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Africa and Iberia in the Pleistocene

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Abstract

The Strait of Gibraltar would logically seem to be a major point of contact between Africa and Europe. Yet, controversy about possible trans-Gibraltar human movements in the Lower, Middle and even Upper Pleistocene has reigned for over a century and continues to do so. Imbricated with biogeographical arguments about faunal transfers and the creation of hominid niches in Iberia, the problem of the relationships between Africa and Iberia is one of the knottiest in Stone Age prehistory. Did early *Homo* (*H. ergaster*, *erectus*, or "*antecessor*") cross into Iberia from the Maghreb, as has long been argued on the basis of general archeological similarities? This old hypothesis, still unproven, is made somewhat more plausible by the re-dating of the site of Ain Hanech in Algeria and, in particular, by the spectacular Lower Pleistocene fossil and artifactual discoveries at Atapuerca in north-central Spain and, less securely, in the Guadix-Baza Basin of Granada. Middle Pleistocene contacts remain problematic, with direct peopling of Iberia from northwest Africa during the mid-Upper Pleistocene seeming (ironically) to be out of the question, as southern Spain and Portugal were one of the last refugia of Neanderthals using Mousterian technology, despite proximity to the putative source of anatomical modernity and cultural superiority. Similarly, despite years of speculation on a migrationist cause for the similarity between tanged points in the Aterian of North Africa and in the Solutrean of Mediterranean Spain and Portugal, the chronological and archeological data solidly disprove this seductive hypothesis. For the Upper Pleistocene, it is only in the terminal Paleolithic that, with clear evidence of marine fishing and probable navigation, a credible case can be made for trans-Gibraltar human contacts. © 2001 Elsevier Science Ltd and INQUA. All rights reserved.

1. Introduction

The question of possible human contacts or even movements between Africa and the Iberian Peninsula during the Pleistocene has been debated periodically for decades (e.g. Souville, 1983). Perhaps, the most prominent supporters of the idea of Paleolithic crossings of the Strait of Gibraltar were Pallary (1909) for the "Ibero-Maurusian", Obermaier (1924) for the "Capsio-Tardenoisian", Pericot (1955) for the Aterian/Solutrean, and Alimen (1975) for the Acheulean. The question concerned Vaufrey as early as the 1920s (e.g. 1929) and remains a "hot" issue today (e.g. Martinet and Searight, 1994; Ramos, 1998). Extremes in the debate have ranged from the postulation of an isthmus during certain early Pleistocene glacial periods (in reality something which has not occurred since the Messinian "crisis" in the late Miocene, ca. 5 Ma) to the common assertion that the currents in the Strait of Gibraltar are too strong to contemplate successful human crossings in the Stone Age.

My particular interest in the subject concerns the paradoxical existence of the apparently last refugium of Neanderthals (with Mousterian culture) in precisely that region of Europe — southern Iberia — which is closest to Africa, the source location of putative adaptively superior *Homo sapiens sapiens*. If the 10–14 km-wide Strait of Gibraltar did present an insurmountable barrier ca. 40–30 ka, how much of a selective advantage could African "Eve" have had over European Neanderthal? This, among others, is one of the questions I would like to explore here. I am troubled by the "insurmountability" of the problem of crossing the Strait for several reasons.

The "Gibraltar problem" has recently been highlighted in the Spanish news media by two contrasting phenomena: first, the frequent (accidental) blowing off course of windsurfers from Tarifa toward the shores of Morocco, and second, the current flood of illegal immigrants crossing into Spain from Morocco in very small boats. Although many die in these modern day passages, many more make it across (although the latter often to find an unpleasant or uncertain fate).

Evidence from the remote past also leads me to suggest that crossing the Strait was not so impossible. Estimates for the first peopling of the Australian part of Sahul range from the certain by ca. 30–40 ka (see Allen, 1994) to the probable by 50–60 ka (Roberts et al., 1994). Even under conditions of maximal pleniglacial sea-level regression,

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this would have required multiple water crossings of as much as ca. 100 km — and frequently enough demographically to sustain a viable human population in Australia. Even more staggering is the recent finding of possible evidence for hominid habitation of the island of Flores (between Sulawesi, Java and Timor in Wallacea, Indonesia) between 900 and 800 ka (by fission track dating of tuffs under- and overlying an artifact-bearing layer at Mata Menge) (Morwood et al., 1998). If confirmed, this would probably have required a water crossing by *Homo erectus* of at least 19 km — nearly twice the maximum width of the Strait of Gibraltar under conditions of maximal regression. The New Guinea (northern) part of Sahul was populated by at least 40 ka (Groube et al., 1986). From there, humans reached the islands of New Britain and New Ireland by ca. 35 ka, over water crossings of as much as ca. 50 km (Pavlides and Gosden, 1994). In short, successful seafaring was clearly among the capacities of early forms of Genus *Homo* in SE Asia.

Closer to the subject of this paper, incontrovertible evidence of navigation on the Mediterranean is more recent, but still falls within the Pleistocene time frame. It is well known, as a result of the excavations at Franchthi Cave (Argolid Peninsula, Greece), that humans began transporting obsidian from the island of Melos to the mainland by ca. 12 ka. Although much closer during sea-level regression during the Last Glacial Maximum (Cherry, 1990), the total distance between Franchthi and Melos of ca. 150 km at that time could have been shortened by island-hopping in the Cyclades, with water gaps of 20–35 km (Perlès, 1987). Shortly thereafter, in the Mesolithic of Franchthi, there is evidence of deep-sea fishing (Renfrew and Aspinall, 1990).

Cyprus appears to have been occupied by humans ca. 10–11 ka, involving a water crossing of at least 30 km from Anatolia (Simmons, 1991). The Balearic Islands (notably Mallorca) do not seem to have been occupied by humans before ca. 8–9 ka (Cherry, 1990). Likewise, both Sardinia and Corsica have archeological sites with radiocarbon dates ranging between 8 and 9 or even 10 ka which seem non-controversial (e.g. Lanfranchi, 1998, but see Cherry, 1990 for cautions concerning dates earlier than ca. 9 ka). Some dates for the "Pre-neolithic" of Corbeddu Cave on Sardinia even range from 11 to 14.6 ka (Klein Hofmeijer and Sondaar, 1989, cited by Lanfranchi, 1988, p. 544), and more recently, human remains from this cave have been published as dating to ca. 20 ka (Sondaar, Elburg and Klein Hofmeijer, 1995, cited by Bonifay et al., 1998, p. 38). Claims for much earlier (i.e. Middle Pleistocene) hominid occupation of Sardinia are highly controversial — indeed problematic (Cherry, 1990; Simmons, 1991, p. 286). Recently, evidence has been published on Coscia Cave in northern Corsica, which, *if* definitely proven, would support an "early Würm" occupation of this island by Neanderthals at least somewhat over ca. 60 ka (Bonifay, 1995; Bonifay et al., 1998). The evidence consists of a "mound" of male deer skulls and antlers, "hearths" and a meager, problematic lithic assemblage. From the glacial-age Elba *peninsula* hominids would have crossed one or two straits, the widest of which (from the island of Capraia) would have been about 15 km. *If* ever satisfactorily demonstrated as a hominid site of this age, Coscia Cave would have major implications for the cultural capacities of Neanderthals — including rudimentary navigation. The obvious route by which Sardinia could be occupied would be via Corsica, with which it was connected by a broad glacial-age land bridge. The Corsica-Sardinia superisland was, however, never attached to the Italian mainland in Pleistocene times (Bonifay, 1995). All the early dates from Corsica and Sardinia are in need of confirmation.

Navigation of an age *at least* equivalent to the Final Magdalenian seems to have been fairly common throughout the Mediterranean. So, why not the Strait of Gibraltar?

2. The Strait of Gibraltar

The narrowest stretch of the Strait is some 25 km long, from Europa (Gibraltar) and Almina (Ceuta) Points in the east to Tarifa and Al-Boasa Points in the west. Under present high sea-level conditions, this stretch is 14 km wide. The Strait widens considerably to the west of Tarifa, its maximum width (between Capes Trafalgar and Espartel) currently being ca. 45 km. The distance between the 100 m isobath contours off Tarifa is 10 km (1 : 175,000 Map, Estrecho de Gibraltar, Instituto Hidrográfico de la Marina, Cádiz, 1977). As noted by Martinet and Searight (1994), several small islands would appear within the Strait in the sector between Paloma Point and Tangiers whenever sea fell further than 100 m below its present level, making for several short water crossings, none greater than ca. 5 km if this (western) route were to have been taken. The distances would have been even shorter under full glacial conditions, with sea-level regression of 120–130 km — assuming tectonic stability and essentially unchanged sediment depositional depth in the Strait in the Pleistocene.

Although we do not know how the currents through the Strait may have been different under glacial conditions, at present there are two currents (surface and subsurface, inward toward the Mediterranean and outward toward the Atlantic), the strength of which varies greatly with the seasons. The salinity differential between the two bodies of water is an important factor in controlling these currents, but winds, atmospheric pressure, and tidal differences are also significant. The Atlantic tide in particular can arrive in violent fashion as a high wave. In general, the surface current is at its weakest in winter under present conditions and there is a 6-h period of slack tide twice a day. It is not believed that there was

a major difference in currents between the present situation and that of a glacial (Martinet and Searight, 1994), but this is, of course, an important unknown. There are some foraminiferal indications that cold Atlantic waters significantly came *into* the Sea of Alborán during the period at least between 12 and 10 ka (Pujol and Verganaud, 1988, cited in Aura et al., 1998, p. 98). The facts remain that the Strait is crossed very frequently at the present time in very small, indeed precarious, craft and that it was both significantly narrower and dotted with small islands during periods of sea-level regression.

3. The Lower Paleolithic (Lower and Middle Pleistocene)

Speculation on the possibility of trans-Gibraltar Strait crossings by makers of Acheulean technology is long standing, and centers on the existence of abundant cleaver flakes — said to be rare or absent elsewhere in the Lower Paleolithic world — both in Africa (including the Maghreb) and in the Iberian Peninsula (Spain and Portugal) (e.g. Alimen, 1975; Freeman, 1975; but see Bordes, 1961, for numerous examples of cleavers from Acheulean and Mousterian sites in France — and not only from its extreme southwestern corner, where, as in Cantabrian Spain, they are well known in the latter period). The Kombewa flake production technique, well known and presumed to have developed first in Africa, is also frequently found to have been used in the Acheulean of Iberia, notably in the Duero Basin (Martín, 1989). This method of predetermining flake size and shape (also known as the "Janus flake" technique), was used in the early (ca. 700 ka) Acheulean of Ternifine (Algeria) and at other sites in Northwest Africa, but is rare in Europe except Iberia (see Debénath and Dibble, 1994, p. 29).

Consideration of the possibility of an (or several) early colonization(s) of at least Western Europe from Africa via Gibraltar is now once again called for, on the one hand, as a result of the discoveries of hominid remains ("*Homo antecessor*") and simple ("Oldowan"-like) stone tools of at least late Lower Pleistocene age (ca. 800 ka) in the Gran Dolina locality at Atapuerca (Burgos) (Bermúdez del Castro, 1998; Carbonell, 1998) [and *possibly* even older — i.e., middle or early Lower Pleistocene — artifacts at the Atapuerca "Elefante" locality and at Orce, in the Guadix-Baza Basin of Granada (Tixier et al., 1995; Dennell, 1998)]. On the other hand, such a reconsideration is also appropriate because of the recent (and still tentative) re-dating of the Mode 1 (i.e. Oldowan-like) site of Ain Hanech (NE Algeria) to the Olduvai paleomagnetic subchron (ca. 1.8 Ma) (Sahnouni, 1998). The fact that bifaces (handaxes) are (at least so far) absent from the very small sample of artifacts at Atapuerca Gran Dolina [as well as at Orce and El Aculadero in Cádiz (Santonja and Villa, 1990)] does not necessarily mean that the first human inhabitants of Spain had gotten there from Asia (*pace* Dennell, 1998), since pre-Acheulean industries also seem to have existed in Maghreb, as had long been argued by C. Arambourg (Fig. 1).

Although the Maghreb is known in the Plio-Pleistocene for the presence of some Holarctic mammalian taxa, it cannot be proven that they (or the African species which reached Europe) had crossed the Strait of Gibraltar, as there exists the alternate Levantine-Anatolian route. The Barbary apes (*Macaca*) had moved south when the Mediterranean was dry during the late Miocene. Late in the Pliocene, *Mammuthus* may have moved into Europe from Africa, while *Equus* went in the opposite direction (Geraads, 1982). The African cercopithecoid, *Theropithecus oswaldi*, appeared in southeastern Spain in the Lower Pleistocene, along with two different kinds of sabre-tooth cats (*Homotherium* and *Meganteron*) and a large hyena (*Pachycrocuta*) (Arribas and Palmqvist, 1999). In the early Middle Pleistocene (ca.700 ka) at Ternifine (northeastern Algeria) mammoth is claimed to reappear in an apparently European form, *M. meridionalis* (Geraads, 1982); the Holarctic brown bear (*Ursus* cf. *arctos*) is also present (Jaeger, 1975). A. Turner (1995) observes that lion, leopard and spotted hyena may all have dispersed into Iberia and Europe from Africa during the Lower Pleistocene, though the route taken is no more known than is that of the hominids both ca. 1 Ma and after 0.5 Ma. He does believe that the Iberian Peninsula was more attractive to hominids than many other regions of Europe during the Lower and early Middle Pleistocene, due to rich scavenging opportunities and relative scarcity of potential competitors. Arribas and Palmqvist (1999) argue that the Lower Pleistocene sabre-tooth cats in Iberia would have provided rich scavenging opportunities for early hominids (cf. *Homo ergaster*) and hyenas, all of which would have been able to cross a Strait of Gibraltar that was only ca. 6.5 km wide during the 200 m Aullen marine transgression event, ca. 1.8–1.6 Ma. Whether there definitely were hominids in the early Lower Pleistocene at the sites they mention (Cueva Victoria in Murcia and Orce-Venta Micena in Granada) remains controversial.

Later in the Middle Pleistocene, *Bos primigenius* and *Lynx* appeared in Morocco, and although the former might have come from Asia, the latter is a possible candidate for trans-Gibraltar crossing (Geraads, 1982). Early in the Upper Pleistocene, a European rhinoceros (*Dicerorhinus hemitoechus*), some deer (*Cervus* and/or *Megaceroides*) and boar (*Sus scrofa*) appeared in the Maghreb, although the former is known from the Haua Fteah Cave in Libya and in Israel and the latter is also found in the Acheulean of the Near East (Jaeger, 1975; Geraads, 1982). While it is known that animals as large as various pachyderms did swim across water gaps wider than the Strait of Gibraltar to colonize islands in both the Old and New Worlds during the Pleistocene, there is

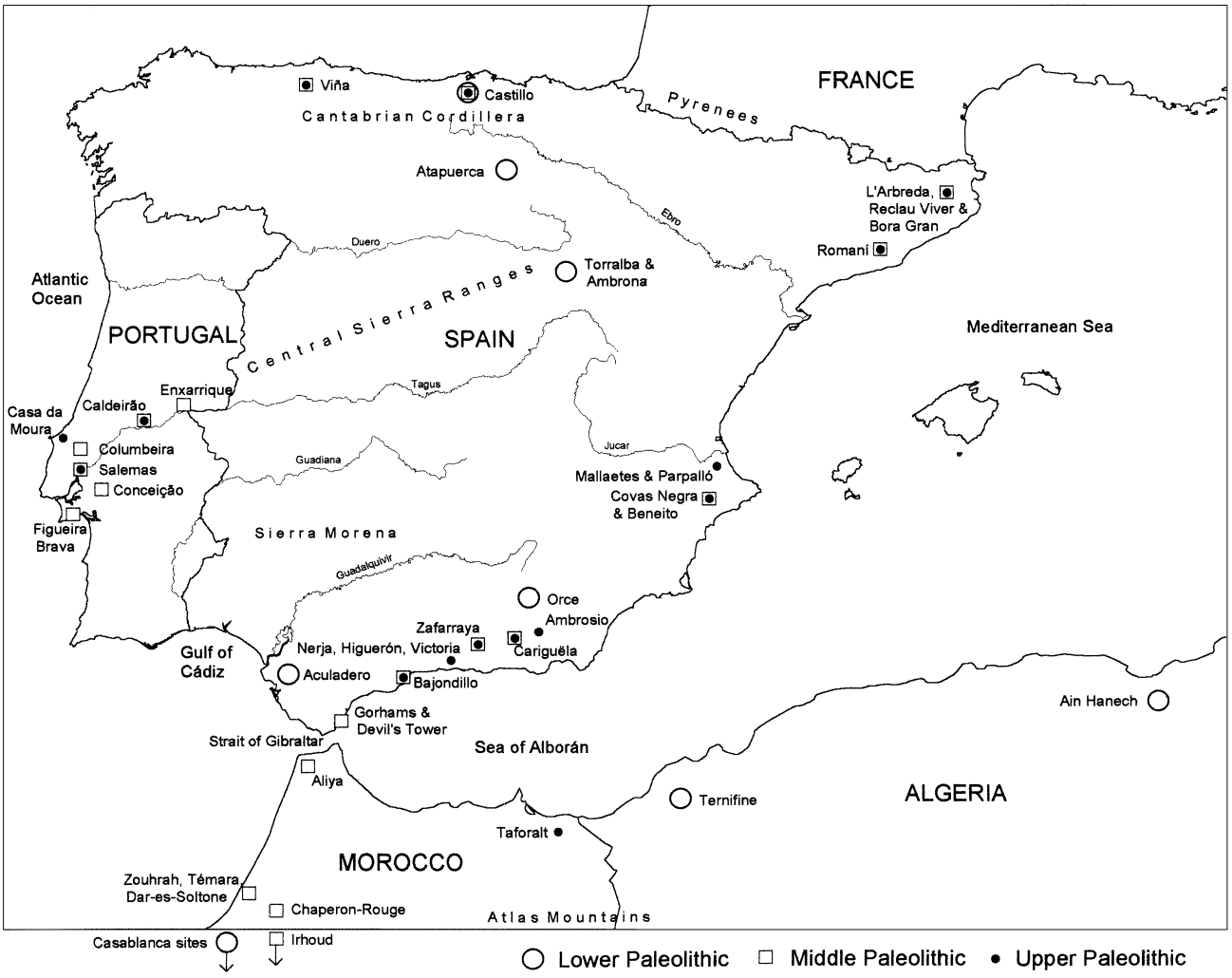

Fig. 1. Selected Lower, Middle, and Upper Paleolithic sites of Iberia and the Maghreb referred to in the text.

no actual proof that this occurred in either direction between Africa and Iberia. In short, it remains to be demonstrated if some of the oldest hominid occupations in Europe proper (i.e. outside the southern Caucasus) — namely those of Spain — were the result of migrations via the shortest, most direct route — the Strait of Gibraltar — or via the longest, most circuitous one — i.e., Levant-Anatolia-Dardanelles-Balkans-Northern Italy–Southeastern France. If the latter, then many sites remain to be found in those regions for the period between ca. 1.8 and 1 Ma!

4. The Middle Paleolithic (early Upper Pleistocene)

The Upper Pleistocene Soltanian continental cycle in Morocco is characterized by an "invasion of European (faunal) elements" (Freeman, 1975, p. 721), as noted above. Probably just prior to the Soltanian, the Maghreb was inhabited by a population of early *Homo sapiens* best characterized by the fossils from Jebel Irhoud (west-central Morocco), which are associated with a Mousterian industry and ESR dates ranging from 90 to 190 ka (the extreme values based on "early uptake" versus "late uptake" assumptions) (Hublin, 1993). Long debated and sometimes referred to as "Neanderthals", Irhoud and other penecontemporaneous Maghrebi specimens are now generally thought to represent an early African form of *Homo sapiens*, but their degree of independence from the European Neanderthals is still somewhat in question. Hublin (1993, pp. 126–127) excludes the Irhoud hominids from the Neanderthal clade, but does admit that the two groups share features which he characterizes as "primitive retentions". While not totally excluding the possibility of "some cultural exchanges … without massive human displacement" across the Strait of Gibraltar, Hublin (1993, p. 128) states that "whatever population exchanges took place (they) were not substantial enough

to allow significant biological change". And he notes that supposed typological similarities (argued by Tixier in Hublin et al., 1987) between the Mousterian industries of Irhoud and Cova Negra in southern Valencia could have resulted from "simple technical convergence". This opinion is directly contested by Smith et al. (1995, pp. 201–202), who argue that the occipital bunning of Irhoud is most likely to have been the result of a genetic relationship to the European Neanderthals, as parallelism is "highly unlikely, particularly given the distinctive neural growth pattern necessary to produce an occipital bun". They conclude that "there was … contact between European and North African Pleistocene human groups at the Strait of Gibraltar" (Smith et al., 1995, p. 203). Among their reasons for asserting this is the study by Simmons and Smith (1991), in which cluster analyses showed close similarities between Irhoud and Neanderthals, especially the original Gibraltar (Forbes Quarry) specimen. They argue, on the basis of these analyses, that there were substantial interconnections (i.e. gene flow) in the circum-Mediterranean region during the late Middle–early Upper Pleistocene, including ones across the Strait of Gibraltar, which they do not at all view as an absolute barrier to human contact. Thus, although, peripheral to the European Neanderthal population, Irhoud is seen as linked to and not absolutely isolated from it. But what of the Middle Paleolithic cultural evidence?

While there are indeed general similarities among the Mousterian industries of the Mediterranean Basin as a whole (and despite the above-mentioned suggestion by Tixier that there are specific similarities between Cova Negra and Irhoud), the most interesting, provocative aspect of the Middle Paleolithic is the case of the Aterian. In reality, the Aterian is an Epi-Mousterian or "transitional" industry, roughly contemporaneous with such European industries as the Szeletian, Bohunician, Olchevian, Chatelperronian, and Uluzzian — but without polished bone tools or weapons. Since the first discovery of a tanged point in the Maghreb over 110 years ago and the definition of the Aterian industry in 1922, this peculiar regional cultural tradition has been the object of chronostratigraphic uncertainty and of controversy concerning its "origins" and "destiny". Although we still lack much essential information on Aterian subsistence, tool use, site structure and overall lifeways, recent work has significantly clarified the stratigraphic position and age range of the Aterian, at least in the core Maghreb area (leaving aside the question of the rather more problematic manifestations of limited numbers of tanged pieces in the early–middle Upper Pleistocene of Cyrenaica and the Eastern Sahara) (Debénath et al., 1986; Tillet, 1995; Wengler, 1997). Radiocarbon dates now indicate that the Maghrebi Aterian spanned the period between ≥ 45 and 25 or 22 ka. This technology clearly developed out of the regional Mousterian and contained considerable evidence of the use of the Levallois technique, as well as continued significant presence of denticulates, notches, and especially sidescrapers. Along with these "Mousterian" types of tools, there are endscrapers, backed knives (including some Chatelperronian-like pieces), foliate "points", tanged points, and other tanged pieces (such as stemmed endscrapers). It is largely a flake-based industry, manifesting substantial continuity in lithic raw material economy from the Mousterian, although there seems to have been some deliberate choice of the better materials (flints) for manufacture of the "pedunculates". The Aterian is directly followed (at least in the key site of Taforalt in northeastern Morocco) by a "true" Upper Paleolithic (ca. 22 ka), which in turn is overlain by the Terminal Paleolithic Ibero-Maurusian (a.k.a. Oranian) industry. The tanged pieces disappear abruptly and the "fate" of the Aterian does continue to be murky (as is the case with many other Paleolithic "cultures").

It was during approximately the first 10 millennia of the Aterian's existence in the Maghreb that the Iberian Peninsula witnessed an interesting situation:

(1) the presence of early Aurignacian industries by ca. 40 ka in northern Spain and
(2) the survival of Mousterian industries and Neanderthals until ca. 30 ka in southern Spain and in Portugal. This situation has been summarized by Raposo and Cardoso (1998), Straus (1996, 1997); Straus et al., 1993; Vega (1993); and Zilhao 1993, 1998; D'Errico et al., 1998, among others. The record supporting this scenario involves particularly the sites of El Castillo in Cantabria; L'Arbreda, Romaní, and Reclau Viver in Catalonia for the earliest Aurignacian; the sites of Caldeirao, Figueira Brava, Columbeira, Salemas, Pedreira de Salemas, Conceiçao, and Foz do Enxarrique in Portuguese Estremadura; Cova Negra and Beneito in Valencia; Cariguëla and — most spectacularly — Zafarraya in Andalucia. The existence of at least an *early* Aurignacian (> 30 ka) in southern Iberian is unproven. There is nothing about the sequences in Cuevas de Nerja (Jordá, 1986) and Bajondillo (Cortés and Simón, 1997) in Málaga that would currently indicate attribution of their lowermost Upper Paleolithic assemblages to this period. The so-called Aurignacian levels in Les Mallaetes (Valencia) (Fortea and Jordá, 1976) and Gorham's Cave (Gibraltar) (Waechter, 1964), both dated to 29–28 ka, are 10 millennia removed from the earliest Aurignacian of northern Spain. The current excavations at Gorham's Cave have not revealed any evidence of an early Aurignacian, while on the contrary there is a *late* Mousterian, in line with the other evidence from Andalucia, as shown by both AMS radiocarbon dating and stratigraphy in the Gibraltar site (Barton et al., 1999). The terminal and tardy Mousterian of southern

Iberia is succeeded either by poorly known industries attributed to a late "Aurignacian" or to the Gravettian (Zilhao, 1995; Cortés et al., 1996).

The late Mousterian in southern Spain and Portugal is associated with Neanderthal remains in several cases, while there are no clear-cut hominid skeletal associations with the early Aurignacian in northern Spain. The few human bones found by Obermaier (1924) in the basal Aurignacian deposit at El Castillo are mainly non-diagnostic fragments. Even the mandible that he found was of a young child, which (while at any rate probably not very diagnostic either), along with the rest of these finds, was lost before being formally published (see Garralda et al., 1992). We do not really know for certain who the makers of the early Aurignacian in Europe were, as substantive, diagnostic, well-provenienced, well-dated remains of "Cromagnon" folk associated with characteristic artifacts do not appear in the record until some 10 millennia after the earliest Aurignacian occurrences. Additionally, within the margins of error associated with the determinations, it now seems that "the" Aurignacian technology (notably antler points, keeled and nosed endscrapers, etc.) appeared simultaneously across Europe, especially if one takes into account the new and more reliable dating of Bacho Kiro (Bulgaria) at 38 ka rather than the original determination of > 43 ka (Hedges et al., 1994; Straus, 1997) — although the younger date does come from higher within the same Level 11 (Bar-Yosef, O., pers. comm.). The so-called "Aurignacian" of the Levant now dates to 36–28 ka (Bar-Yosef et al., 1996), providing, at least in my mind, a plausible case of technological convergence (i.e., parallel independent invention).

It is, in my opinion at least, a paradox that supposedly cold-adapted Neanderthals (e.g. Holliday, 1995, and references therein) survived the longest in precisely that area of Europe that is closest to Africa: southern Iberia, while some of the earliest Aurignacian assemblages (generally assumed to be the work of anatomically modern humans) are found in the colder parts of Central and North-west Europe. If the supposed "newcomers" had an adaptive edge in those more continental and northerly regions, why did they apparently not have such an advantage that would have also allowed them to quickly sweep (from either the north or from the south) into that region that was presumably "closest to home", both geographically and ecologically? Northwest Africa, with a long, partially in situ evolutionary trajectory leading to forms of *Homo sapiens* [as represented by Irhoud and Témara for more archaic specimens to Dar es Soltane, Mugharet el 'Aliya, Zouhrah and Grotte des Contrebandiers for putatively less archaic ones (see Klein, 1989, pp. 288–291; Hublin, 1993)], participated fully in the trend toward *anatomically* modern humans that characterized Africa during the Upper Pleistocene. What is less clear to me are the arguments for *adaptive* superiority on the part of these hominids vis-à-vis the Neanderthals, particularly since it seems to have taken tens of millennia to supposedly manifest itself [witness the cases of so-called "Proto-Cro-Magnons" with Mousterian technology and subsistence at Qafzeh and Skhul in Israel ca. 90–100 ka that are indistinguishable from those of Neanderthal-associated Middle Paleolithic occupations (see papers in Akazawa et al., 1998)]. The behavioral modernity and adaptive superiority of the supposed makers of the early Aurignacian of Europe have been postulated by too many to cite (e.g. Zubrow, 1989; Bar-Josef, 1998; Klein, 1998; Mellars, 1998). These arguments generally require some untestable "black box" type of explanation involving shifts in mental capacities or in the ability for complex language, long after the evolution of a (nearly) modern skeletal anatomy. But, with such a supposed adaptive advantage on the part of early Upper Paleolithic *Homo sapiens sapiens*, one would imagine:

(1) an ability to cross the Strait of Gibraltar (no wider than the estuary of some of the Tagus), and
(2) a proclivity first to occupy the most African-like of European environments, i.e., southern Iberia. Yet they did not do so.

Indeed, the simplistic, delayed-reaction Out of Africa "invasionist" model to explain the Upper Paleolithic of Europe meets with its biggest challenge in the 10,000-year survival of Mousterian Neanderthals in southern Iberia at the very door of Africa.

5. The Aterian and the Iberian Solutrean

We have seen how the Maghrebi Mousterian developed into a local "transitional" industry, the Aterian, with a bonafide combination of Middle and Upper Paleolithic lithic technologies and tool types. The Aterian has bifacial foliate pieces, but these are not rare in this time range, neither in Europe (Central European Micoquian and Szeletian sensu lato) nor in Africa (Lupemban). The distinctive aspect of the Aterian is the tang, which was almost certainly a hafting element. Tanged pieces had been, up until that time (ca. ≥ 45–22 ka), highly unusual in prehistory, but since then have been invented and reinvented repeatedly in different regions of the world, especially in the projectile point category. The relative unusualness of central tangs (or stems) in European Paleolithic contexts is probably the main reason for the long-standing disbelief among some prehistorians that they could have been independently invented in the Solutrean of Mediterranean Spain and Portugal. Hence the "Africanist" explanation: the Solutrean of Iberia must have had a North African origin; such was the opinion of Luis Pericot (e.g. 1950), who had first found tanged points in the great Valencian Solutrean site of Parpalló in the early 1930s. The

hypothesis of an Aterian origin for the Solutrean was hotly debated in the 1950s and was opposed by Breuil (among others) on technological grounds (i.e., the Aterian is a flake-based, Levalloisian industry, whereas the Solutrean is a blade-based one). The hypothesis was rejected by Smith (1966), who gives an excellent summary of both points of view. By the 1960s, it was apparently dead. It has, however, been given a new lease on life recently by Debénath et al. (1986) and by Ramos (1998), which is why I must discuss it here.

These authors argue that "the Aterians" were essentially driven out of the Maghreb by a supposed onslaught of "Iberomaurusians" who had crossed the Straits of Sicily from Italy into Tunisia (Debénath et al., 1986, pp. 242–244). This event *supposedly* took place around 25–22 ka [although, as noted above, the Aterian is followed at the key site of Taforalt in northeast Morocco by an earlier, non-Iberomaurusian blade industry between 22 and 16 ka (Roche, 1971, cited in Phillipson, 1993, p. 94)] and Debénath et al. claim that this matches up well with the beginnings of the Iberian Solutrean ca. 21 ka. However, the dating of the late Aterian at ca. 22–25 ka is far from certain: there are only a handful of dates in this recent time range (Grotte des Contrebandiers/Témara: 24,500 ± 600 and 23,600 ± 1000 BP by C14; Chaperon Rouge: 28,200 ± 3300 BP by TL) (Texier et al., 1988). Other dates are actually in the 30–40 ka time range and > 30 or 40 ka. Error ranges are often very large, calling into question whether these might not in reality all be infinite dates (Klein, pers. comm.). Recent OSL and TL dating of Aterian sites in the Libyan Sahara suggests that this technology existed there between ca. 90 and 60 ka, after which time at least this region was abandoned due to extreme aridity (Cremaschi et al., 1998). Whether the Aterian "survived" in coastal regions of Morocco until or even shortly after the end of isotope stage 3 is still under debate.

Even should one accept the few commonly accepted late dates for the Upper Aterian, there are still significant difficulties with the theory that the Iberian Solutrean could have been "derived" from the Aterian. Besides the utterly complicated and unlikely nature of this double invasion scenario (out of and into Europe!), the supposed Epigravettian/Iberomaurusian aspect of which is completely rejected from an Italian perspective by Zampetti (1989), there is a significant chronological problem.

The tanged points of the Mediterranean Spanish and Portuguese Estremadura Solutrean appear in the late phase of that techno-complex, ca. 19–18 ka. At the well-excavated and dated site of Caldeirao Cave in Portuguese Estremadura, tanged points are first found in a level that dates to 18,840 ± 200 BP (Zilhao, 1994). The other oldest well-dated tanged points from a well-documented stratigraphic provenience (despite the antiquity of the excavation) are those of Parpalló Cave in Valencia at 18,080 + 850/ − 750 BP (Davidson, 1974; Fullola, 1994). Other dates for levels with tanged points in Mediterranean Spain range up to 16,500 ± 280 BP at Cueva Ambrosio in Almería (Ripoll López, 1988). The tanged points [found in association with shouldered and some leaf-shaped points, as well as with backed bladelets and the whole array of typically Upper Paleolithic tools of apparent Gravettian derivation (see one recent scenario for the in situ development of the Solutrean in Zilhão, 1994, 1995)] now have a distribution from Girona to Cádiz, plus a cluster in Portuguese Estremadura. The gaps in this essentially near-coastal distribution of late Solutrean sites with tanged points in southern Catalonia/Castellón and in the Algarve may be more apparent than real and are likely to be filled by future research.

In short, for the Debénath et al. (1986) Aterian-to-Solutrean scenario to work (leaving aside the question of the highly unlikely, wrongly aged "Ibero-Maurusian" invasion from Italy that drove the Maghrebis into Iberia), the "Aterians" would have to:

(1) forget their tanging technology upon crossing the Strait of Gibraltar;
(2) reinvent it some 3–6000 years later — but then only for points and not for endscrapers which had been part of their repertoire in the Maghreb;
(3) change from a basically Levalloiso-Mousterian flake-based technology to a Gravettian-like blade-based one (with all the other attributes of a Gravettian industry that was adding foliate points) immediately after crossing the Strait.

Even accepting the shortest amount of time for the (inexplicable) "reinvention" of the tang by this supposed immigrant culture in Iberia, that represents at least 150 human generations of "cultural amnesia" — hardly a plausible scenario compared to the alternative hypothesis of independent invention of this useful hafting feature. After all, true blade technology, as another lithic example, was invented, abandoned and reinvented again and again in different regions of the world at many times, including several instances of its invention in the early Upper Pleistocene of NW Europe, the Near East, North Africa and Sub-Saharan Africa (e.g. Lamdan and Ronen, 1989; Conard, 1990; papers in Révillion and Tuffreau, 1994). The fact that some "Parpalló" points look like stemmed (or "corner-notched") points from early Holocene Native American technologies of the United States does not require a trans-Atlantic migration (followed by a huge waiting period of archeological invisibility) to explain the latter. I think that all reasonable archaeologists would agree that technological convergence is the only reasonable explanation in this case! In the same vein, the superficial similarity of concave base points from the Solutrean of northern Spain to Clovis-style Paleoindian points (despite the lack of basal fluting among the former) could appeal to hyper-migrationists

despite the distance of at least 5000 km of ocean and 5000 years time difference (see Greenman, 1963; Preston, 1997; Begley and Murr, 1999, for similar arguments). It is the geographic proximity and *relative* temporal proximity of the Aterian to the Iberian Solutrean that has repeatedly made the invasion hypothesis (or its less dramatic cousin, the diffusion hypothesis) so seductive. But, in practice, it works no more than do the absurd trans-Atlantic ones.

6. The Terminal Paleolithic

One of the stronger cards in the deck of trans-Gibraltar theorists comes at the very end of the Pleistocene (not too far removed in time from the proven implantation of the early Neolithic Cardial Culture on both shores of the Sea of Alborán). That card is the Taforalt harpoon, often cited as prima facie evidence of Upper Magdalenian water crossings [e.g., most recently, Otte (1997, p. 35) where this fairly well-known object is cited incorrectly as coming from Ceuta; see also Zampetti (1989, p. 473); Camps-Faber (1966, pp. 136–139), and the original reference in Roche (1963, p. 80, Fig. 34, no. 2). The object in question is a small mesial (or mesio-distal) fragment of a harpoon with three short barbs on one edge. Found by Roche, in Level III of Taforalt Cave, the harpoon comes from a Final Iberomaurusian (a.k.a. "Oranian") context, with abundant backed bladelets and backed points (total = 63%) and little else, except a few denticulates, endscrapers, retouched flakes and very few circle segments. Level III is bracketed by Ibero-Maurusian levels with radiocarbon dates: Level II at 10,800 ± 400 and Level VI at 12,070 ± 400 BP. Thus, the harpoon must be about 11,000 years old — contemporary with the Final Magdalenian in Mediterranean Spain. This harpoon is the only object of its kind known from the Maghreb (Roche, 1963), although harpoons are also found in the contemporaneous Natufian of the Levant and in the early Holocene "Mesolithic" of the Sudanese Nile and the lacustrine regions of East Africa. Level III (and other Iberomaurusian levels) yielded marine mollusc shells and fish. The shells are rolled (Roche, 1963, p. 154) and must have been collected on the beaches not for food, but as curiosities.

The Iberomaurusian is now believed to be of essentially local, North African origin, beginning at least ca.16 ka. It is characterized by abundant backed bladelets, very few burins, rather banal, simple endscrapers, a few geometric segments, and, among other things, a peculiar curved backed piece/*piquant trièdre*: the "Mouillah point", made by the microburin technique, which is seen by some as a cultural marker (Zampetti, 1989; Bar-Yosef, O., pers. comm.). It thus shares little specifically in common with the lithic industries of Mediterranean Spain (see Aura, 1995) — or with those of the Sicilian Final Epigravettian (Zampetti, 1989). But what of the Taforalt harpoon?

The Upper/Final Magdalenian of Mediterranean Spain spans the period between ca. 14 and 10.5 ka (uncalibrated, radiocarbon dates) (Aura et al., 1998). Some 50 osseous harpoons are now known from late Magdalenian sites that span the distance from northern Catalonia [the rather isolated site of Bora Gran in Gerona, with nearly 20 harpoons (Canal and Carbonell, 1989)] to southern Andalucia (Nerja in Málaga, with 5). Some of these Mediterranean harpoons (particularly those of Bora Gran, but also a few from greater Valencia and Andalucía) are of Franco-Cantabrian appearance (gracile, with salient, complex barbs), but most are somewhat wider and have short, simply angled barbs, reminiscent of the Taforalt piece (see Aura, 1995, Figs. VIII.2 and VIII.3). The Nerja harpoons are accompanied by bi-pointed "fish gorges" (Alcalá et al., 1987). With the exception of the harpoons from Bora Gran and Parpalló, all these Mediterranean Spanish Magdalenian harpoons are from sites that were close to the late Tardiglacial seashore. This is especially the case of Nerja and the nearby caves of Higuerón and Victoria along the northern shore of the Sea of Alborán in Málaga (Aura et al., 1993). These sites are almost directly opposite (north) of Taforat, from which they are separated by ca. 160 km of ocean. While located at 750 m above present sea level in the Beni-Snassen hills, Taforalt is only ca. 30 km from the coast, southeast of the Melilla peninsula (Roche, 1963, 1969). Ironically, the distribution of harpoons, while stretching from Bora Gran to Nerja to Taforalt, does not continue into Portugal, where osseous implements are rare in "Magdalenian" contexts, perhaps partly because most of the known sites are open air, with poor organic preservation (Zilhao, 1995).

In Mediterranean (as in Cantabrian) Spain, not only mollusc-, crustacean- and urchin-gathering, but also fishing, seem to have been major subsistence activities during the terminal Magdalenian as the sea-level rose rapidly, especially along the northern shore of the Sea of Alborán. And, in addition to many littoral species, some of the many taxa of fish that were caught are deep-sea varieties, most notably the Gadidae (haddock, pollack — reflecting the inflow of cold Atlantic waters into the Sea of Alborán) at Nerja (Roselló et al., 1995). The terminal Paleolithic ichthyofauna of Nerja, while small in total size of the sample as compared to the post-Paleolithic assemblages, is notably rich in taxa — including even sturgeon. Fishing was clearly not simply a minor subsistence activity in the Final Magdalenian of Nerja (Aura et al., 1998). There is also considerable evidence of marine resource exploitation at the nearby terminal Paleolithic (and Epipaleolithic) sites of Hoyo de la Mina and Cueva Victoria, both (like Nerja) with shell midden deposits and at least the former with abundant fish (Aura et al., 1993). Finally, a mandible of monk seal was found in the Final

Magdalenian shell midden at Nerja, and a probable seal canine was found in similar deposits at Hoyo de la Mina (Alcalá et al., 1987). This is yet further evidence of marine resource exploitation, although the seals could well have been killed (or scavenged) while hauled (or washed) up on shore. All these indicators of use of the sea from Málaga add to the evidence of tuna remains in the Upper Paleolithic levels in Gorham's Cave (Waechter, 1964), whose dating and attribution may eventually be established more precisely by the current excavations at this site (Stringer, pers. comm.). The implication of these finds is for deep sea fishing in the Strait of Gibraltar.

Although bone harpoons are found widespread in the early *Holocene* technologies of North Africa, the Nile Valley, and Central Africa, the Taforalt harpoon, in a Final Iberomaurusian context, is contemporaneous with the harpoons of the Mediterranean Spanish Magdalenian. A very likely hypothesis to explain it would be human contacts across the Sea of Alborán/Strait of Gibraltar in the period between ca. 12 and 10.5 ka. These would have occurred as a result of fishing expeditions. The existence of competent deep-sea fishing and navigation in Upper Magdalenian/Iberomaurusian times should not be in doubt, especially given the evidence from Franchthi Cave of trips to Melos Island in this period, or the evidence for human settlement of Cyprus, Corsica and Sardinia by *at least* this time, as discussed above. By no means, however, is there any indication of a human migration or invasion in either direction across the Strait in terminal Pleistocene times. Such would really have to wait until AD 711 and the Arab invasion led by Tarik, from whom Gibraltar takes its name!

7. Conclusions

The record of human contacts between North Africa and Iberia is at best spotty and ambiguous. The prehistory of Iberia (as conducted both by natives and, in particular, by French archeologists) has flirted with "Africanism" on several occasions and in relation to several major prehistoric periods (Acheulean, Solutrean, Magdalenian and Mesolithic) — but never with much success (Sanchidrián et al., 1996, pp. 17–18). Humans — no less than other mammals — often seem to have found the Strait of Gibraltar "a very effective natural barrier" throughout the Pleistocene (Currant, 1994, p. 115). This definitely seems to have been the case during the period between ca. 40 and 30 ka, when southern Iberia — so close and yet, apparently, so far from the supposed African homeland of modern humans — became the last refuge in Europe of a Neanderthal population with Mousterian technology. Resisting what common wisdom describes as the "adaptive advantages" of the "newcomers", these Andalusian and Estremaduran Neanderthals survived — apparently successfully, judging from their ca. 500-generation solo reign in the lands south of the Ebro.

Among the "superior characteristics" of African-originating *Homo sapiens sapiens* there was apparently NOT an ability to cross the Strait of Gibraltar or a capacity for displacing the South Iberian Neanderthals from either the south or north until less than 30,000 years ago. And this was despite the facts that ultimately African-derived hominids had crossed water gaps to occupy the islands and Sahul continent of Australasia perhaps beginning as early as the late Lower Pleistocene or that Corsica may possibly have been occupied by Neanderthals at least shortly before ca. 60,000 years ago.

As for the rest, the evidence from Atapuerca's railroad trench (Gran Dolina and possibly Elefante Cave) makes the case for a Lower Pleistocene occupation of the *western* end of southern Europe from Northwest Africa all the more possible, since the Spanish evidence is now the oldest credible evidence for human occupation anywhere in Europe. Nevertheless, the alternate — but far less direct — route (via the Near East, Anatolia or the Caucasus, Southeastern Europe) is clearly still viable and would have avoided the problem of Gibraltar's vaunted currents. Whether there continued to be at least sporadic contacts during the later Acheulean (hence the "African-style" cleaver flakes in Iberia, to the near — but not total — exclusion of the rest of Europe) remains an open question. Some readings of the skeletal evidence from the two sides of the Strait argue for at least limited gene flow, while others see total isolation in the early Upper Pleistocene.

The Aterian "explanation" for the Mediterranean and Portuguese tanged point Solutrean has always been seductive (like so many other cases of similarities among supposedly unusual or precocious artifact forms, where archaeologists cannot resist the postulation of migrations or invasions, instead of the more mundane possibility of parallel independent inventions). The Aterian tanged pieces were simply developed and disappeared too early to be the "explanation" for the stemmed points of Parpalló or Casa da Moura. The little matter of at least 3000 years or 150 human generations is simply too important to ignore, despite the physical proximity of the Aterian and Solutrean phenomena. Again, the Strait of Gibraltar, while perhaps not an absolute barrier, does seem to have been a frontier, between (earlier) technological developments within a Mousterian context in Northwest Africa and superficially similar (but later) ones within a Gravettian-derived context in Iberia. Each subcontinental region had its own technological traditions, its own "history", despite parallel developments.

Finally, the Taforalt harpoon and the evidence for deep-sea fishing and navigation in the Upper Magdalenian of Andalucia do suggest the existence of at least sporadic contacts between the separate, but parallel

terminal Paleolithic ("microlithizing") cultures of the southern and northern shores of the Sea of Alborán. But, apparently, in no way did these constitute anything other than minor phenomena, as the two cultural traditions continued to develop in their own ways, the one into the Capsian and the other into the Microlaminar Epipaleolithic. As *the* source for all modernity — biological and cultural — Africa seems to fail the test *in the case of Iberia* throughout much of the Pleistocene, at least in terms of direct influence, despite its role in the *original* hominid occupation of Europe.

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