



A REVIEW OF THE MIDDLE TO UPPER PALEOLITHIC TRANSITION IN IBERIA.

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INTRODUCTION

Both traditional and recent "Out-of-Africa" scenarios for the re-placement of European Neandertals (*Homo sapiens neandertalensis*) by anatomically modern humans (*H.s.sapiens*, "AMH") assume that the latter were uniquely responsible for the earliest Aurignacian technology and argue for an East-to-West population movement beginning in the Near East and ending at the Atlantic shore (e.g., Obermaier 1924; Garrod 1936,1953; Breuil & Lantier 1959; Stringer 1988, 1989; Stringer & Stringer 1991). The "Daughters of Eve" hypothesis places the AMH "Eden" in Africa and the date of expulsion from the garden at between about 100-200,000 years ago, based on assumed mitochondrial DNA mutation rates (Grun & Andrews 1988, both with refs.; but see Templeton 1992; Hedges et al. 1992). Supposed confirmation of a migration of AMH out of Africa comes from the recent TL/ESR dating of associated materials from the Levantine caves of Qafzeh and Skhul to the period between about 80-120 ka bp (Valladas et al. 1988; Schwarcz et al. 1988; Stringer et al. 1989; Grun & Stringer 1991), although application of these related methods is still experimental and in need of independent validation.

In light of the genetic requirement argued by supporters of the "African Eve" hypothesis that existing European (and Asian) populations be eliminated by the advancing African humans, and given their idea (reminiscent of the prehistory of the 1920's)

that these Africans had "some degree of technological and/or cultural advantage" over the Neandertal natives (Stoneking & Cann 1989 : 28), it is important to call to mind the fact that the Qafzeh and Skhul fossils are associated with Mousterian artifacts (Bar-Yosef 1989). Were the African-descended AMH population so adaptively favored vis à vis Neandertals, it remains difficult to explain why/how the latter remained in or later invaded the Near East as recently as 60 ka bp, as shown by the dates at Kebara (Valladas et al. 1987; Grun & Stringer 1991).

It is relevant to the frequent equation of Africa-descended AMH with the traditional "Aurignacian" stone and bone technology (with art/ornamentation), to note that the "Levantine Aurignacian" *sensu stricto* began at only about 29 ka bp, although other lithic blade-rich industries appeared in the Levant by about 45 ka bp (Marks 1990). Any continued attempt to interpret "the Aurignacian" as an "ethnic" phenomenon linked to a new "race" spreading across Europe from the Near East, must confront this essential chronological fact, not to mention the serious problems involved in equating lithic and bone technological inventories with actual ethnically bounded socio-cultural entities (see Straus 1987; Clark & Lindly 1991).

Given the "Out-of Africa" hypothesis and the problems relating to the Near Eastern record mentioned above, this paper seeks to ask the simple question, "Why are there apparently no 'Daughters of Eve' in the Iberian Peninsula, separated from Africa by only 10-14 km at Gibraltar?"

All past and present Neandertal replacement scenarios have focused on the East. Although the Dardanelles and Bosphorus are narrower than the Straits of Gibraltar (and, unlike Gibraltar, went dry during some periods of glacial sea level regression [Klein

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1989: 204]), one can easily see Spain from Morocco. There are some archeological indications that the Iberian Peninsula was first populated by *Homo erectus* from NW Africa at least in Acheulean/late Lower or early Middle Pleistocene times (e.g., Freeman 1973; Alimen 1975; Bordes & Villa 1990). If possible by about 700 ka bp, why did not geographically expanding, adaptively "superior" African AMH not cross the Straits of Gibraltar around or before 40 ka bp? In light of the recent publication of 40 ka bp AMS and Th-U dates for the appearance of the Aurignacian in northern Spain (Bischoff et al. 1988, 1989; Cabrera & Bischoff 1989; Straus 1989,1990) and arguments for late-surviving ("Würm III" : <35 ka bp) Mousterian assemblages (and possibly Neandertals) in southern Spain (Vega-Toscano et al. 1988; Vega-Toscano 1990; Villaverde & Fumanal 1990), the time is right to review the Iberian data and to suggest some of its implications for the related debates over the Middle-to-Upper Paleolithic transition and the Neandertal replacement in Europe.

THE MIDDLE-TO-UPPER PALEOLITHIC TRANSITION IN NORTHERN IBERIA

Mousterian industries are rich in flake sidescrapers and denticulates, while Upper Paleolithic ones are characterized by a variety of new, specialized tools and weapon tips often made on stone blades, as well as of bone, antler and ivory. Two regions of northern Spain have provided archeological evidence for replacement of the Mousterian by the Upper Paleolithic : Catalonia (just south of the eastern Pyrenees) and Cantabria (the coastal strip along the western prolongation of the Pyrenees).

CANTABRIA

Two sites near the city of Santander, Cueva Morín and El Pendo, contain single Chatelperronian assemblages. These are in levels either directly atop a Mousterian sequence (Morín) or separated from it by two early Aurignacian levels (El Pendo). Besides Chatelperron knives and other backed blades, both assemblages contain substantial percentages of a variety of endscrapers and burins (mainly simple dihedral types) and huge quantities (40-70%) of denticulates, notches and sidescrapers (González Echegaray & Freeman 1971; González Echegaray 1980).

Charcoal from Morín Chatelperronian level 10 was dated by conventional radiocarbon (CvC14) to 35.9 ± 6.8 BP. (Stuckenrath 1978--SI-951A, corrected for Libby half-life). Directly overlying early Aurignacian level 9 is undated, but level 8a (with possible burials associated with early Aurignacian artifacts) is CvC14- dated on charcoal samples to about 27.6 ka bp (Stuckenrath 1978--SI-952,952A,956). There are no radiometric dates from El Pendo, but as at Morín, K.W.Butzer (1981) argues for an age right after the traditional French "Würm II/III" interstadial(38-34.5 ka bp), with the Chatelperronian and earliest Aurignacian of Cantabria having existed under the severe cold conditions of early Würm III and then during the more moderate Arcy oscillation (31.5-30 ka bp). A. Leroi-Gourhan (1971; Leroyer & Leroi-Gourhan 1983), based on palynology rather than on sedimentology, pushes the beginnings of the Morín Chatelperronian back into the "interstadial" (the Hengelo/Les Cottés period, [36-35 ka bp], in line with the central tendency of the radiocarbon date).

Bone from level Xb, overlying Chatelperronian knife-bearing level Xa, in Ekain Cave in Guipúzcoa (Basque Country) has been CvC14-dated to >30.6 ka bp (Altuna & Merino 1984--I-11056). A Chatelperronian-Aurignacian sequence of levels has recently been reported at Labeko Cave, also in Guipúzcoa (Sánchez Goñi 1991).

Cabrera and Bischoff (1989) have recently reported replicate accelerator radiocarbon (AMS) dates on charcoal from the lowest Aurignacian level (18) at the monumental cave site of El Castillo (Cantabria). The three dates are 40.0, 38.5 and 37.7 ka bp (all \pm ca. 2 ka)(AA-2405, 2406, 2407). This level, with classic early Aurignacian bone points, keeled and nosed endscrapers and retouched blades, is separated from the (as yet undated) uppermost Mousterian level by a 0.15-0.50 m-thick archeologically sterile silt and travertine layer (Cabrera 1984). The only other relevant dates from Cantabrian Spain are CvC14 on travertines overlying the Mousterian at Castillo (31.5 ± 1.4 ka bp [I-5149]) and at adjacent La Flecha Cave (31.6 ± 0.9 ka bp [SI-4460])(Butzer 1981). However, at the site of Cueva Millán in southern Burgos (on the Meseta of Old Castile, 140 km south of El Castillo), the topmost Mousterian level is

dated by a single C_vC₁₄ determination on bone to 37.6 ± 0.7 ka bp (GrN-11021) (Moure & Garcia-Soto 1980). Recent geomorphological and palynological studies, supported by a single C_vC₁₄ determination (on charcoal) of 41.4 ± 2.5 ka bp (UGRA-293), suggest that the Mousterian open-air site of Kurtzia near Bilbao (Vizcaya) dates to the Hengelo interstadial (Muñoz et al. 1990). All these indications suggest that the appearance of the technologies with blades, endscrapers, burins, backed knives and (sometimes) bone points occurred in north-central Spain at sometime between about 40-36,000 years ago. However, Mousterian-type tools continued to be made and used in very significant quantities throughout the entire early Upper Paleolithic (see Bernaldo de Quirós 1982; Straus & Heller 1988; Straus 1990).

On the other hand, we have essentially no evidence for the replacement of Neandertals by AMH in this region. Isolated Neandertal remains have been found at Lezetxiki and Axlor in Guipúzcoa and at Los Casares (Guadalajara). There is no strong evidence for the age of any of these scraps, although (unlikely) claims have been made for great age (i.e., pre-Last Glacial) of Lezetxiki by Yokoyama, on the basis of uranium-series dating of bones (Altuna 1990). The only early AMH remains from Cantabria were a child mandible, an adult molar and 14 small bone fragments from Aurignacian Delta (=Level 18) at El Castillo and an adult skullcap from the so called (but totally undated) "Aurignacian" (*sensu lato*) stratum in nearby, long-since destroyed Camargo Cave (Obermaier 1924; Cabrera 1984). All these remains have been lost and were never formally published, although a photo of the calotte (Obermaier 1924 : Plate 17) is clearly of an anatomically modern skull. It would be very significant if the Castillo jaw were to be located so that a taxonomic diagnosis could be done--difficult though that might be, given its juvenile status. In short, we know nothing of the replacement of the Neanderthals in north-central Spain. Recent TL-dating of the Chatelperronian material associated with the Neandertal at Saint-Césaire in SW France to 36.3 ± 2.7 ka bp (Mercier et al. 1991) certainly makes a late survival of Neandertals in adjacent Cantabrian Spain possible. The identity of the makers of the early Aurignacian in SW France is unknown; there are no well-dated hominid

remains of any subspecies clearly associated with this period (Gambier 1989).

CATALONIA

No certain Chatelperronian sites have been found in Catalonia, but two sites (Abric Romaní in Barcelona Prov. and L'Abreda in Girona Prov.) have recently provided chronometric evidence for the replacement of Mousterian technology by Aurignacian technology. (Isolated Chatelperron points have been found in the basal "Aurignacian" levels at L'Abreda and nearby Reclau Viver, associated with both supposedly characteristic Aurignacian and Mousterian artifacts [Canal & Carbonell 1989:324,337].)

Neandertals were present in Catalonia at least until ca. 45 ± 4 ka bp (average of 4 U-series dates on travertine adhering to the Banyoles mandible from Girona--Julià & Bischoff 1991). There are no finds of AMH in Catalonia that are relevant to the question of the transition.

Romaní is one of a series of rockshelters formed in the cliff of the springfed travertine plateau of Capellades along the Rio Anoia. Teeth attributed to Neandertal were found in association with Mousterian artifacts at the nearby site of Abric Agut (Lumley 1973). There are at least 12.5 m of Mousterian levels interstratified with travertine deposits in Abric Romaní (Mora et al. 1988). These were directly overlain by about 3 m of Upper Paleolithic levels, the lowest of which was classified as "Aurignacian", with blades, bladelets, burins, endscrapers, etc. (Laplace 1962; de Lumley & Ripoll 1962; Vaquero n.d.). Only small remnants of this Aurignacian remained to be excavated in recent work directed by E. Carbonell. Thirty-eight high-quality uranium-series dates on samples of the unusual fast-forming moss-generated travertine were reported by J. Bischoff et al. (1988). The dates span the entire thickness of the exposed Mousterian sequence and are stratigraphically coherent, ranging from ca. 60 ka bp at the bottom to ca. 40 ka bp at the top. All indications are that the Romaní travertines are a closed system from the point of view of uranium fixation. A sample from travertine right above the oldest Aurignacian layer

(1.0.1) was U-series dated 4 times, producing corrected ages between 42.8-39.2 (all ± 0.7 -1.5) ka bp.

Three unpublished AMS-C14 dates run on charcoal at the University of Arizona from the basal Aurignacian deposit itself at Romaní have yielded results ranging between 37.3-36.6 ka bp (although two others from the same bed date at 23.2 & 28.4 ka bp, suggesting contamination by younger organics which had become carbonized). Two unpublished US Geological Survey CvC14 dates of 37 & 36 ka bp on travertine immediately below and above this level, respectively, confirm the three older AMS-C14 dates. These re-sults show that little reliability can be placed on single dates. Calibration of the radiocarbon dates by high-precision uranium-series dating of the travertines associated with the latest Mousterian and earliest Aurignacian at Romaní is not yet completed. The U-series dates (including new unpublished ones) suggest that the technological transition took place at Romaní ca. 40 ka bp.

L'Arbreda Cave contains archeological deposits that are at least 10 m. deep, to date the basal 3 m of which pertain to the Mousterian (Soler & Maroto 1987a). The Mousterian sequence is directly overlain by an early Aurignacian deposit with retouched blades, Dufour bladelets, keeled and nosed endscrapers, burins and split-base bone points (Soler & Maroto 1987b). Charcoal samples from the top of the Mousterian sequence and from the base of the Aurignacian were dated by AMS-C14. The average of two statistically identical determinations from the Mousterian is 40.4 ± 1.4 ka bp (discounting one anomalous date of 34.1 ± 0.75 ka bp) and the average of 4 statistically identical dates from the Aurignacian is 38.5 ± 1.0 ka bp (Bischoff et al. 1989). (An earlier CvC14 date of 25.8 ± 0.4 ka bp on charcoal from the early Aurignacian is manifestly too young in view of the stratigraphic position and artifact content of the level [Delibrias et al. 1987].) In addition there is a CvC14 date of 36.4 ± 1.8 ka bp (CSIC-197) on bone from the middle one of 3 Mousterian levels in nearby Els Ermitons Cave (Girona Prov.) (Canal & Carbonell 1989).

All these data suggest that Aurignacian technology replaced Mousterian technology in Catalonia around 38-39,000 years

ago, at about the same time that the technological transition was occurring in Cantabria. As at El Castillo, it is the reproducibility and consistency of multiple dates on coeval samples both at Romaní and L'Arbreda that lend credibility to this early dating for the Middle-Upper Paleolithic transition in northern Spain. As in Cantabria, we have no evidence as to which hominid(s) was(were) the maker(s) of the Aurignacian artifacts, but unlike Cantabria, there is no clear indication of a separate Chatelperronian industry (a possible MP-UP technological "hybrid") in Catalonia.

The new dates for the appearance of the so called Aurignacian technology in northern Spain are far older than any from the rest of Western Europe including SW Germany. They are much older than any dates for the Chatelperronian of France or for the Uluzzian (the Italian stratigraphic and typological equivalent of the Chatelperronian) (Harrold 1989; Sims 1991 with refs.). They are about the same as the CvC14 dates for the Szeletian and Bohunician (Mousterian-Upper Paleolithic "hybrid" industries) of Hungary and Czechoslovakia (i.e., 38-42 ka bp)(Allsworth-Jones 1986; Svoboda & Siman 1989). While the northern Spanish Aurignacian dates are older than several early Aurignacian CvC14 determinations from Eastern and Central Europe (e.g., Velika Pecina, Pesko and Krems), they are about the same or perhaps somewhat younger than other early Aurignacian dates from Samuilica (42.8 ± 1.3 ka bp) and Bacho Kiro in Bulgaria (a single infinite date of >43 ka bp), Istállösko level 9 in Hungary (44.3 ± 1.9 and 39.7 ± 0.9 ka bp) and Willendorf level 2 in Lower Austria ($39.5 + 1.55/-1.2$ ka bp and $44.7+3.7/-2.5$ ka bp) (Allsworth-Jones 1986; Otte 1990 & pers. comm; Svoboda & Siman 1989). All these sites should be redated with multiple determinations, to obtain the best possible estimates of age. Single dates published as "finite", but that are older than c.30ka bp, should probably be considered as minima. At most, there would seem to be a difference of ca. 5 ka between the oldest Aurignacian dates in Central and Eastern Europe (regions between which there is no clear temporal cline) and those of northern Spain. Even this relatively short amount of time for the supposed "spread" of Aurignacian people or ideas across ca. 2300 km from SE to SW Europe may prove illusory.

THE LATE MOUSTERIAN OF SOUTHERN IBERIA

It has long been argued that Upper Paleolithic technologies were late in appearing and that the Mousterian (and indeed Neandertal) survived late in southeastern Spain (e.g., Garcia Sánchez 1960; Cacho 1980, 1982, all with refs.). This hypothesis has recently received considerable attention (Vega-Toscano et al. 1988; Vega-Toscano 1990; Villaverde & Fumanal 1990) and would seem to fly in the face of the hypothesis that anatomically modern humans and their Upper Paleolithic culture came into Europe from Africa. The regions of Valencia and Andalucía have long been archeologically investigated and harbor large numbers of cave sites with long stratigraphic sequences. Despite this wealth of data, there is an absence of evidence for early Aurignacian (or other blade-rich) assemblages in southern Spain (or in Portugal). As shown by Cacho (1980, 1982), there are (apart from some old, undated, problematical collections) no EUP assemblages in SE Spain proven to be earlier than the Aurignacian at Les Mallaetes (southern Valencia Prov.). Level XII at this site, containing a keeled endscraper, has been CvC14-dated on charcoal to 29.7 ± 0.56 ka bp (KN-I/926). Overlying Level XI yielded a flat-section sagaie, a notched bone awl and a small number of retouched blades and flakes---but no backed pieces (Jordá & Fortea 1976). Stratum D at Gorham's Cave in Gibraltar is traditionally assigned to the Aurignacian, although its collections are also very small and difficult to classify (Cacho 1982). It is CvC14-dated to 27.9 ± 0.3 and 28.7 ± 0.2 ka bp (GrN-1363 & Moure 1978). This is a review of the late Mousterian in S Iberia.

PORTUGAL

At present, the oldest radiocarbon dates associated with clearly defined Upper Paleolithic materials in Portugal are of Last Glacial Maximum age (with Solutrean artifacts), not much older than 20 ka bp (Zilhão 1990). There is an AMS-C14 date of 27.6 ± 0.6 ka bp (OxA-1941) on a bone from culturally undefined Level K in Caldeirão Cave (Estremadura) (Zilhão 1990). The apparent lack of >30 ka bp EUP assemblages in Portugal is the case despite the existence of

fairly abundant Mousterian manifestations in central and southern Portugal.

Mousterian levels at three sites in central Portugal have recently been dated by Cv C14 : Gruta Nova da Columbeira Level 20 (base of the Mousterian sequence): 28.9 ± 0.95 ka bp (Gif-2704) (on "carbonaceous earth"); Pedreira das Salemas Lower Bed: $29.9+1.1/-1.0$ ka bp (ICEN-366) (on bone collagen); Gruta da Figueira Brava Lower Bed: 30.9 ± 0.7 ka bp (ICEN-387) and 30.05 ± 0.55 ka bp (ICEN-386) (Delibrias et al. 1986; Antunes et al. 1989). There are even younger (problematical) dates for Mousterian levels at the first two sites. The Figueira Brava dates are on marine shell (Patella sp.), but the oceanic carbon reservoir effect was taken into consideration by A. Monge Soares, a specialist in shell dating.

Despite obvious questions concerning these dates, confirmation of an apparently surprisingly late survival of Mousterian technology in Portugal (and possibly of Neandertal anatomy---since a molar attributed to this taxon was found at Columbeira [Veiga & Leitão 1984]) may soon be available. Uranium-series dates in the same time range as these CvC14 dates have recently been obtained on tooth enamel from a couple of other Mousterian sites in Central Portugal (A. Marks, pers. comm.).

Recently, J. Zilhão (1990) has published two Cv C14 dates on Helix (landsnail) shells for an archeologically sterile layer between apparent Mousterian and Solutrean levels in Lapa dos Furos (Estremadura). These dates, the older of which the laboratory considers to be of good quality, are 30.6 ± 0.76 and $34.6+1.16/-1.0$ ka bp (ICEN-472 & 473). There are no early anatomically modern human remains in Portugal, although there is, in addition to the Neandertal tooth in Gruta Nova da Columbeira, another isolated possible Neandertal tooth at Salemas (in the cave adjacent to the quarry [Pedreira])---also in Portuguese Estremadura (Veiga & Leitão 1984).

The Algarve (southernmost Portugal) is at present totally lacking in EUP evidence, despite its proximity to Africa (Straus 1988).

VALENCIA

The most extensive (albeit still inadequate) data on the question of the MP-UP and Neandertal-AMH transitions in southern Iberia come from southeastern Spain, specifically southern Valencia and Andalucia. The key sequence in Valencia is Cova Negra (Xátiva). Cova Negra has been the subject of several excavations and many publications, most recently those of Perez (1977), Villaverde (1984), Fumanal (1986), Arsuaga et al. (1989) and Villaverde & Fumanal (1990). The last of these (supplemented by a personal communication from V. Villaverde) presents a synthesis of present thinking on the chronostratigraphy of the 6 m sequence of deposits in this cave.

All the *in situ* archeological materials in Cova Negra are classified as Mousterian; earlier reports of possible Aurignacian materials at the top of the sequence are apparently baseless (Cacho 1982; Villaverde 1984). (There may have been a minor LUP occupation of the cave, however.). The earliest sedimentary deposits in the cave are attributed on geological grounds to the Last Interglacial (Oxygen Isotope Stage 5e). These are followed by a series of cold and temperate phases. These are marked, despite the southerly latitude. Of relevance here are Levels II-IV, all with Mousterian tools and no blades (V. Villaverde, pers. comm.). Level IV is interpreted as a paleosol (with granulometry dominated by clays, evidence of oxidization and no *éboulis*). Level III, in contrast, is rich in *éboulis*—presumed evidence of frost-shattering of the cave ceiling and walls. Carbonates precipitated in Level V, from water percolated from above, have been $CvC14$ -dated to 28.9 ± 5.6 , >28.7 and >28.7 ka bp (C-847,848 & 849) (Villaverde & Fumanal 1990; Villaverde pers. comm.). Clearly these determinations do not date Level V per se, but they may well pertain to the temperate, humid conditions of Level IV. The Level IV paleosol is attributed to the Würm II/III interstadial (now considered to be the unique "Würm Interstadial" and situated within the second half of Oxygen Isotope Stage 3, ca. 38-34.5 ka bp [Laville et al. 1983]).

If the chrono-climatic interpretation of the sedimentary alternations of the whole Cova Negra stratigraphic sequence are correct

and if the Level V carbonate precipitate dates are correct, then Level IV may well have been formed during the Würm Interstadial and the *éboulis* of Level III may well have been deposited during the initial cold phase of the traditional Würm III (late Oxygen Isotope Stage 3). This would make the Charentian-like Mousterian assemblages of Levels III, II and I more recent than ca. 34.5 ka bp—clearly more recent (even much more recent) than the Chatelperronian and early Aurignacian assemblages of northern Spain and France. Almost all the artifacts are made on flints (generally of good quality). Thus it is not the case that the non-Upper Paleolithic aspect of the industry is due to manufacture on coarse-grain or otherwise poor-quality rock—which is often the case with some Cantabrian assemblages of Upper Paleolithic age.

Unfortunately the Neandertal remains from Cova Negra came from much lower, earlier layers: the parietal from the middle part of the stratigraphy ("Würm II"); the juvenile mandible and molar from the lower-middle part ("late Würm I") (Arsuaga et al. 1989). Thus this site sheds light on the possible late survival of Middle Paleolithic technology in southern Iberian, but not on that of the Neandertal anatomy. Current research in Cova Negra, directed by Villaverde, may further clarify the crucial chronostratigraphic questions.

Another Valencian site, Cova Beneito, located near Alcoy in Alicante Prov. about 30 km south of Cova Negra, provides some radiocarbon evidence for the age of the late Mousterian in southern Iberia (Alicante is now part of the Autonomous Region of Valencia.). Beneito has a long sequence (almost 5m) of Bronze Age, Upper Paleolithic and Mousterian deposits (Iturbe & Cortell 1987; Barton 1988). Located not far south of Les Mallaetes, Beneito has levels assigned to the Aurignacian with bone sagaies, perforated shells and teeth, Dufour bladelets and many burins. These layers are undated, but overlie a pair of lenses with scarce cultural remains of Upper Paleolithic aspect, the lower of which is AMS-C14 dated to 33.9 ± 1.1 ka bp (AA-1388). This lens yielded a bladelet with semi-abrupt retouch, while the upper lens produced a keeled & Cortell 1987,1982). According to Barton (1988), the basal deposit at Beneito consists of 50 cm of cemented coarse gravels

with Mousterian artifacts (of "Charentian" facies according to Iturbe & Cortell [1987]). It is the top of the cemented gravels that is AMS-C14 dated on a single charcoal sample to 38.8 ± 1.9 ka bp (AA-1387). This stratum is overlain by 60 cm of blocks and coarse gravels, the bottom 25 cm of which still contain Mousterian tools. However, naturally backed knives are more abundant and a perforated lynx canine and two more bladelet fragments with semi-abrupt retouch were found in the uppermost Mousterian level (Iturbe & Cortell 1982 : 43). The possibility of downward migration of these latter 3 small artifacts certainly should be entertained. The single 33.9 ka bp date (on charcoal) comes from the upper 35 cm of the block-gravel unit, itself overlain by fine calcareous sand attributed to the Arcy oscillation (with the "Aurignacian" materials) (Barton 1988).

The important fact is that Mousterian occupations continued well after the period of deposition of the basal gravels and well after the 38.8 ka bp AMS-C14 date. The 33.9 ka bp determination may provide a minimum date for the very earliest traces of Upper Paleolithic occupation (only 1 [possibly intrusive] bladelet) at Beneito (and in all of SE Iberia) : 6000 years later than the earliest (and far more convincing) Upper Paleolithic assemblages in Cantabria and Catalonia.

ANDALUSIA

Two cave sites in eastern Andalusia provide critical (albeit unconfirmed) evidence suggesting the late survival of Mousterian technology and Neandertal anatomy in southern Spain : Zafarraya and especially Carihuëla. Limited supporting evidence comes from Devil's Tower and Gorham's Caves in Gibraltar.

Carihuëla, with a composite stratigraphic sequence totalling over 6 m in depth---nearly all of which has Mousterian artifacts ---is located 40 km NE of the city of Granada in the Sierra Harana at 1020 m altitude. This large, complex cave was first "excavated" by the Swiss archeologist J-C. Spahni in the mid-1950's, when remains of robust AMH were found supposedly associated with Mousterian artifacts in Spahni's Strata 2 & 3 (=present Units III & upper IVa) and remains of Neandertals (2 parietal fragments

and a frontal) were found also in association with Mousterian artifacts in Spahni's Strata 6, 7 & 9 (present Units V, VI & VIII)(Vega Toscano 1988 with refs.). Further hominid remains (mostly unpublished, some now apparently lost) were found during the course of the essentially unpublished excavations of H.T. Irwin and R.Fryxell in 1969-1971 (see extensive reconstruction of this work from excavator notes in Vega Toscano 1988). L.G. Vega Toscano has subsequently conducted research in Carihuëla and has synthesized much of the archeological, paleoenvironmental and chronostratigraphic information from this important site (Vega Toscano 1988, 1990; Vega Toscano et al. 1988). The significance of his meticulous research is that he has studied the artifact assemblages, managed to place the hominid fossils in a unified stratigraphic scheme for the cave (despite poor, confused provenience data from the early excavations) and proposed a coherent, synthetic chronostratigraphic scheme correlating the main (sedimentologically quite distinct) depositional units with major marine and terrestrial Upper Pleistocene subdivisions. The validity of this scheme relies on an assumption that sedimentological variations in the sequence are not solely the results of local depositional and weathering processes. The available published analyses of microfaunas from Carihuëla (Ruiz & Garcia 1977; Ruiz et al. 1986) provide only scanty chronological interpretations, notably a "Würm II" attribution for unspecified levels containing *Microtus nivalis*.

In the archeological arena, Vega Toscano concludes that all the assemblages in question are typologically and technologically "Mousterian" (generally sidescraper-rich and made on good quality local flints and chalcedonies). There are no traces of "technological" change suggestive of an Upper Paleolithic---even in the levels of the uppermost Mousterian unit (IV). Despite the lack of Upper Paleolithic tools, this unit and the one below it (V) are assigned to early Oxygen Isotope Stage 2 and late O.I.Stage 3 ("Würm III"). The argument for this late assignment (Vega Toscano 1988; Vega Toscano et al. 1988) goes as follows :

The lowest deposit (Unit XII) yet attained in Carihuëla (bedrock has not yet

been reached) consists of organic-rich clay with flowstones and was laid down under very temperate, humid conditions (based on sedimentological and microfaunal analyses) attributed to O.I. Stage 5e (the Last or Eem Interglacial) or possibly 5c. Unit XI (composed of 13 levels showing evidence of slow climatic deterioration) is insecurely attributed to the early Last Glacial (early Würm I, O.I. Stages 5d-a). Unit X sediments and rodents testify to a short, intense cold but relatively humid period. It and Unit IX (slightly more temperate) are assigned to late Würm I (O.I. Stage 4). Unit VIII was formed under more temperate, more humid conditions attributed to the Würm I/II "interstadial", correlated with either early O.I. Stage 3 or late 4 (Vega Toscano 1990). Extremely cold conditions reappeared during the formation of Unit VII (with major rockfalls due to frost-shattering and the possible presence of lemming). This pleniglacial period is attributed to Würm II (late O.I. Stage 4/early 3). Then there was an episode of erosion followed by the deposition of Unit VI under conditions of continued high humidity and no gelifraction until the very end of this period, equated with the Würm II/III interstadial (now recognized in France as the sole full-fledged interstadial within the Last Glacial). This episode occurred about mid-way through O.I. Stage 3.

Cold, dry conditions returned to Carihuëla in Unit V, which yielded the uppermost of the Neandertal parietals. Coming after the Würm II/III interstadial, this unit and IV (somewhat more temperate and humid) are assigned to Würm III (late O.I. Stage 3 or early 2). Generally colder conditions, but with short humid, slightly more temperate oscillations, were reestablished in Unit III times---attributed tentatively by Vega Toscano et al. (1988) to Würm IV (O.I. Stage 2). Unit IVa (the top of IV in the cave interior) yielded a tibia of AMH in apparent association with Mousterian tools. Other AMH remains were found in Unit III by both Spahni and Irwin (though the femur found by the latter has apparently never been described and is missing). But the Mousterian tools could be the result of colluvial deposition from the cave mouth (Vega Toscano 1988). This problem remains to be solved.

What seems likely, however, is the presence of Neandertal remains and Mousterian tools (with no traces of Upper Paleolithic technology) in levels formed under temperate, humid conditions ("Würm Interstadial") and under the succeeding cold, drier conditions (early "Würm III"). What is missing is chronometric dating of this sequence at Carihuëla. Early attempts at TL-dating of burnt flints (Goksu et al. 1974) produced dates of 48, 46, 39, 31-35, 32 and 28 ka bp for the Mousterian deposits from Irwin's excavations. Unfortunately the stratigraphic proveniences of these determinations are unclear, but the dates do not contradict the possibility of a late Neandertal population with purely Mousterian technology in this site. Radiometric dating of Carihuëla should be a top-priority research goal---along with detailed study of all the fossil hominid remains from this site.

Recently Neandertal remains and Mousterian artifacts have been discovered in the cave of El Boquete de Zafarraya in Málaga, right on the border with Granada Province. Zafarraya is located at 1,100 m above sea level, in a pass leading from the Mediterranean coast through the Sierra de Alhama. Large-scale Franco-Hispanic excavations have just begun under the direction of J.-J. Hublin and C. Barroso (n.d. & Hublin pers. comm.). The only publications so far are preliminary notes on the stratigraphy and on the initial discoveries (Barroso et al. 1983, 1984; Garcia Sánchez 1986; Medina et al. 1986). Preliminarily, five strata (A-E) with Mousterian artifacts were defined; the base of the deposit has yet to be attained and there are no Upper Paleolithic levels. The artifacts are made almost exclusively of a variety of flints. The assemblages are characterized as "Typical Mousterian" with relatively few sidescrapers and high Levallois indices (Medina et al. 1986). There are a few backed pieces (Hublin & Barroso n.d.). As at Cova Negra and Carihuëla, the existence of simple, "Mousterian" tools is not the result of there locally being only scarce raw materials of good quality. To the contrary, Upper Paleolithic blades and tools appear early in northern Spain despite the local scarcity of large, good-quality flint nodules.

The Neandertal remains from Zafarraya (so far) consist of a femur from Stratum E and a magnificent complete mandible with teeth from overlying Stratum D (García Sánchez 1986). There is no doubt about the Neandertal attribution of these remains---or about their provenience. Their dating, however, is only very provisional at this time.

The current chronological hypothesis for Zafarraya is based on rodent remains and comparisons with the relatively nearby site of Carihuëla. The absence of *Allocricetus bursae* and the presence of *Microtus arvalis* in Zafarraya are said to suggest that these deposits are younger than the Würm II levels at Carihuëla, where *A.bursae* is still present. *M. arvalis* disappeared only later in Andalusia (Barroso et al. 1983,1984; Medina et al. 1986). *A.bursae* made its last appearance at Carihuëla in Unit VI, which is assigned to the Würm II/III Interstadial (Vega Toscano 1988). Hence, it is argued, the Zafarraya Neandertals and Mousterian date to Würm III (Vega Toscano et al. 1988; Vega Toscano 1990; Hublin & Barroso n.d.). The microfaunal comparison between Zafarraya & Carihuëla, if confirmed, would seem to be ecologically reasonable, since both sites, located at the same altitude in mountainous terrain within 85 km of each other, are in the Mediterranean upland zone of SE Iberia. However the regional validity of the rodent chronology for SE Iberia needs to be more firmly established and independently verified by radiometric dating. The present research at Zafarraya, with AMS-C14 dating being conducted by H.Valladas, should provide a critical test of the hypothesis of a late-surviving Neandertal population using only Mousterian tools in Andalusia (J.J. Hublin, pers.comm.).

The only other chronological indicators available from southern Iberia are not highly relevant. They are C_vC14 dates from two cave sites in Gibraltar : Devil's Tower and Gorham's Cave. In the former, a single sample from the third level below the top of the Mousterian sequence was dated to >30 ka bp (GrN-2488) and at the latter the topmost Mousterian level (G) was dated to 47.7 ± 1.5, 49.2 ± 3.2 and >47 ka bp (GrN-1473, 1556 & 1678) (all dates on charcoal except GrN-1678, which is on "humus") (Bernaldo de Quirós & Moure 1978).

The overall current picture suggests that in southern Iberia 1.) there is no very early (i.e., >30-34 ka bp) Upper Paleolithic; 2.) there is no evidence for early anatomically modern humans in 3.) there is some evidence that Mousterian technology continued to be made (apparently exclusively) well after the Würm Interstadial (i.e., after the period 38-34.5 ka bp) into "Würm III" (late O.I.Stage 3; 4.) there is some evidence at two sites (Carihuëla and Zafarraya) that Neandertals may also have survived into Würm III in Andalusia, despite the physical proximity of this region to Africa and the supposed homeland of all anatomically modern humans. However, much more radiometric dating is needed, especially in S. Iberia.

DISCUSSION

The evidence for the period of the so-called Middle-to-Upper Paleolithic and Neandertal-to-AMH transitions is contradictory in the Iberian Peninsula. For one thing, despite a century and a quarter of often intensive archeological and paleontological research, no remains of AMH attributable to the period between about 40-30 ka bp (let alone earlier) have been found in Spain or Portugal. Indeed for all of Europe, well-dated remains of AMH are at best rare until about 30 ka bp. If European populations of AMH were derived from immigrants out of Africa, where better to look for early evidence of such migrations than in Iberia, separated from Morocco by only 8 km of water under conditions of glacial sea-level regression? After all, hominids had crossed several water gaps of 30-90 km in getting to Australia-New Guinea ("Sahul")---a landmass which they could not see from the glacial peninsula and islands of Indonesia ("Sunda")---some 40-50 ka bp (Klein 1989). According to Shackleton et al. (1984), under glacial conditions, "(b)ecause...temperature and salinity differed much less between the Atlantic and the western Mediterranean than they do now, there is no reason to assume that surface currents were enhanced to a degree that rendered this waterway (the Straits of Gibraltar) a serious obstacle, even for very small craft." Yet apparently AMH did not cross in early or mid Upper Pleistocene times.

The glaring absence of AMH remains in Iberia, even well after the supposed 100-200 ka bp evolution of the African Eve, would seem

to cast doubt on the probability of the Out-of-Africa scenario, although the archeological record of human occupation of the Rif 40-30 ka bp is currently not very clear. Even a possible absence of AMH populations in the Rif at this time would call into question the putative adaptive superiority of the African emigrants.

With the end of pure Mousterian technologies, the appearance of stone prismatic blade and bladelet tools, specialized endscrapers, burins, along with complex fashioned bone/antler/tooth artifacts in northern Spain by nearly 40 ka bp poses a significant archeological problem. Were such developments simply the result of human migrations/expansion or the diffusion of technological designs from the east? Or might all or part of the western Aurignacian phenomenon be a home-grown product of technological convergence? The facts that "the Aurignacian" is manifestly an archeological construct and that so-called "Aurignacian" assemblages in the Near East are younger than their European counterparts, should lead to more serious consideration of the convergence hypothesis. Archeologist-perceived typological similarities do not ethnic or cultural identity make.

Even if blades, thick endscrapers, nibbled bladelets and bone points were somehow ethnically meaningful, the evidence for their antecedence in eastern and central Europe vis à vis northern Iberia is not at all evident in light of the dates from Cantabria and Catalonia. Nor is their authorship at all clear. Blade technology having long been an important element of Middle and even Lower Paleolithic industries in Europe (and elsewhere) (see Conard 1991 with refs.), it would not be surprising if western Europeans (including Neandertals---such as the Chatelperronian toolmaker of Saint-Césaire) had quite independently pursued further development of such blank manufacturing and invented new tool types also presaged in many Mousterian assemblages (notably the so-called Mousterian of Acheulean Tradition [Bordes 1972]).

Finally, although the evidence still leaves much to be desired by way of absolute dating, it would appear that southern Iberia---with Last Glacial-age environments very different from those of the north---was a

distinct cultural (and perhaps hominid biogeographic) province. Pure Mousterian technologies seem to have persisted here long after the development of Aurignacian ones not only in eastern and central Europe, but also in northern Iberia. And the Neandertal anatomy seems to have survived at least in Andalusia perhaps at least until 30 ka bp---despite the proximity of Africa and the supposed source of anatomically modern *Homo sapiens sapiens*. In this regard it is worth noting that Simmons and Smith (1991) have recently shown strong morphological similarities between the Gibraltar (Forbes Quarry) Neandertal and the Djebel Irhoud fossils in Morocco. Some attributes of the Djebel Irhoud crania (e.g., occipital bunning) might even have a European origin, while other traits are more widely shared---some with sub-Saharan fossils. Leaving aside anatomical and chronological problems with Irhoud (J-J.Hublin, pers.comm.), it is worthwhile noting that they argue for broad similarities among the hominids of the circum-Mediterranean region in the early Upper Pleistocene and suggest that "modern humans in (this) region are derived from this web of interconnecting lineages rather than from a single African strand" (Simmons & Smith 1991 : 626).

All the questions posed by this brief review need to be conclusively answered before we accept the new invasionist hypothesis of AMH sweeping out of Africa, through the Near East (only---but not across the Straits of Gibraltar) and westward across Europe, armed with Upper Paleolithic tools (including weapons) with which to replace the longstanding, adaptively successful European Neandertal populations. The suspicion of at least one of the present authors (LGS) is that the nature of "the Transition" was much more complex and involved a mosaic of different regional trajectories of change in both the cultural and anatomical domains. Such a view is strongly suggested by the fact that even within a sub-continental area as small as the Iberian Peninsula, a wide variety and a broad timing of developments are demonstrated to have characterized the so-called Middle-to-Upper Paleolithic transition. Archeological, chronostratigraphic and paleontological research in the next few years in Iberia are likely to shed considerable light on the complex situation that obtained during the

middle of the Last Glacial on this peninsula--
so close to Africa and yet so far.

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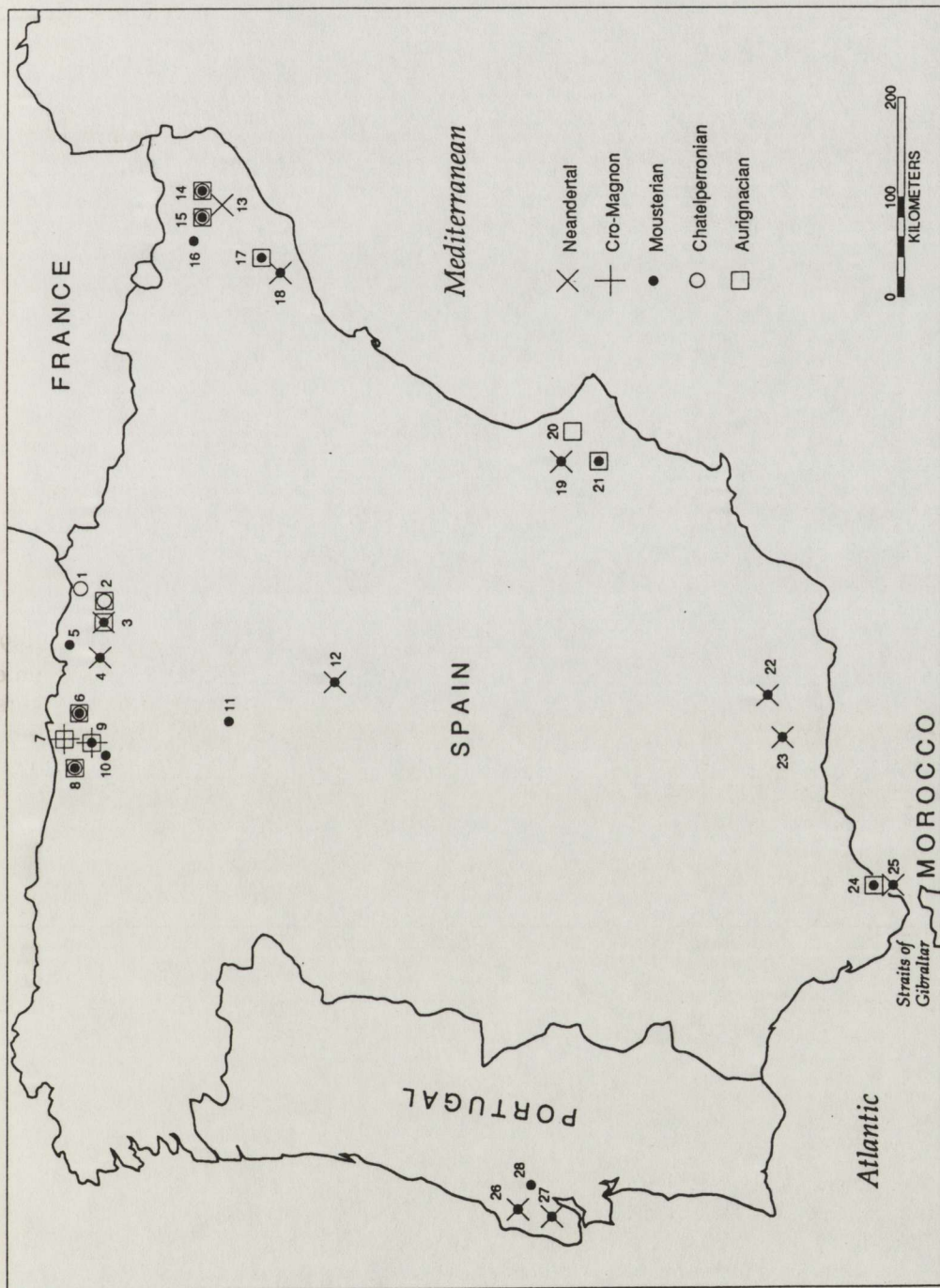
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Selected sites on the Iberian Peninsula with Neandertal or Cro-Magnon remains, Mousterian, Chatelperronian or Aurignacian artifacts.



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| 1. Ekain | 15. Reclau Viver | 22. Carhuëla |
| 2. Labeko | 16. Els Ermitons | 23. Zafarraya |
| 3. Lezetxiki | 17. Romani | 24. Gorham's Cave |
| 4. Axlor | 18. Agut | 25. Deveil's Tower |
| 5. Kurtzia | 19. Cova Negra | 26. Comumbeira |
| 6. Morín | 20. Les Mallaetes | 27. Salemas |
| 7. Camargo | 21. Beneito | 28. Figueria Brava |