indicators, and especially between terrestrial and marine sources (e.g., LAVILLE *et al.*, 1983). Thus, what follows is a much simplified, imperfect summary of the main environmental trends during stages 3 & 2 in Vasco-Cantabria, based on many of the sources cited above, among others.

Basically, there was a shift toward colder, more open environments with the onset of the Gravettian, c. 25 kya. The late Mousterian, Chatelperronian and Aurignacian, in contrast, had seen conditions of open parkland, with rather high humidity and coldness intermediate between stadial & interglacial conditions. The exact number and nature of oscillations within late isotope stage 3 are poorly known, and most schemes depend on putative correlations with the Périgord

(LAVILLE *et al.*, 1980) & Grande Pile sequences (WOILLARD & MOOK 1982). The extent of woodland is not well known and thermophile trees were apparently scarce even during the most interstadial episodes of the interpleniglacial. During the Pleniglacial and early Tardiglacial the region was vegetated with heath and grasslands, and there were only scattered pines and junipers. Many steep slopes may have been bare of vegetation and were thus unstable. Cold was severe, as attested by deep sea cores in the Cantabrian Sea, but the region never saw real glacial drought. Storminess was intensive especially along the coasts of Galicia, due to extreme ocean temperature gradients. These maximal conditions of Stage 2 obtained during the Solutrean and continued through the early Magdalenian, albeit probably with some moderating episodes. However, trees (other than isolated pines) really didn't begin to reappear significantly until the late Tardiglacial (Bölling/Alleröd) & include *Quercus, Corylus* and *Betula*. More thermophile taxa made their significant appearance at the very end of the Last Glacial, especially in Preboreal/Boreal.

Archeofaunas of the early Upper Paleolithic (and late Middle Paleolithic) include significant quantities of horse & bovines--together with red deer--but the late Upper Paleolithic was strongly dominated by red deer & ibex (depending on site location : plains, valleys & lowlands vs. steep, rocky slopes & uplands). Roe deer and boar--true woodland taxa--only reappear significantly in the late Tardiglacial, although chamois is present in some earlier faunas.

So the Middle-Upper Paleolithic transition basically took place under relatively moderate conditions and the real worsening (especially in terms of very cold temperatures) did not occur until 15-20, 000 years later, when the evidence of site numbers (and perhaps hence population density) was much higher in this region---as in other southern refugium regions of Europe (STRAUS 1977, 1990). The MP-UP transition (equated with sterile layer 19 and basal Aurignacian level 18 in El Castillo Cave) took place during the moderate, humid (so-called) Hengelo oscillation, c.40, 000 radiocarbon years BP (according to ten AMS dates for level 18 run by three different laboratories) (CABRERA *et al.*, 1996). The latest Mousterian at Castillo (central Cantabria) dates to c. 41, 000 BP and occurred under colder conditions within late-middle stage 3. Another well-studied "transition"site, La Viña (central Asturias), has evidence of temperate conditions in early Aurignacian level XIII, dating to 36, 500±750 BP (FORTEA 1996). This would be before Denekamp /Arcy and even before Les Cottés, or at most at the very beginning of Les Cottés, if it is not some oscillation not recognized in the French sequences). The underlying Mousterian layer (XIII basal--separated from the lowest Aurignacian by an erosional episode) was also deposited under moderate conditions dating to 42, 000 or >47, 00 ? BP (J.Fortea, pers.comm.).

There are only about 15 known Mousterian sites in Vasco-Cantabria (several with multiple layers), few of which are at all dated. But some regional late Mousterian levels, besides those of Castillo & Viña, include ones that are palynologically assigned to "Hengelo", although they are not radiometrically dated (Cueva Morín & El Pendo in central Cantabria). El Otero, in eastern Cantabria, and Amalda, in Guipúzcoa, also have fairly high arboreal pollen percentages (but, as usual, these are mainly comprised of pine). So open pine

woodlands with high humidity (attested by large amounts of fern sprores and grass pollens, with only traces of hazel or oak, etc.) seem to have characterized the late Mousterian as much as the earliest UP. All the above-mentioned sites have both Mousterian and Aurignacian levels (with Morín & Pendo also having Chatelperronian ones); this is also true of several other EUP sites. There would seem to be evidence of continuity in environments, faunas, settlement locations, as well as in aspects of technology across the MP-UP transition in this region (e.g., STRAUS & HELLER 1988; CABRERA & BERNALDO DE QUIRÓS 1996).

EARLY STAGE 3

The latest Mousterian in Cuevas Millán & Ermita (Burgos, Old Castile) have radiocarbon ages of 37 & 31 kya respectively (although the latter is said to be too young, due to poorly preserved bone collagen [MOURE *et al.*, 1997]). Mousterian level 2 in Jarama VI Cave (Guadalajara, northern New Castile) has recently produced radiocarbon dates on charcoal of 29.5±2.7 & 32.6±1.9 kya, but "post-depositional fluvial processes" may have impacted the validity of these determinations (GARCÍA 1997). Peña Miel in La Rioja (Upper Ebro valley) is dated to c. 40 kya; Gabasa cave in Huesca (Aragón) has Mousterian levels said on geological grounds to span late Würm II, II/III interstadial & early Würm III, with a C14 date of 46±4 kya for one of the interstadial levels (UTRILLA 1987, with refs.). In the Cantabrian region itself, in addition to the dates for El Castillo (Level 18) & La Viña (Level XIII basal) cited above ? Cueva Morín's latest Mousterian has a very imprecise *terminus ante quem* date of >36±7 kya (based on the C14 age of the overlying Chatelperronian level) and La Flecha (adjacent to El Castillo) has a C14 date of >31 kya for its Mousterian (BUTZER 1981). None of these dates (except those of Castillo) is very precise or informative, and clearly much more dating needs to be done. The the upper Ebro & Duero drainages and the mesetas do have relatively abundant Mousterian sites (including the well-known cave of Los Casares in Guadalajara and numerous open-air localities in the Madrid Basin). But without credible dating we cannot test the hypothesis that all or most of them are of interstadial (or Last Interglacial) age, although this is plausible, since conditions during stadials (pleniglacials) would have been very harsh and food resources relatively scarce. An early Würm interstadial age has been proposed for the Mousterian of Los Casares (GARCÍA 1997). Population levels may have been low in the Middle Paleolithic and large areas of Spain may have been only slightly populated or used--if at all--especially during colder phases.

LATE STAGE 3

Data on which the following comments are based can be found in Tables 1, 2 & 3 and Figure 1; much of the information on Vasco-Cantabria is summarized in Straus (1992), with references.

Earliest Aurignacian (pre-Chatelperronian) sites are rare and confined to the Cantabrian coastal zone. The Chatelperronian is also scantily represented and

is virtually undated, although it does seem to postdate the earliest Aurignacian, with the one poor date of 36±7 kya at Morin. At El Pendo, the Chatelperronian level is sandwiched between Aurignacian ones, although the credibility of the stratigraphy has recently been called into question for geomorphological reasons (BARANDIARÁN *et al.*, 1996). There is a possible Chatelperronian site (Mucientes) at 780 m in the Pisuerga valley on the meseta of Valladolid (Old Castile) (MARTÍN *et al.*, 1986) and another one (A Valiña), with a date of 35±1.7 kya, is located at an elevation of 620 m in Lugo (Galicia) (LLANA & SOTO 1991). These sites may be testimony to the relatively benign climatic conditions of the Les Cottés climatic episode, since both Old Castile & Galicia seem to have been substantially abandoned later on during the Upper Pleniglacial.

Late (post-Chatelperronian) Aurignacian levels are dated (mainly at Morín, Amalda & Rascaño) to c. 29-27 kya, although in several instances (such as at the latter of these sites) banal assemblages lacking definite Aurignacian diagnostic artifacts are assigned to this culture mainly on the basis of the radiometric dates, a tautological procedure. Altogether, there are only 15 "Aurignacian" sites (early & late) in N. Spain (and very few in Mediterranean Spain & Portugal, with none at all in southernmost Iberia) & only 5-8 Chatelperronian ones (and none elsewhere in Iberia, with the possible exceptions of three sites in the Serinyà area of NE Catalunya [CANAL & CARBONELL 1989]). This record covers a period of some 13, 000 years ? There is only ±1 C14-dated level per 2 millennia time slice, and altogether there is on average only about 1.5 Aurignacian + Chatelperronian site per millennium (both dated+undated).

EARLY STAGE 2 : LAST GLACIAL MAXIMUM

The Gravettian is also poorly represented in Vasco-Cantabria & is badly dated, with a maximum of only 14 sites. There are none outside the north-central coastal region : Asturias, Cantabria & the coastal provinces (Vizcaya & Guipúzcoa) of Euskadi (Basque Autonomous Region). The C14 dates range from c.27.4-21.0 kya, with some clearly erroneous outliers. There are no sites on the Meseta, in Navarra, Aragón or in Galicia, but there are a few Cantabrian Gravettian sites (usually rich in Noailles burins) in montane settings, such as Bolinkoba (Vizcaya--350 m.a.s.l.).

As I have been arguing since the mid-1970s (e.g., STRAUS 1977), the inflection point in known archeological site numbers came with the Solutrean during the Last Glacial Maximum. There are now some 52 Solutrean sites in Vasco-Cantabria. Solutrean sites are also much more numerous than sites of earlier periods in Catalunya, Levante, Andalucia or Portugal. This phenomenon would seem to be the result of a population "boom" in the south of Europe due to contraction of the total human range in the continent, with gradual abandonment of the north after c. 23 kya and concentration of the remaining bands in refugia south of the Loire, especially in SW & SE France & in Iberia (STRAUS 1991). The many radiocarbon dates for the Vasco-Cantabrian Solutrean place it between c.20.5-17 (or maybe 16.5) kya, clearly ending later than in France, but on a par with the situation in Levante & Portugal. Solutrean sites are not

necessarily easier to find (at El Mirón Cave the Solutrean is 2-3 m below the surface!), but the diagnostic lithic foliate, shouldered & tanged points do make it generally "easy" to identify & hence to date such sites (except in cases of surface finds or unstratified sites, where they can be and are indeed sometimes confused with certain Chalcolithic or Bronze Age points). This facility of identification distinguishes Solutrean point-bearing assemblages from some banal, generic Upper Paleolithic assemblages which cannot really be dated without application of C14. But then what should be done about Solutrean-age assemblages lacking in points ?

While the distribution of Solutrean sites is, as I have argued, peripheral in Iberia, there are old reports of Solutrean-like points found in sandpits (notably El Sotillo) in the Madrid area of central Spain (which are in need of restudy & confirmation)--and now there is an unquestionable Solutrean site--Peña Capón--at c.800 m in the Henares basin on Guadalajara, 100 km northeast of Madrid, unfortunately not yet dated & now destroyed by a reservoir (ALCOLEA *et al.*, 1997). Whether this site can be attributed to a moderating climatic oscillation (Laugerie or early Lascaux) remains to be seen. The site of Chaves in the Ebro basin of Huesca at c. 600 m, together with recently discovered sites in upper Navarra, provide links between the dense clusters of Cantabrian & Catalan Solutrean sites along the southern flank of the Pyrenees (UTRILLA & MAZO 1996), just as the scattering of Solutrean sites in Ariège show a possible avenue of communication between the Solutrean concentrations in the Pays Basque and Languedoc (PETRAGLIA *et al.*, n.d.). Similarly, the growing number of Solutrean sites in southern Andalucia & Alentejo provide a possible connection between the Levantine and Portuguese Estremadura clusters (e.g., ZILHAO 1990; ZILHAO *et al.*, 1997; RAMOS *et al.*, 1995) and the new Solutrean site of Olga Grande near the Côa valley of northeastern Portugal begins to suggest a link between the densely peopled LGM territories of Asturias & Estremadura (AUBRY 1998). The extent & exact timing of Solutrean settlement of the central core of the Peninsula remain to be determined however. There are also suggestions (based on stylistic comparisons) that the rock art in La Griega Cave on the northern flank of the Sierra de Guadarrama in Segovia might be of Solutrean age, which would coincide with the evidence from Peña Capón (SAUVET 1985).

Since the Solutrean lasted only 3000 years--the duration of the Last Glacial Maximum--that comes to an average of 17.3 sites per millennium in north-central Spain (& 6 C14-dated sites per millennium) : a dramatic increase over the Gravettian, Aurignacian & Chatelperronian, each with only 1-2 sites on average per millennium (!).

The above remarks notwithstanding, neither the Cantabrian Cordillera (nor the other mountain chains of Iberia or the high mesetas), nor the Pyrenees are at all rich in Solutrean sites. Most are close to the present shore (which in Vasco-Cantabria is 6-12 km inland of the Pleni-glacial shore), usually in lowland settings. There are a few exceptions, with some mountainside Solutrean sites (Bolinkoba, Mirón & several small Solutrean sites in Navarra). Also in contrast to EUP, sites with multiple Solutrean levels are more common. However, in general--with the exception of a few extraordinarily rich Solutrean sites (mainly in central & eastern Asturias, such as Las Caldas, Cueto de la Mina, La Riera, &

central Cantabria, notably Altamira)--many sites & levels of this period are relatively limited & some may represent mere ephemeral "visits" (as is the case of most French--mainly lowland--Pyrenean sites). This is an especially sharp difference with the overlying early Magdalenian which deposited thick, dense occupation residues, often in the same caves.

LATE STAGE 2 : DRYAS I

Indeed, the settlement pattern in Vasco-Cantabria remained basically the same across the Solutrean-early Magdalenian transition, which was a gradual, subtle one, not marked by radical shifts in environment or human adaptations. There are 66 sites attributed to the "pre-harpoon" Lower & Middle Magdalenian (17-13 kya), with about the same average number of sites per millennium as in the Solutrean (16.5). (The total number of sites could be somewhat inflated, as it includes several old finds reported as "Magdalenian", but with no known harpoons, a fact which could simply be the result of sampling in very limited excavations or simply surface collecting. It is also possible that some of these sites could be of Solutrean age, but are lacking in foliate or shouldered stone points, since the remaining "substrates" of the lithic assemblages of the Solutrean and early Magdalenian are often indistinguishable [STRAUS 1975]). The numbers of C14-dated sites per millennium (8.3) increases vis à vis the Solutrean, perhaps as an accidental result of the quantity of modern excavations of Magdalenian levels in recent years. There are some sites again in Galicia & in Old Castile, although there are few available details on these (FORTEA 1996). There is also evidence of cave art on the mesetas that <u>may</u> be of this age (based on stylistic comparisons, the kinds of represented fauna, etc.) : Siega Verde (c.600 m.a.s.l. in Salamanca), La Hoz (1050 m.a.s.l. in Guadalajara) (BALBÍN & ALCOLEA 1994). And there are several sites in Navarra (including Zatoya at 900 m) & Aragón (all between 500-600 m) at fairly high elevations (UTRILLA & MAZO 1996). And there are others definitely <u>in</u> the Cantabrian Cordillera (Collubil, Rascaño, Mirón, Salitre, Bolinkoba), generally up to 300 m above sea level and involved in specialized ibex hunting. This period also saw an explosion of sites in the Pyrenees mountains themselves, as the glaciers quickly melted back (e.g., CLOTTES 1989). This trend continued in the late Magdalenian & Azilian in both mountain chains (as also in the Alps, Massif Central, Jura, etc.) (see papers in RIGAUD *et al.*, 1992 & RIGAUD 1989).

There was another "boom" in the brie ? Late Magdalenian period (Bölling-Alleröd), 13-11 kya (probably due both to *in situ* local population growth and increased numbers of logistical locations--as well as perhaps because of the relative ease of discovery & identification of such fairly recent sites). There are dense patterns of sites along many Cantabrian valleys or stretches of coastline. There are 59 known Upper Magdalenian sites, which equates to 29.5/millennium on average and c. 10 radiocarbon-dated ones per millennium. There are also quite a few sites in Navarra, Aragón & Castile--some (such as Dehesa, at c.1200 m in the Tormes basin of Salamanca [FABIÁN 1986]) intermediate between northern Spain & Portugal, the latter with its recently enriched distribution of sites especially in Estremadura. Cave art on the northern meseta of Burgos in Ojo

Guareña, Atapuerca, & Penches, plus the possible habitation site of La Blanca may date to the terminal Magdalenian; these caves are between 760-1050 m.a.s.l. (CLARK 1979; CORCHON 1996).

Essentially the same situation obtained at the very end of the Pleistocene in the Azilian : Dryas III & beginning of Preboreal. There are 58 known sites in the period between 11-9 kya, with an average of 29 sites per millennium and c. 10 C14-dated sites/millennium. There are numerous very high sites in this period, including ones on the slopes--both north & south--of the Picos de Europa, with sites at >/= 1000 m (DIEZ 1996) (and even up to 1260 m) above sea level, especially in León (La Uña, Espertín) (BERNALDO DE QUIRÓS & NEIRA 1996) and Burgos (Nispera) (CORCHÓN 1989). There was a clear "reconquest" of the mountains, as in the Pyrenees with sites as high as Balma Margineda at 970 m.a.s.l. in Andorra (GUILAINE & MARTZLUFF 1995).

POST STAGE 2 : BOREAL-ATLANTIC

This late Magdalenian-Azilian expansion up into the mountains & the interior was followed under conditions of Boreal & early Atlantic--with heavy reforestation--by an abandonment or at least a major "thinning" of human settlement in the interior & uplands. This is mirrored by a major concentration of settlement along the Holocene (modern) shore in the form of the Asturian of eastern Asturias & western Cantabria and other Mesolithic coastal "cultures" from Galicia to the French Basque Country, all often with shell middens & minimal artifact assemblages (that generally include cobble picks) (e.g., GONZÁLEZ MORALES 1995). If true, why did this partial abandonment of the interior & concentration along the shore occur ? It could be due to the difficulty of human penetration into the now-densely wooded, steep interior. This hypothesis and the early indicators of an immediately pre-Neolithic move back into the interior in some areas of Vasco-Cantabria in the mid-Atlantic period are currently under active investigation by several research teams. Indeed, the most recent discoveries (at sites such as Los Canes in eastern Asturias [ARIAS 1991], El Mirón in eastern Cantabria [STRAUS & GONZÁLEZ MORALES 1998] and Urratxa in Vizcaya [MUÑOZ & BERGANZA 1997]) are beginning to suggest the existence of at least ephemeral occupations of or "visits" to the montane zones of Vasco-Cantabria during the Boreal and early Atlantic periods, prior to the adoption of ceramic technology and domesticated animals.

PROBLEMS

There is poor radiometric temporal resolution until the Solutrean, such that the late Middle Paleolithic and early Upper Paleolithic are badly dated--except at El Castillo. There is poor resolution or control of climatic phases & environments in oxygen isotope stage 3 & even within stage 2. There is a strong bias toward cave sites (although caves--which are ready-made shelters & which occur in the whole gamut of elevations, solar orientations & exposures--were

certainly preferred for many types of camps, given the cold temperatures, high humidity & storminess of the Last Glacial). There are still gaps in the distribution of known sites due to historical accidents of where prehistorians "looked" (and still tend to look, by mainly reexcavating known cave sites) & where they didn't look. This is clear with the large numbers of new discoveries in formerly ignored or "forgotten" valleys of Vasco-Cantabria, or even on the mesetas, in Galicia, Navarra & Aragón. There have been definite research orientation biases.

Nonetheless, it is clear that Iberia was a major human refugium during the Last Glacial Maximum, with a population boom caused by a gradual, cumulative influx of people, as northern Europe was progressively abandoned and the human range contracted. Some environments (namely the low, peripheral, coastal ones) were definitely preferred, due to their relative richness of resources and shelter compared to the high hinterlands of Iberia---although minor occupations or crossings of & visits to the mesetas cannot be totally excluded even in Solutrean times (after all, the Portuguese Solutrean has both Cantabrian-type shouldered points and Levantine-type tanged points). However, the (re-)conquest of the mesetas and of the mountains really mostly took place during the Tardiglacial with warming & glacial retreat, as evidenced by both living and rock art sites of (probable) Magdalenian age, with even more recent sites in the interior pertaining to the Azilian, which straddled stages 2-1. Aside from these clear climatic correlations, it is not obvious that environmental change was always responsible for cultural changes (such as the Middle-Upper Paleolithic transition, which took place under the relatively benign conditions of the Interpleniglacial). Indeed, cultural "fads" or inventions transmitted socially, need to be seen as "causing" such shifts as the Solutrean-Magdalenian or Magdalenian-Azilian transitions, especially far to the south in Spain, where the climatic fluctuations of the Last Glacial were not always as pronounced as they were further north in Europe. The core region of north-central Spain seems to have been one of continuous human occupation since at least Mousterian times, due to its rich resources (food, natural shelter, water, lithic raw materials). Other regions were less favorable for humans, especially under full glacial conditions, when they may have been totally avoided or only briefly visited or transited. Working this out will require archeologists to look systematically in such regions--even when chances of success may seem slim. Negative evidence is often just as important as positive evidence, especially when trying to document settement patterns in remote prehistory.

Much more systematic survey and testing needs to be done, along with radiometric dating, paleoenvironmental studies (such as long pollen cores, oxygen isotope analyses of speleothems, etc.) & finer dissection, plus broader exposure of excavated sites, in order to take truer measures of settlement intensity, function & duration. It is entirely possible that the maps we have made and the explanations for known distributions of sites we have constructed, will have to be seriously modified or even scrapped in the future, as Paleolithic archeological research increasingly spreads out across Iberia to "non-traditional" regions, away from the "promised lands" of the Cantabrian & Mediterranean coasts. Nevertheless, new discoveries in the center of Iberia cannot take away from the critical, & likely enduring fact of the richness of the coastal peripheries during the Ice Age.

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Non-Radiocarbon-Dated Sites in North-Central Spain (Euskadi, Cantabria & Asturias +)

PERIOD	AGE RANGE	UNDATED SITES	*TOTAL* NUMBER OF SITES PER	
			Period(n)	Millennium
Chatelperronian	36-32 kya	Pendo, Labeko, Oscura Perán?, Cudón?, Mucientes?	# 5-8	1.25-2.00
Aurignacian	40-27 kya	Conde, Arnero, Cueto de la Mina, Cierro, Pendo, Camargo?, Hornos de la Peña, Otero, Kurtzia?	15	1.15
Gravettian	27-20 kya	Viña, Cueto de la Mina, Salitre?, Santimamiñe, Llonín, Bolinkoba, Usategui, Lezia, Atxurra	14	2.00
Solutrean	20-17 kya	Viña, Lluera I & II, Candamo, Balmori, Buxu, Tres Calabres, Coberizas, Cierro, Cova Rosa, Oscura de Perán, *Llonín*, *Corao*, Sulamula, Aviao, Sel, Pendo, Morín, Ruso, Cobalejos, Carranseja, Camargo, Castillo, Pasiega, Salitre, Bona, Ramales, Haza, Mirón, Fte.del Francés, Santimamiñe, Atxeta, Atxuri, Bolinkoba, Ermittia, Aitzbitarte III, Etxauri**, Leguintxiki**, Coscobilo?**, Peña Capón#, Sotillo?#	52	17.33

Early Magdalenian 17-13 kya		Candamo, Ancenja, Sofoxó, Lluera, C.Rosa, Cierro, Cierro, Cuevona, S.Antonio, Viesca, Collubil, Loja, Coberizas, Llonín, C.de la Mina, Balmori, Fonfría, Juan de Covera, C.de la Peña, Coimbre, Trauno, Hermida, Cuco, Hornos de la P., Pasiega, Loreto, Camargo, Fte. Francés, Cobalejos, Truchiro, Salitre, Bona, Sailleunta, Bolinkoba, Santimamiñe, Atxurra, Lumentxa, Ermittia, Urtiaga, Sorquinen, Aitzbitarte III&IV, Férvedes II*, Dos Niñas*, Jarama II#	66	16.50
Late Magdalenian 13-11 kya		Sofoxó, Viña, Oscura de Ania, Entrefoces, Ferrán, Viesca, Canes, Cierro, Cova Rosa, Azules, Collubil, Bricia, Hermida, Llonín, Linar, Sovilla, Morín, Piélago, Fragua, Chora, Otero, Valle, Atxeta, Santimamiñe, Silibranka, Lumentxa, Abittaga, Goikolau, Ermittia, AitzbitarteIV, Torre, Lezetxiki, Iruroin, Langatxo, Arrillor**, Alaiz**, Etxauri**, Dehesa#, Penches?#	59	29.50
Azilian	11-9 kya	Oscura Perán, Paloma, Balmori, Canes, Pindal, Llonín, Meaza, Pendo, Camargo, Castillo, Morín, Salitre, Otero, C.de los Hornos, Cubero, Atxeta, Atxurra, Sta.Catalina, Lumentxa, Bolinkoba, Silibranka, Ermittia, Agarre, Erralla, Pikandita, Aitzbitarte IV, A.de la Mina, Espertín#, Uña#, Cantera?# , P.Grande*, P.do Inferno*, P.de Xiboi*	58	29.00

Key: *:Galicia; **:Navarra; #:Castilla-León; n: total number of dated + undated sites.

Radiocarbon-Dated Early Upper Paleolithic Sites in North-Central Spain (Euskadi, Cantabria, Asturias)

kya	Sites	14C Dates	Cultural Affiliation	Number of Sites	No. of 14C-Dated Levels	Climatic Phase
40						
39	Castillo 18 b1-2,c	10 dates: 40,700 - 37,100	Au	1	3	Hengelo
38						
37				1	1	
	Viña XIII	36,500 +/- 750	Au			
36						
	Morín 10	35,875 +/- 6780	Ch	2	2	Cottés
35						
	Valiña IV **	34,800 + 1900 / - 1500	Ch			
34						
33				1	1	
32	Güelga	32,000 + 1600 / - 1350	Au			
	(Valiña IV **)	(2 dates of c. 31,700)	Ch	3	3	
31	Morín 6/7	31,600 +/- 900	Au			Arcy
	Ekain IX	>30,600	Ch?			
30	Labeko V	30,615 +/- 820	Au			
29	Morín 7	28,700 +/- 900	Au	1	1	
28						Maisières
	Morín 8	3 dates of c. 27,500	Au	4	5	
27	Amalda VII	2 dates of c. 27,400	Gr			
	(Morín 7)	(27,200 +/- 1500)	Au			
	Rascaño 7	27,200 + 950 / - 810	Au?			
	Rascaño 9	>27,000	Au?			
26	Alkerdi 2	26,470 + 530 / - 490	Gr			
				1	2	
25	Aitzbitarte III Lev. VI	5 dates: 25,380 - 23,830	Gr			
	Aitzbitarte III Lev. V	2 dates: 24,910 - 23,230	Gr			
24						
23				1	1	Tursac
22	Fte. del Salín	22,340 + 510 / - 480	Gr?			
	Ekain VIII	20,900 +/- 450	Gr?	4	7	
	Labeko IV	21,665 +/- 305	Au?			
21	Riera 1	3 dates: 20,860 - 19,620	Au?			
	Morín 5 up	20,100 +/- 350	Gr			
	Riera 4	20,970 +/- 620	Sol			
	Riera 7	20,000 +/- 210	Sol			
20	Riera 8	20,690 +/- 810	Sol			

Au = Aurignacian, Ch = Chatelperronian, Gr = Gravettian, Sol = Solutrean; ** Galicia

Radiocarbon-Dated Late Upper Paleolithic Sites in North-Central Spain (Euskadi, Cantabria, Asturias)

kya	Sites	Cultural Affiliation	Number of Sites	No. of 14C-Dated Levels	Climatic Phase
20					
19	Riera 10; Caldas 18, 16, 12, 9; Cueto de la Mina Vb; Hornos de la Peña; Lezetxiki IIIa (?); Chaves * c1	Sol	6	13	Laugerie
18	(Riera 16); Caldas 7, 3; Altamira	Sol			LGM sensu stricto
17	Riera 17, 15, (12); Cueto de la Mina F (?); Caldas 4; Chufín; Aitzbitarte IV Lev. IV; Urtiaga F base; Amalda IV	Sol	12	19	Lascaux
16	Riera 14; Amalda IV; Canes 2A Riera 19; Castillo 8; Rascaño 5; Mirón 110, 111; Erralla V; Ekain VIIb, VIIf; Canes 2B	Sol Mag			DRYAS Ia
15	(Riera 15, 19); Tito Bustillo 1a/b; Lloseta A; Altamira; Juyo VI; Rascaño 4, 3; Mirón 15, 16, 116; Erralla V; Ekain VIIc, d; Abauntz *** E; Ojo Guareña ****	Mag	16	24	Angles
14	Paloma; Entrefoces B; Güelga; Tito Bustillo 1a/b, 1c2, 2, Sanctuary; Altamira; Juyo 7; Mirón 108, VIII; Pendo; Berroberría *** G; (Abauntz *** E); Buendía ****	Mag			DRYAS Ib Prebölling
13	Viña IV; Caldas III, VIII; Tito Bustillo 1c; Pendo; Juyo 4; Mirón (108), 115; (Ekain VIIf); Berroberría *** E Forcas * 14; Abauntz *** E2	Mag	22	29	DRYAS Ic Bölling
12	Caldas VII; Paloma; Riera 20, 21/23, 27 base; Tito Bustillo Sanctuary; Pendo; Castillo 6; Pila IV-2; Rascaño 2b; Mirón 12; Erralla III; Ekain VIb; Abauntz *** E1; Chaves * 2a, 2bs, 2bi; Forcas * 13	Mag			DRYAS II
11	Riera 26; Paloma; Cueto de la Mina B; Cualventi 5; Mirón 11.1, 102.1; Laminak II; Berroberría *** D lower; Palomera **** Azules 3e; Pila III-3; Antón Koba VIII; Zatoya *** II, BIII; (Abauntz *** E1); Peña del Diablo * 1, 2	Mag Az	20	28	Alleröd
10	Urtiaga D Lluera I; Riera 27 top; Azules 3d/e, (3e); Piélago 4, 1; Valle; Rascaño 1.2, 1.3; Perro 2a/b; Arenaza III; Urratxa; Laminak I; Portugain ***; Berroberría *** D	Mag Az			DRYAS III Preboreal
9	Azules 3d, 3a; Cierro; Oscura de Ania IIa; Peña Oviedo; Fragua 3; Arenaza IID; Santimamiñe 7 (?); Ekain II, IV; Abauntz *** D; Forcas * 7, 9 Mazaculos 3.3; Perro 3	Az As	18	24	
8	Calavera 1, 2; Urtiaga C; Zatoya *** Ib Riera 28, 29 lower; Penicial; Berroberría *** C, B base	Az As			Boreal

* Aragón, *** Navarra, **** Castilla-León

Sol = Solutrean, Mag = Magdalenian, Az = Azilian, As = Asturian & other Mesolithic

THE UPPER PALEOLITHIC SETTLEMENT OF NORTH-CENTRAL SPAIN*

*Vasco-Cantabria (Asturias, Cantabria, & Euskadi) plus Galicia, Castilla-León, Navarra & Aragón.