AN ESSAY AT SYNTHESIS: TARDIGLACIAL ADAPTIVE SYSTEMS IN THE VASCO-CANTABRIAN AND PYRENEAN REGIONS OF S.W. EUROPE

Lawrence Guy Straus (1)

RESUMEN

Este artículo pretende realizar una síntesis amplia de las evidencias cronoesтратigráficas, paleoambientales y culturales disponibles en la actualidad para el periodo Tardiglacial (ca. 16-10.000 B.P) en las regiones vasco-cantábrica y pirenaica del S.O de Europa. Su propósito es de comparar y contrastar los sistemas adaptativos humanos en las dos regiones y de trazar su desarrollo a través del curso de los cambios ambientales de los últimos milenios del Würm. El artículo toma en consideración los resultados de los proyectos de investigación multi-disciplinaria más recientes llevados a cabo en Asturias, Cantabria, Euskal-Herría, Gascoña y Ariège. Se emplea una aproximación no tipológica a los conjuntos magdalenienses y azilienses tradicionales.

ABSTRACT

This paper attempts to broadly synthesize the chronostratigraphic, paleoenvironmental and cultural evidence available to date for the Tardiglacial period (ca.16-10 Kya) in the Vasco-Cantabrian and Pyrenean regions of SW Europe. Its aim is to compare and contrast contemporaneous human adaptive systems in the two contiguous regions and to trace their development during the final millennia of the Last Glacial. The paper takes into consideration the results of the latest multidisciplinary research projects conducted in Asturias, Cantabria, the Basque Country, Gascony and Ariège. A non-typological approach is taken to the traditional Magdalenian and Azilian assemblage groups.

RESUME

Cet article essaie de faire une synthèse large des témoignages chronostratigraphiques, paléoenvironnementaux et culturels disponibles à l’heure actuelle pour la période tardiglaciaire (ca. 16-10.000 B.P) dans les regions basco-cantabrique et pyrénéenne du S.O de l’Europe. Son but est de comparer et de tracer le développement à travers du cours des derniers millénaires du Würm. L’article prend en consideration les résultats des projets de recherche pluridisciplinaires les plus récents menés à bien aux Asturies, en Cantabrie, Pays Basque, Gascogne et Ariège. On prend une approche non-typologique aux ensembles magdaléniens et aziliens traditionnels.

LABURPENA


(1) Department of Anthropology. University of New Mexico, Albuquerque, N.M. 87131, USA
THE PROBLEM

The Magdalenian and Epipaleolithic cultures of Périgord, Ille de France and Germany have been sometimes overgeneralized to serve as models of Tardiglacial and early Postglacial adaptations throughout Western Europe, yet they were the products of particular environmental settings and resource structures that lent themselves to extensive mobility on the part of human bands. Regions with broad plains or plateaux and often limited relief, they were inhabited by large herds of highly migratory ungulates such as reindeer, bison, horses and saiga antelopes, which thrived on various rich mixtures of herbaceous vegetation. The annual ranges of human groups that preyed on these game are suggested, on the bases of distribution maps of non-local lithics, molluscs and fossils, to have been quite large (probably on the order of many hundreds of kilometers). Under many circumstances, the optimal strategy for exploiting the migratory big game resources would have been to emphasize residential mobility (sensu L.R. Binford), whereby entire human bands (multiple families) moved to the locations of food resources (which, under glacial conditions, were essentially terrestrial mammals). This pattern of specialized, highly mobile big game hunting (probably a more-or-less accurate characterization of the “Magdalenian” adaptations of northerly regions of Western Europe) was terminated abruptly at the end of the Pleistocene and replaced by a pattern of adaptations to the newly reforested habitats, with their abundant plant, aquatic and now generally smaller, less aggregated land mammal resources.

Perhaps less widely known, but sharply contrasting with the northerly pattern of adaptations, is the Mediterranean pattern documented by a limited number of late Glacial sites in Portugal, southern and eastern Spain, Italy and Greece. The southern peninsulas of Europe were less drastically affected by the climatic fluctuations of the Last Glacial and served as refugia for plant and animal species which spread throughout much of temperate Europe under Interglacial conditions. Red, roe and fallow deer, ibex, boar and lagomorphs were the main terrestrial food resources exploited by human groups in these regions, but, in coastal areas (many now inundated as a result of Holocene marine transgression) fish and shellfish were important supplementary resources in the late Upper Paleolithic and there were many more edible plant foods (e.g., acorn and hazel nuts, berries, roots, seeds) than in late Glacial France or Germany. However it is not yet clear how abundant the food resources (particularly the larger ungulates) were in Mediterranean lands during this period, and few models exist for the Magdalenian/Epigravettian subsistence strategies in these regions.

The purpose of this presentation is to explore the nature of human adaptations across time through the period from about 16,000 to about 9000 BP in two adjacent regions situated at the intermediate latitude of 43 degrees north: Vasco-Cantabrian Spain and the French Pyrenees. These two regions share the same mountain cordillera, but differ in their positions relative to the Atlantic coast. Prehistoric archaeological, palaeontological and paleoenvironmental investigations over more than a century have produced a dense data base for the Last Glacial, now dated by abundant radiocarbon determinations. Thus the Cantabrian and Pyrenean regions make an ideal case for controlled comparisons of human adaptive strategies, differing among specific habitats and changing through time.

THE REGIONS

Like Languedoc and Provence, the Vasco-Cantabrian and Pyrenean regions lay between the northerly and southerly provinces of Last Glacial Europe and shared elements of the flora and fauna of both provinces. The co-existence of red deer and reindeer is a most graphic example of this phenomenon. The complex, mountainous relief of the regions provided diverse microhabitats and both food and lithic resources for hunter-gatherers. Limited stands of thermophile arborescent species survived on south-facing slopes that were sheltered from winds and provided with local water sources. However, open plateaux and coastal plains were still particularly cold and stormy, with open grassland or heathland vegetation, at least in Dryas I, a period when mountain glaciers were still in existence in the high peaks of the cordilleran crest.

Vasco-Cantabrian Spain (the modern provinces of Guipúzcoa, Vizcaya, Cantabria and Asturias) is bordered to the north by the Atlantic, which, though particularly cold before the retreat of polar waters and the readvance of the Gulf Stream, was fairly rich in marine molluscs and fish and, especially, in anadromous salmonids. To the south, however, lies the high (ca. 1000 m.) northern Meseta of Castile, a region cold, resource-poor and inhospitable even today and undoubtedly far worse from a hunter-gatherer’s point of view during the late Glacial, especially when compared with the resource-rich (albeit narrow and stormy) north coastal strip. The continental shelf is narrow and steep, so even during the Last Glacial Maximum (ca. 18,000 BP), the shore was no more than 8-12 Km. north of its present position and increasingly closer to it during the Tardiglacial and early Postglacial. The region’s backbone, the Cordillera is fairly low in the eastern (Basque) sector but rises toward the west in Cantabria and eastern Asturias, before descending again in the direction of the Galician shield. The highest mountains, the Picos de Europa (max. elev. = 2600m.), are actually a separate chain north of the Cordillera and very close to the shore in eastern Asturias and western Cantabria. Low but steep mountain ranges run parallel to the coast and Cordillera in Asturias and Cantabria, where there are, nonetheless, stretches of narrow, rolling, karstic coastal plains and some fairly ample intermontane river valleys. In the Basque Country, the much less regularly structured mountains plunge directly into the sea and broad valleys are few, as are east-west avenues of communication.

Pyrenean France is a somewhat less easily defined region running along the northern flanks of the Pyrenees and including (for the purposes of this presentation) the upper drainage of the Garonne and Adour rivers, from the Ariège through the Haute-Garonne, Hautes-Pyrénées and Pyrénées-Atlantiques departments. (Pyrénéees-Orientales is not specifi-
flanked to the north by a parallel chain of low hills, whereas consists of vast, low or moderately low plains (the Aquitaine cation, east-west movement is quite easy directly to the north geologically dealt with here, as it is clearly within the Mediterranean geographic sphere, although there are artifactual, artistic and faunal indicators that suggest its cultural/adaptive alignment with the central and western Pyrenees in Magdalenian times.) The highest mountains are in the central sector; not much higher than the Picos de Europe, they too were glaciated in the Last Glacial, but, unlike them, still bear small remnant glaciers. Like the Cantabrian Cordillera and Picos, the Pyrenees drop much more steeply and deeply on the northern side than on the southern (meseta) site, and although the upper mountain valleys basically provide south-north axes of communica
tion, east-west movement is quite easy directly to the north of the chain. Most of the rivers soon trend westward toward the Bay of Biscay. (Only the Aude and a few shorter streams drain eastward into the Mediterranean. The Aude-Garonne watershed is a narrow, low one.) The central Pyrenees are flanked to the north by a parallel chain of low hills, whereas the orography of the French Basque Country is once again more confused, with many small, meandering valleys and few direct routes through the foothills. However, even in that westernmost sector, the northern edge of the Pyrenean region consists of vast, low or moderately low plains (the Aquitaine Basin and the Lannemezan Plateau). The continental shelf off Les Landes is broad and shallow, so the late Glacial shore was relatively far to the west of the present coast. A natural division between this region and the rest of Southwest France is difficult to define, especially since the marshlands of Les Landes are probably a postglacial phenomenon. However, a distinct linear pattern of Magdalenian sites exists along the Pyrenees, separated from the sites of Gironde, Dordogne and Lot by a relatively empty strip, suggesting the reality of a Pyrenean culture-area in Tardiglacial times, an impression supported by distinctive mobile and cave art.

**CHRONOLOGY**

The Solutrean of the northern flanks of the Pyrenees is essentially undated; most of the major sites of the period in this region were excavated before the discovery of radiocarbon. With the significant exception of Embulla (situated at 470 m. above present sea level in Pyrénées-Orientales) the French Pyrenean Solutrean sites are in lowlands or at most in foothills.

In contrast, the Solutrean of Vasco-Cantabria is well dated. The most recent, coherent determinations from the region are two dates of ca. 17 kyr from Level 17 at La Riera (Asturias) and three dates ranging from 17,580 ± 440 to 16,090 ± 240 BP from Level IV at Amalda (Guipúzcoa). The Solutrean sites are mostly concentrated in the coastal zone and in the lower river valleys, although a few are found on steep mountainsides at moderate elevations.

Leaving aside the question of the normative definition of such archeological constructs as the "Solutrean" and "Magdalenian", the earliest dated Tardiglacial deposits without Solutrean points in the Pyrenean region are all in the 14,000 year range and assigned to the "Magdalenian III" (Duruthy Level 5) or "IV" (Duruthy Level 4, Labastide, Aurensan, Diogène, Tuc d’Audoubert, Enlène, Fontanet). There would seem to be a significant hiatus in dated sites and no evidence for an "early Magdalenian" in this region. (The "early Magdalenian" site of Lassac, dated to 16,750 ± 250 BP and the "middle Magdalenian" site of Gazel, dated to 15,070 ± 270 BP, are both well outside the region, north of Carcassonne.) Cylindrical section harpoons appear in the Pyrenees around 12,500 BP and are replaced by flat-sectioned ("Azilian") ones around 11,000 BP (or perhaps at least 500 years earlier at some sites and a bit more recently at others).

Similarly, the existence of a Périgord-style "early Magdalenian" in Cantabrian Spain is problematical, although there are chronologically old deposits without Solutrean points at La Riera (Level 19, 3 dates: 16,420 ± 430-15,230 ± 300 BP; Level 20: 17,160 ± 440BP, El Rascaño (Level 5: 16,430 ± 130 BP), Ekain (Level e: 15,800 ± 350), Erralla (Level V, 3 dates 16,270 ± 240-15,740 ± 240 BP), and Urtiaga (Level F: 17,190 ± 190). Previously called "Magdalenian III", the earliest post-Solutrean cultural manifestations in the region are now generally referred to as "Lower Cantabrian Magdalenian", spanning the period from 16 or 17 kyr to about 14 or 15 kyr, when the first cylindrical section harpoons appear in the record at Tito Bustillo (hence, the beginning of the "Upper Cantabrian Magdalenian"). Some authors identify a "Middle Magdalenian" phase: at La Viña, with dates at 13,3 kyr, this is associated with "contours découpés" similar to those of the Pyrenean "Magdalenian IV". Other such finds dating to about the same period have been found in the "Lower" and "early Upper" Magdalenian of El Jayo and Tito Bustillo, respectively. The Azilian technology seems to have appeared by about 11,000 B.P. As in the Pyrenees, it and the Final Magdalenian seem to have overlapped within the Alleröd, at least within the limits of resolution of the existing radiocarbon dates (with typical single standard deviations ranging from about 100 to about 300 years). However, the Azilian seems in general to have begun somewhat earlier in France than in Spain.

**PALEOENVIRONMENTS**

The so-called Solutrean-Magdalenian transition in Cantabrian Spain occurred during the relatively temperate Lascaux oscillation immediately following the Last Glacial Maximum, well documented palynologically and/or sedimentologically at La Riera, Cueva Chufin, El Rascaño, Ekain and Amalda. Following this brief pulse in which arboreal vegetation (especially Pinus, accompanied by limited quantities of various decidous taxa including the Quercetum mixtum group) increased (AP ≤ 20%, there was a sharp decline in temperatures and humidity. Vegetation in the Dryas I was characterized by relatively dry steppe grasslands, with very small stands of pines. The rather intense cold of Dryas I was interrupted by a short oscillation probably corresponding to Pre-Bolling, during which cryoclastic activity decreased. The later part of Dryas I saw a return to very cold conditions with very few trees. The glacial conditions begin their ultimate
decline in the Bölling, which is represented by levels in several sites (e.g., El Rascaño, El Pendo, Tito Bustillo) and depositional hiatus in several others. A number of thermophile species of trees appear, in addition to the ubiquitous pines, in what must have been a nascent parkland at least in interior areas sheltered from the cold sea winds. The extent of climatic worsening in the Dryas II is presently in question. However this was a period in which reindeer, never truly abundant in Vasco-Cantabria, make their appearance in the archeofaunas of many sites stretching from Guipúzcoa as far west as eastern Asturias. Although there is controversy surrounding this issue, it seems that the Upper Magdalenian began in this time. Localized woodlands (with a variety of thermophile tree taxa, notably hazel) and ferns abounded in the particularly humid Allerød phase. Dryas III is not well known in Vasco-Cantabria, but at Berroberria and Ekain, tree pollens did decrease sharply and an open grassland briefly reappeared as the dominant vegetation type, albeit with scattered stands of pines and hazels. The Preboreal, beginning shortly before 10,000 BP, witnessed rapid reforestation of the region, first with pines and hazels, accompanied by smaller numbers of more warmth-loving deciduous taxa including oaks, elms and alders, as well as abundant ferns, attesting to high humidity. The regional Azilian technologically developed out of the Magdalenian in the late Allerød and Dryas III, and continued into the Preboreal. Specialized coastal shell midden sites (the “Asturian”) appear in the Preboreal and Boreal, and possibly also overlap in the early Atlantic period with the appearance of ceramics and domesticated animals.

The basic Tardiglacial paleoclimatic record of the western and central Pyrenees is, not surprisingly, similar to that of Vasco-Cantabria. Data are lacking for the period right after the Last Glacial Maximum (i.e., “Lascaux”), but the regional Dryas I was characterized by cold, dry conditions, with rich, open grasslands favoring vast herds of grazing ungulates including even saiga antelope recently found in the basal cultural level at Abri Dufaure (Stratum 6, 2 dates: 14,600 BP). Coastal areas had vegetation with some tundra elements, as well as steppe taxa. The Pre-Bölling, noted at Duruthy, saw a modest increase in arboreal pollen, mainly consisting of pine and birch, with some thermophiles. After a brief return to very cold conditions (Dryas 1b), the Bölling, beginning around 13 kyr, was marked by significant increases in trees, especially pine and birch, but also hazel, under conditions of great humidity and relatively mild temperatures particularly in summer. Dryas II does not appear in high-resolution deep sea cores recently drilled in the Gulf of Gascony/Bay of Biscay. The oxygen isotope records simply indicate a major, protracted period of warming from around 13 kyr to around 11 kyr, corresponding to the pollen zones of Bölling + Allerød. There are some indications, however, in the sedimentology and palynology of Duruthy and Dufaure and in the pollen of the Lourdes bog cores in the Pyrenean region for a brief, subtle period of cooling before the marked Allerød oscillation. Vegetation, particularly in lowland areas like those around Duruthy and Dufaure, consisted of rather dense parkland during the Allerød (itself subdivided into two warmer phases separated by a somewhat cooler, drier episode). Arboreal pollen percentages went as high as 50% and included several thermophile taxa. The period was marked by high humidity. Visible in the deep sea cores, Dryas III, although short (ca. 600 yr.) was a fairly brutal return to cold conditions, with a marked decrease in arboreal vegetation. Humidity nevertheless remained fairly high. Reindeer, which had thrived in the Pyrenean region in Dryas I, survived and were hunted in large numbers throughout Allerød (as shown by the radiocarbon-dated Final Magdalenian deposits of both Duruthy and Dufaure) Taxed by the effects of that temperate period, by competition from red deer (whose abundance steadily increased throughout Allerød) and perhaps by efficient, specialized hunting by humans, reindeer numbers dwindled dramatically in Dryas III, which is ironic since the environmental conditions would seem to have been more suitable to this arctic species at the time. Because of its ability to seek cool summer pasture in the Pyrenees, Rangifer managed to even survive into the Preboreal, when at least the lowlands were reforested with a wide variety of trees including thermophiles. The consistent presence of small numbers of reindeer remains throughout the Azilian deposits at Duruthy and Dufaure, which date to Dryas III and Preboreal, confirms earlier finds of reindeer in the Azilian of Le Mas d’Azil, Le Trou Violet and possibly La Tourasse, Massat and Montfort. Reindeer, extirpated in Périgord since Allerød times, also seems to have hung on relatively late in the regions adjoining the Alps and Jura, with their high summer pastures.

Both in Vasco-Cantabria and especially in the Pyrenean lowlands (better suited for the grazing of large herds), bison and horses were major game animals in the Magdalenian, but declined sharply in importance in the last centuries of the Glacial and first centuries of the postglacial. The changing relative proportions in the natural faunas of Bison priscus and Bos primigenius, both of which were present in the Tardiglacial of both regions, are impossible to accurately determine due to the great morphological similarity of most of the skeletal parts of both bovines. Thus the time of extinction of bison in these regions is not accurately known. Nor is the nature and timing of the decline of Equus caballus adequately documented; it clearly did continue into Postglacial times, but probably in much reduced numbers and herd sizes.

In both regions the Pyrenean ibex thrived in steep, rocky habitats, although certainly at lower elevations under the glacial conditions of the late Glacial. It was hunted from specialized upland sites since Solutrean times, a pattern also well documented at a number of Magdalenian and Azilian loci in the Picos de Europa, Cantabrian Cordillera and Pyrenees. Chamois were probably found in woodlands and thickets, especially in rugged (but not necessarily mountainous) terrain.

Red deer was the mainstay of all Paleolithic human subsistence in Vasco-Cantabria under all environmental conditions, as it is an extremely flexible species in terms of acceptable climate, habitat and diet. It was probably an ecological vicar of reindeer, slightly outcompeting and thus virtually excluding it from Vasco-Cantabria (which actually lies to the west and not to the south of the reindeer’s domain in Gascony). As the environmental conditions in Gascony became increa-
singly unfavorable to reindeer, red deer began replacing it in Allerød times. Much more strictly indicative of forested conditions, however, are the roe deer and boar, both of which become significant elements in the archeofaunas of both regions only at the close of the Glacial and beginning of the Postglacial.

Other major elements of the Tardiglacial faunas of both regions were members of the Carnivora. Their numbers and diversity were thinned through the course of the climatic oscillations of the period from Bölling to Preboreal. Extirpated or extinguished in these regions in this time period (or slightly earlier) were the dhole, arctic fox, cave lion, leopard, cave bear and hyena. This phenomenon was undoubtedly in large part related to the decline of large, herding ungulates.

### SETTLEMENT PATTERNS

Magdalenian sites have been excavated in Vasco-Cantabria since the 1870's notably beginning with the work of Sanz de Sautuola, who also discovered the rupestral art of Altamira. Many major sites were first systematically dug in the first two decades of this century and many were remarkably well published owing to the scientific rigor of such early prehistorians as Alcalde del Rio, Sierra, Vega del Sella and Obermaier. Luckily, however, Tardiglacial archeological deposits remained in many of the classic sites (e.g., Lumentxa, La Riera, Cueva Morín, El Rascaño, Altamira) and many more sites have been discovered from the 1950's through the present (e.g., Ekain, Erralla, Amalda, Arenaza, El Perro, La Plia, La Viña, Las Caldas, Cova Rosa, El Cierro, La Llueria, Entrefoces, et al.) permitting the carrying out of (re-)excavations, many of which have been the subjects of extensive, multidisciplinary monographs. Several doctoral theses (most of which have been published) have provided extensive syntheses and analyses of particular Paleoithic periods (including the Magdalenian and Azilian) and of individual sites (e.g., El Castillo, La Paloma) faunas, pollens and sediments.

Much work has been done to establish a regional chronostatigraphy independent of “dating-by-artifacts”, however nor enough Magdalenian sites are as yet radiocarbon dated or studied palynologically or sedimentologically to meaningfully analyze the settlement patterns of Vasco-Cantabria by individual climatic phases. In terms of fossil directors, which when present do have some temporal value, the Magdalenian deposits can be divided between those without and those with harpoons. Further normative temporal subdivisions have yet to be convincingly shown to have general validity. Neither of the two major subdivisions of the Magdalenian (Lower and Upper) seems to be represented by many more sites than is the Solutrean; each of the three periods is about 3000 years long and has about 35 known sites. In Vasco-Cantabria, the big increase in site numbers occurred in the Solutrean (Las Glacial Maximum), Whereas in the Pyrenees it came only in the Magdalenian (Tardiglacial).

In chronostratigraphic terms, the Lower Cantabrian Magdalenian corresponds basically to the DryasI, but it had begun in Lascaux and it also included Pre- Bölling and Bölling. Thus this was fundamentally a period characterized by cold climate and open environments, but with episodes of more moderate climate and somewhat expanded thickets, especially in sheltered interior valleys. Since the disappearance of Solutrean points and their apparent replacement by antler sagays, so common in the Lower Cantabrian Magdalenian, seems to have taken place during the course of Lascaux, it would be hard to ascribe a direct climatic cause to the technological change. However the backed bladelet technology, also very prevalent in the Lower Cantabrian Magdalenian, was already well developed in Solutrean times. Another aspect of continuity was the nucleiform endscraper, abundant in some assemblages of both culture-stratigraphic units.

The geographic distribution of Cantabrian Solutrean and Lower Magdalenian sites is identical; indeed most Lower Magdalenian deposits are underlain by Solutrean ones (i.e., the sites of the two entities are usually one and the same). In general terms, most of the sites are located within 10 km. (Usually less) of the present coast. Most would have been approximately in the middle of the Tardiglacial coastal plain, Particularly in Cantabria and eastern Asturias. Caves and rockshelters chosen for habitation in this zone were usually low, sheltered from ocean winds by ridges, and facing south to west for optimal solar exposure. These include such major residential sites as Altamira, Cueto de la Mina, La Riera, El Juyo, La Lloseta, Lumentxa, et al. (Virtually no open air sites are known from this period). In the Basque Country (especially Guipúzcoa) and in the mountainous interior of Cantabria and Asturias, there are major sites along the main river valleys (e.g., El Castillo, La Viña, Ermittia) and several sites (often smaller e.g., Las Caldas, Hornos de la Peña, Ekain, Erralla) on tributary side valleys, which are usually steep-sided culs-de-sac.

Overlapping with the latter two categories are sites which are located on particularly steep cliffsisdes on main or side valleys in the northern flanks of the Cordillera or Picos de Europa; such specialized ibex hunting camps include Collubi, El Rascaño, El Salitre and Bolinkoba. Although the elevations of these sites are not very impressive (usually 250-350 m. above present sea level), they lie within only 20-35 km. of walking distance of the present coast, which gives an indication of the abruptness of the terrain. These sites are usually adjacent to mountains of about 1000 m. or more in height and represent the evidence of the deepest significant penetration of the interior of north-central Spain (save for a Lower Magdalenian specialized chamois hunting site, Abautz, at about 700 m. above sea level on a side gorge of a northern Ebro tributary on the southern flank of the Cordillera in Navarra). This penetration of the mountainous interior seems to have continued a trend begun in the Solutrean.

Several (but by no means all) major sites (e.g., Altamira, El Juyo, Las Caldas, La Viña) were abandoned at the end of the Lower/Middle Cantabrian Magdalenian. And some major Upper Magdalenian sites seem to have been entirely new,
never before occupied, although located close to other sites with Lower Magdalenian deposits (e.g., Tito Bustillo, El Valle). Some other sites had been earlier occupied in Solutrean times and were then reoccupied in the Upper Magdalenian. However, many of the most important Magdalenian sites (e.g., La Paloma, Cueto de la Mina, La Riera, El Castillo, El Rascaño, Erralla, Ekain, et al.) contain both Lower and Upper Magdalenian deposits and usually Azilian ones as well. In the case of undated deposits, some assemblages lacking harpoons of either round or flat section could actually pertain to late time periods as a result of the sites not having had a role in human fishing activities. (Difficulty in distinguishing the three basic culture-stratigraphic units is particularly great in Asturias, where quartzite and consequently large, often "crude" flake—and chunk-based artifacts dominate the lithic assemblages.) In turn, there seems to be a notable difference in settlement patterns between the Lower and Upper Magdalenian divisions.

The settlement patterns of the Magdalenian in the Pyrenean region are based on an explosive increase in site numbers (>70) compared with all earlier time periods including ones of much greater length. Not only are there far more Magdalenian sites, but it was in this period that humans made the first really substantial use of the mountains themselves. There are open-air sites attributed to the Magdalenian, but most of the useful information comes from caves and rockshelters. The overall pattern is a linear distribution of sites along the northern flanks of the mountain chain (in the lowlands, in foothill ranges and at the very edge of the chain where rivers break through the mountains to the lowlands) combined with sites in high mountain valleys (notably in the upper valleys of the Ariège and Salat, but also in the Tet, Saison, Bidouze and Nivelle).

One of the most serious problems that affects the study of Tardiglacial settlement in the Pyrenees is unevenness of chronological precision. The region had the fortune (or misfortune) of being heavily researched and looted very early, from the mid-19th century through the first half of the 20th century. While several of the more scientific excavators were titans in the development of prehistory (e.g., Piette, Larret, Breuil, Saint-Périer, Péquart), their methods—particularly stratigraphic—were often crude at best by today’s standards. Other “antiquarians” conducted monumental diggings in many caves and left behind an even more meagre trail of data and the organized, commerical extraction of cave deposits for fertilizer was conducted on a much larger scale than in Vasco-Cantabria, which of course also suffered its share of early, poorly documented excavation. The upshot of this history is that many major sites yielded great masses of Magdalenian (and other) materials that cannot be given more precise chronological attribution (except when the presence of harpoons lets us know that part or all of the assemblage pertained to the Upper Magdalenian or certain diagnostic works of mobile art indicating the existence of a Middle Magdalenian). Recent efforts at studying what remains of old collections from these sites and dating bones or charcoal from them (e.g., at Labastide, Aurensan, Espelungue, Espéche), sometimes associated with new excavations (e.g., at Le Mas d’Azil, Enlène, Espelungue, Brassempouy), has much remedied this situation, but many major sites can still only be chronologically placed in a general sense and many publications are pending. Some efforts have begun to restudy collections from excavations which were competently conducted, but unfortunately just a little “too early” in this century (e.g., at La Vache, Isturitz) Several modern large-scale excavations have been recently completed or are still underway (e.g., at Les Eglises, Rhodes II, Malarode, Poyemau, Duruthy, Dufaure) and are adding much detail to our knowledge of Magdalenian chronology, environments, subsistence, seasonality and technology. As noted above, there seems to be a lacuna in the Pyrenean record between the Solutrean (none of whose sites are radiocarbon dated) and the well-dated “explosion” of Middle Magdalenian sites at right around 14,000 BP. There are a few assemblages attributed on rather vague typological grounds to the so-called “Magdalenian III”, but only one is from a modern excavation (Duruthy, Level 5) and it dates to 14,180 ± 200 BP, which is in the “Magdalenian IV” time range. At adjacent Dufaure, the basal level, with a small, basal lithic assemblage dates to 14,600-14,000 BP on the basis of 3 determinations.

The Middle Magdalenian of the Pyrenees is a rather extraordinary phenomenon. First, it is tightly dated at 11 sites by 24 radiocarbon and 1 thermoluminescence determinations between about 14,5 and 13 kyr (although there is a certain amount of circular reasoning involved in the stage attribution of dated materials from old collections). Second, it is defined by a remarkably rich inventory of mobile art works (some probably purely decorative/symbolic, others practical artifacts), notably contours découpés, spiral motif wands, fawn-bird motif atl-ats, and rondelles décorées et perforées. Some of these objects are found exclusively or almost exclusively in the Pyrenean region and only in this time slice. The main sites of this well-defined period include Duruthy (together with the other sites of the Pastou cluster: Dufaure and le Grand Pastou), Isturitz, Espelungue (and several of the other sites at Arudy), Espégluques (and other sites at Lourdes), Le Mas d’Azil, Enlène, et al. These and most of the many other sites with deposits attributed to this period are located either in the lowland valleys of major rivers leading toward the mountains (the Garonne and the lower Gaves de Pau and Oloron), in the Pyrenean foreranges (Petits-Pyrénées, Plantauel or Basque hills) or in valleys right below the first major Pyrenean range where major rivers break through to the lowlands (the Ariège, Salat, Garonne, Nesté, Adour, Pau, Ossau, Oloron and other rivers). There are a few possible Middle Magdalenian sites in the higher reaches of the Salat and Ariège drainages (notably Bédéilhac and Fontanet, neither of which has been studied in any detail). Obviously these categories of site locations overlap somewhat, but the main point is that, as in Vasco-Cantabria, the settlement pattern includes both lowland and upland sites linked by major river valleys descending from the cordillera. The largest, richest, probably residential sites are in low, sheltered locations, not surprising given the cold conditions still reigning in Dryas I. As in Vasco-Cantabria, some Middle Magdalenian sites lack Upper Magdalenian deposits (e.g., Brassempouy), but
most do and there are also sites that saw their first occupation in the Upper Magdalenian notably in the higher elevations of central Pyrenean valleys. Thus the Upper Magdalenian settlement pattern, referring to a period of more temperate climate and more wooded vegetation at least at the lower elevations, is basically similar to that of the Middle Magdalenian. Most of the biggest Upper Magdalenian sites are the same as the middle Magdalenian “super-sites” of the lowland and foothill areas (e.g., Isturitz, Duruthy/Dufaure, Le Mas d’Azil). But, perhaps related to the warming temperatures and retreating glaciers, there are more “mountain” sites, particularly in the upper valleys of the Ariège and Salat and their tributaries (e.g., Les Eglises, Niaux, La Vache, Rhodes II and other sites around Tarascon-sur-l’Ariège; Bedelhac and Massat in the upper Salat drainage may or may not have been first occupied in the Upper Magdalenian). Upper Magdalenian deposits also exist in the mountains of both the western and eastern Pyrenees (e.g., Berroberria and other sites around Sare and Le Trou Souffleur on the upper Tei). The “conquest of the Pyrenees” continued space in the Azilian (e.g., La Balma Margineda, at ca. 970 m in Andorra).

**SUBSISTENCE**

Beginning in Solutrean times and accelerating in the Magdalenian, hunter-gatherers in Vasco-Cantabria greatly intensified the food quest vis à vis that of their Middle and early Upper Paleolithic ancestors. That intensification had two aspects: specialization and diversification. Specialization particularly affected the hunting of red deer, a key food source since Mousterian times in this region. In many Magdalenian levels (e.g., at La Paloma, Tito Bustillo, la Riera, El Cierro, Altamira, El Juyo, El Castillo, Urtiaga, Ekain, Cervera) Cerbus is the overwhelmingly dominant species, with MNIs' of 15-30 per level typical. Some mortality data indicate that mass hunting was involved. Limited sex information for adult deer, coupled with the frequent presence of fawns, suggests that some of the hunting involved the slaughter of herds of hinds with their yearlings. Since most of the deer-dominated sites are on the coastal plains or in broad lower valleys, this makes sense because the female herds are generally found at lower elevations than the adult males, which are either solitary or grouped into small, fluid herds separate from the females except during rut in fall. By Solutrean and Magdalenian times, humans had developed tactics and weapons for efficiently driving, surrounding, and killing large numbers of red deer, probably utilizing cal-de-sac valleys, gorges, rivers, deep snow, and other natural features, as well as decoys, drive lines and beaters to their advantage in such slaughters. Earlier hunters had apparently tended to take red deer in much smaller numbers or just one-by-one.

**Subsistence diversification involved:** 1.) the more frequent, systematic hunting of a variety of other medium-small size ungulates that had been either totally or largely ignored in earlier periods and 2.) the utilization of aquatic resources and perhaps birds. Beginning in the Solutrean and continuing in the Magdalenian, Vasco-Cantabrian hunters systematically hunted ibex, which is to say that they were now for the first time exploiting steep, rocky habitats, sometimes in the flanks of the Cordillera and sometimes on cliff-like slopes of coastal ranges. Chamois were also systematically exploited generally to a greater extent than they had been before this time. With increasing forestation, boar and roe deer became more significant elements of the regional mammalian fauna and, unlike in earlier periods of relatively wooded environments, they too were hunted. Of course, horses and bovines continued to be important elements of the diet, if only due to their large body size, since large numbers never seem to have been killed at any one time. The first systematic exploitation of ibex and boars suggest that late Upper Paleolithic humans had developed ways and means for hunting swift and wary animals on the one hand and swift and dangerous ones on the other. The effective, efficient hunting of these animals, and the mass hunting of red deer imply that the human groups had good sources of information, planning and organizational ability, at least situational leadership, and projectile weapons. Fairly elaborate strategies may have been required to successfully hunt ibex, for example, utilizing beaters driving a herd (whose location had been carefully scouted out the night before the hunt) toward hidden hunters or toward cliffs too precipitous even for ibex. The large numbers of ibex remain at such Magdalenian sites as Collubil, El Rascaño, El Salitre, Bolinkoba, Erañila, Ermittia, and Ekain are testaments to this kind of activity. Solutrean and Magdalenian hunters were also for the first time systematically engaged in procuring small, burrowing fur-bearers (mostly mustelids and foxes), probably through the use of traps.

First documented in the Solutrean of La Riera, and continuing in the Lower and Upper Magdalenian of that site and others, especially in eastern Asturias (e.g., Tito Bustillo, Cueto de la Mina, Balmox, La Lloseta, Cova Rosa, etc.) and Cantabria (Altamira, El Juyo, La Pila, El Otero, La Chora, etc.), marine molluscs became a significant supplementary food resource, even when people had to carry them 1-2 hours to the sites from the Tardiglacial shore. The main shellfish taxa collected were various species of Patella (mostly P. vulgata) and Littorina littorea, inhabitants of estuaries and the upper littoral. But, as dramatically shown at La Riera, through the course of the Magdalenian crustaceans and more molluscan species were added to the diet, including ones inhabiting the more open, less easily accessible lower tidal reaches of the shore. And, as also demonstrated at La Riera as well as at a number of other sites, the size of the limpets decreased fairly steadily through time, at least in part due to overfishing by the humans. Anadromous fish also seriously enter the archeological record in this region in the Solutrean and increase in their representation in the Magdalenian (albeit always in small numbers, due to fragility, as well as poor preservation conditions and/or inadequate recovery methods). These include salmon and sea trout, as well as trout which remain in the freshwater streams. (Vasco-Cantabria remains a region with several rich trout and salmon rivers, despite the decimation caused by 20th century pollution.) In late Magdalenian times these fish, which could have been caught in streams and estuaries, are joined by a few marine fish.
which must have been caught from rocks off the open littoral (or from boats, for which we have no evidence).

Bird bones are quite frequent among the finds from modern, screened excavations of Magdalenian deposits, and were even noted in old excavations. They include both aquatic and terrestrial taxa. The bones often bear definite cut marks and were clearly butchered by people, but it is impossible to say whether they were used for both food and feathers or only for the latter. All these data clearly suggest that humans were under pressure to maximize their utilization of the food resources available to them in all the habitats of Tardiglacial Vasco-Cantabria. In turn, they seem to have placed considerable pressure on some of the animals they exploited by killing many young deer and limpets. Note that while we have no direct evidence for the exploitation of plant foods, which would have been increasingly available particularly in Bölling and Alleröd, there are heavy-duty choppers and bifaces and grinding stones in many Magdalenian sites; these may have been used to procure and/or process such foods (roots, nuts, berries).

Relatively little is known of human subsistence in the Pyrenean region before the Magdalenian. Isturitz is essentially the only site in the region with faunal information for the Solutrean, and it is imprecise; horses, reindeer and bovines were hunted, along with some saiga. With the Middle Magdalenian data become relatively abundant, however few are in quantified form. Reindeer was often the most frequently hunted game, followed by horse and then bovines (mostly bison), with trace quantities of saiga (an antelope much more common on the Dryas I steppes of Guyenne to the north). Red deer is usually represented in the lowland sites; traces of roe deer and boar in some levels are indicative of the existence of thicket species, perhaps mostly in Prebolling and Bölling. Horse is actually the numerically superior species sometimes (e.g., at Duruthy), but even when it is outnumbered by reindeer in terms of identified remains and/or individuals (as at Dufaure and Isturitz), it (and sometimes the bovines) may have provided more meat than Rangifer. However, at Enlène (and apparently at Le Portel also in the central Pyrenean foothill range), reindeer is extremely abundant and is almost the only ungulate present. In some respects the overall faunal inventory of the Pyrenean Middle Magdalenian is rather diversified, with three (or four) large-medium-size ungulates (reindeer, horse and bovines) all being important to the diet (and with red deer having non-negligible significance at some sites, such as Le Mas d'Azil, Isturitz and Dufaure).

The situation seems to change somewhat in the Upper Pyrenean Magdalenian, with more sites seeming to become more highly specialized in the hunting of one or the other of two medium-size ungulates: reindeer and ibex. At Duruthy and Dufaure, as well as in the collections of older excavations of Upper Magdalenian deposits at such sites as Gourdan, La Vache (Garrigou Hall), reindeer is overwhelmingly dominant. The Pastou sites (probably like many others in this region as in the Périgord) are located in front of a ford and there is evidence (in the form of a 19th century find of reindeer bones associated with Magdalenian artifacts in a bog on the opposite side of the Gave d'Oloron river) that mass reindeer kills were conducted at water-crossings, perhaps on traditional migration routes between the Pyrenean high pastures and the lowlands and coast of the southern Aquitaine Basin.

The other type of specialized hunting was, as in Vasco-Cantabria, that of ibex. The best studied of the hunting camps involved in large-scale slaughter of ibex is Les Eglises, high on a cliffside on the upper Ariège valley near Niaux. Fontanet, La Vache and other sites. Almost all the ungulate remains are of Capra pyrenaica. Other specialized ibex-hunting sites dating certainly or probably to the Upper Magdalenian include the Monique Hall of La Vache, the inner chamber site of Bédeilhac and the site of Belvis in the eastern Pyrenees.

Another interesting (and somewhat controversial) aspect of Upper Magdalenian subsistence in the Pyrenees is fishing, obviously suggested by the often abundant harpoons at sites in the region. Salmon are present Upper (and some Middle) Magdalenian levels both in the lowlands and in the mountains, along rivers that today or at least until recently were noted for their runs. Salmon bones were consistently noted in the early excavations throughout the region and have been found in substantial quantities in recent work at Duruthy, Arancov and Les Eglises (interestingly, although mammalian and avian bone is well preserved at Dufaure and one pike bone was found, salmon is absent and harpoons are very rare.) The Duruthy and Les Eglises remains, because they are well documented, are indicative of the fact that in the Upper Magdalenian salmon fishing was conducted both in the lower and upper courses of their spawning runs. However, the importance of fish in the overall diet is difficult to assess. If dried or smoked, salmon could have been an especially important tidying-over resource for lean seasons such as late winter. How fish procurement and processing were scheduled around such crucial activities as reindeer or ibex hunting, remains to be determined for any individual site.

As in Vasco-Cantabria, bird remains are fairly frequently found in Magdalenian deposits in the Pyrenean region, but their purpose as food or feather source (for fetching darts or arrows, for decoration, or for clothing) is unknown. At Les Eglises, along with the abundant ibex bones and salmon remains, there are many ptarmigan bones, suggesting systematic driving and netting of these ground-dwelling birds, probably on their low winter pastures. At Dufaure a substantial number of owl claws (with definite cut marks) have been found. Isturitz records birds throughout its long Paleolithic sequence and even a few in the Mousterian, though some may have roosted and died naturally in this vast cave. The numbers of bird remains does increase in the Magdalenian levels.

Finally, there are sea shells in Magdalenian sites along the entire mountain chain, those in the central area being as much as 220 km. from either the Atlantic or Mediterranean coast. Shells from both seas are present in many sites. Depending on the distance of each particular site from each coast, this evidence suggests the existence both of contacts and exchanges with groups that included one distant coast in their annual round, and of actual migrations to the other coast on the part of the group directly acquiring some of the shells. These shells (as well as fossils and other "curiosities" such as shark...
and cetacean teeth collected by Magdalenian people) were used for decoration. However, in at least the case of Isturitz, where there are relatively abundant littorinas in the Magdalenian deposits and where the Tardiglacial shore lay at a long day’s walk from the site, they may have served as supplementary food. As in Vasco-Cantabria, choppers and grinding stones have been found in Pyrenean Magdalenian deposits and may be evidence of the utilization of some plant foods, but this is not yet proven.

By and large, Upper Magdalenian subsistence in the Pyrenean region was fairly specialized, depending heavily on reindeer and ibex, of course with significant exploitation of horse, bovines, red deer (particularly toward the end of the period) and salmon.

**SEASONALITY**

Unfortunately the crucial element of seasonality is still relatively poorly documented, particularly in Vasco-Cantabria. However we do possess enough data to suggest that a significant difference may have existed between the two regions in the late Glacial with respect to how Magdalenian hunter-gatherers seasonally utilized lowland and upland habitats. Naturally one would expect hunter-gatherer use of the lowlands of the Cantabrian region to be in winter and uplands in summer, particularly as the chief game animal, red deer, is known in areas with hills or mountains at present to move high pastures in summer and to seek shelter at lower elevations in winter. While *Cervus* undoubtedly did move short distances altitudinally in the late Glacial, the limited seasonality data from mandibular dental eruption and wear sequences, long bone fusion evidence, salmon vertebrae sizes, etc.) from La Riera suggest a tendency for the site to be occupied by people mainly in spring and summer during the Lower and Upper Magdalenian periods, despite its lowland, coastal plain location. There is only slight indication of fall and winter use in two contiguous Lower Magdalenian levels. Red deer bones and teeth and limpet shell rings from the Upper Magdalenian deposit at nearby Tio Bustillo, also located on the coastal plain of eastern Asturias, adjacent to the estuary of a river leading up to the Ficos de Europa, indicate human occupation of the cave at all seasons of the year (although, of course, not likely continuously). Old faunal collections from the Magdalenian levels at Cueto de la Mina, located next to La Riera, confirm the evidence of multi-season use of the coastal plain. We as yet lack anything other than anecdotal information on seasonality form sites located in the mountainous interior of Asturias, but nothing yet suggests a single-season use.

On the contrary, in Santander we lack solid evidence of seasonality from the many major Magdalenian sites on the relatively broad coastal plain, but have good evidence from ibex remains of use of the upland site of El Rascaño at all seasons of the year. At El Juyo, a site where major slaughters of red deer took place in the middle of the coastal plain at times contemporary with the Lower Magdalenian of El Rascaño, the dental evidence does not permit elimination of the hypothesis of site use at all seasons of the year; spring is definitely represented by teeth of neonates among *Cervus*.

In Guipúzcoa, where the mountains plunge directly into the sea in most sectors, we have much more seasonality data. At Urtiaga, near the present shore, red deer and ibex were hunted at all seasons during the Magdalenian and at nearby Ermitia they were killed in summer and in late and early winter. At Aitzbitarte, also not far from the coast near San Sebastián, there is limited evidence of summer reindeer hunting. In the interior (not still nor far from the present shore: 7-9 km. further by foot), the Magdalenian levels of Ekain show red deer and ibex killing in early summer and fall, and those of Erralla show ibex killing in spring, summer, fall, and possibly winter. At Abaurz, on the south side of the Cordillera but within a long day’s walk of Aitzbitarte, chamois were killed in summer and fall, which is not surprising given the site’s interior location and high elevation. Ekain, Erralla and Abaurz have all yielded non-local flints, as well as seashells, as testimony to the movements of people to these interior sites from the coast. Shells are present in upland sites in Santander and Asturias as well, sometimes in substantial quantities indicative of a possible subsistence function.

To summarize the seasonality information from Vasco-Cantabria, both coastal and upland sites seems to have been used by people at all seasons of the year. The distances between most interior sites (including the specialized ibex-hunting stations) and the major sites of the coastal zone rarely exceeded 30 km. and movements of people between the two major habitats must have been very frequent.

The quantity, nature and results of seasonality studies and the scale of the exploited landscapes in the Pyrenees were quite different from those of the Cantabrian region. The study of long-distance seasonal movements of Magdalenian groups in the Pyrenees has been an object of study since the beginning of this century because of the abundance of remains of and obviously great reliance on reindeer. As will all seasonality studies based on the biology and ethology of animals, numerous uniformitarian assumptions have had to be made concerning the biology and behavior of *Rangifer* in the Tardiglacial environments of the middle latitude location of the Pyrenees based on modern observations at high latitudes.

One critical consideration that is often ignored is the fact that the nature and scale of reindeer migrations can be very different in mountainous regions than in the “classic”, usually flat, barren grounds of Canada. It was noted above that there is ample evidence in the Pyrenees for long-distance contacts or movements in the form of seashells, shark teeth, fossils, etc., and, less specifically, in the form of distinctive art styles found in Magdalenian sites and in presumed Magdalenian cave art sanctuaries from one end of the region to the other. To prove that human groups actually moved long distances: across at least parts of this region in extensive annual subsistence rounds, one has to show their presence at particular sites in certain types of habitats at some season(s) and --more difficult to demonstrate-- their absence from those sites at other seasons.

Seasonality studies using modern methods (analyses of ungulate mandibular dental eruption and wear, dental...
of cervid antlers) have been carried out on remains from three in the central mountains. Analyses of teeth have also been done on a much larger sample of Magdalenian collections from older excavations, some of which lack all but the most general chronological control.

At the Pastou sites of Duruthy and Dufaure there is no evidence of summer occupation in Upper Magdalenian times (or, although the data are scanty, in Middle Magdalenian). At Dufaure this is based not only on cementum annuli from reindeer, but also from red deer, bovine, and horse. At Duruthy, salmon fishing was done in early fall, whereas the absence of salmon remains at Dufaure suggests a human pattern of arrival at that site in late fall, after the salmon had already passed through the lower course of the Gave d’Oloron en route to spawning areas in its upper course in the mountains. The Dufaure Upper Magdalenian avifauna contains several winter visitor species, but no summer residents. Humans seem to have used the Pastou sites until spring, although there is no way to prove that they were at the sites continuously during any one year from fall through spring. Reindeer from old Middle Magdalenian collections of Brassempouy (also in the lowlands of Les Landes) indicate only spring occupation, whereas the reindeer from undifferentiated Middle and Upper Magdalenian deposits at Isturitz, in the foothills of the Basque Pyrenees about 30 km. south of Pastou, indicate occupations in late winter, spring and summer. Middle Magdalenian reindeer form Espalungue at Arudy, about 70 km. upstream of Pastou on the edge of the Pyrenees, were killed in spring and winter, while those from the undifferentiated Magdalenian of Espèlugues at Lourdes, in a similar location at the edge of the mountains about 100 km. upstream from Pastou, were killed in summer and fall.

Further east, in Hautes-Pyrénées and Haute-Garonne, the mountain-edge, Magdalenian IV-VI sites of Gourdan and Lortet have occupations of spring, summer, fall and, at the former, some winter utilization, whereas the old excavations at Lespugue in the Save gorge of the Lannemezan plateau of the mountains yield evidence suggestive of only cold season occupations. In the foothills of the Ariège, the Middle Magdalenian of Enlène and Le Portel and the undifferentiated Magdalenian of Le Mas d’Azil give results indicating mostly winter and spring reindeer hunting. As expected, reindeer in the high mountain site of La Vache in the upper Ariège drainage were killed in spring and summer. However, ibex teeth and salmon vertebrae from Les Eglises, near La Vache, show it to have been occupied repeatedly and exclusively in late fall/winter. Ibex (and ptarmigan) were killed on their low winter pastures (driven downslope by snow) and salmon were fished in their spawning waters in the upper Ariège. It has been proposed that La Vache and the nearby site of Bédédeilhac may have been used both in summer as base camps for hunting reindeer on their high pastures and as specialized ibex hunting stations in winter, since both species are present, but mostly in different (outer and inner) chambers of the caves. This hypothesis and the hypotheses of summer occupations of the mountain sites of Belvis, Massat and Fontanet, remain to be tested, however.

In sum, lowland locations seem mostly to have been used for cold season occupations, whereas mountain locations could be used either for summer residence or for specialized hunting and fishing in late fall and winter. Sites right along the edge of the mountains, but not at high elevations, are more ambiguous, since they could have used at either cold or warm times of the year, easily exploiting both upland and lowland resources and ambushing game during the transitional migration seasons of fall and spring at valley chokepoints along the routes between mountain and low pastures. Palaeontological measurements from a number of Magdalenian sites in the Pyrenean region and in Guyenne show that the reindeer in the former region were larger than those of the latter and were thus probably separate populations. The Pyrenean herds probably conducted their full annual migratory pattern within that region and did not go north to Guyenne, as others have argued from time to time.

MOBILITY STRATEGIES

It is proposed on the bases of the information developed above, that the Magdalenian settlement-subistence systems operative in Cantabrian Spain and in Pyrenean France systems made differing uses of residential and logistical mobility. In the former region most of the large residential sites (based on the richness and diversity of their assemblages of bone and stone tools and manufacturing debris, the abundance of faunal remains of many types and species, the thickness of their deposits, the presence of many features such as pits, pavements and hearths) are located on the coastal plain or along the broad, lower valleys of rivers in the foothills. Bands may have moved their residential loci among such sites as local foraged supplies of food and fuel were temporarily depleted or as trash and vermin built up. They generally moved among sites with similarly attractive features in terms of shelter, insolation, water availability and central location vis-à-vis the coast and the mountain edge. Because of the short distances to the upper river courses and Cordilleran slopes, those habitats could be exploited at all seasons of the year by parties on short expeditions from the lowland sites. There is no evidence of strictly seasonal altitudinal transhumance, probably because all the resources of the region were so close at hand even from sites in the middle of the Tardiglacial coastal zone and because the main game species, red deer, is not usually a long-distance migrator. It does move altitudinally, but its migrations pale in comparison to those of its distant cousin the reindeer. The interior of vasco-Cantabria could of course be used residually by bands as well as logistically by parties, perhaps mostly in summer, but this remains to be shown.

Something closer to a transhumant system seems to have operated in the Pyrenean region. Sites like Duruthy, Dufaure, Enlène and Le Portel were cold-season residences. The amount of construction, especially at the Pastou sites which
have good shelter, insolation and strategic values, is evidence that people repeatedly came back to these lowland locations. When at the Pastou, the humans exploited flint sources in the vicinity of the sites. While it is unlikely that whole human groups moved the entire length of the Pyrenees during an annual round, individual bands may have followed or at least intercepted reindeer herds in different parts of their movements between upland and lowland pastures, travelling perhaps hundreds (but not thousands) of kilometers in a year. Summer residential base loci were thus in or at the edge of the mountains. However, groups based in the lowlands in winter also dispatched hunting/fishing parties into the mountains. Lithic raw material evidence from Les Eglises shows that the hunters came there equipped with artifacts and blanks of flint from the eastern lowlands. Other lithic evidence seems to link sites of the Ariege mountains with lowland areas around Mas d’Azil-Ealene. There are flints at Isturitz from known sources near the Pastou. In short, the Pyrenean evidence suggests substantial residential mobility on a seasonal schedule and on an altitudinal axis, combined with logistical mobility to exploit particular resources (e.g., ibex, salmon, ptarmigan) in a seasonal direction opposite to the fundamental regional rhythm of the reindeer migrations. It was in the course of the residential moves, tied to the reindeer migrations, that Pyrenean human bands may have exchanged members, objects, information about resource location and condition, and ideas. In the context of the wider “Magdalenian” world or community, and despite contacts to Vasco-Cantabria, Catalonia, Languedoc and Guyenne, the intensity of social contacts within the shared ecosystem of the Tardiglacial Pyrenees must explain the distinctive art styles of this region.

POST-PLEISTOCENE ADAPTATIONS: CHANGE VERSUS CONTINUITY

The Azilian of Cantabrian Spain and Southwest France is technologically an offshoot of the Magdalenian, usually with fewer formal tool types, simpler manufacturing techniques often emphasizing flake blanks, fewer burins, more (especially short) endscrapers, little mobile art (save some engraved bones and cobbles and, exceptionally, cobbles painted with geometric designs or dots) and simple, undecorated, flat-section harpoons in place of the often elegant, sometimes decorated round-section Magdalenian ones. As noted above, there is evidence that the development of the Azilian technology occurred earlier in some parts of France than in Cantabrian Spain. Here we are concerned with the nature of the change in adaptations that happened at the end of the Last Glacial, a period of great climatic and environmental instability.

Humans in the Pyrenean region seem to have increasingly heavily exploited reindeer even after optimal conditions for this species had ended in Allerod. Whether humans contributed to Rangifer’s eventual local extinction would be worth investigating. A few reindeer survived through the better conditions of Dryas III (but were apparently already too decimated to demographically rebound) and even into Preboreal at Duruthy and Dufaure (and possibly elsewhere in the Pyrenean region), probably because they could seek cool summer pasture in the mountains. However, red deer, which had been steadily increasing from Allerod times, rapidly took their place, causing major changes in settlement-subsistence systems. Red deer live in smaller herds and migrate less than reindeer. The implications for human group and territory size, mobility and hunting strategies would have been dramatic. First defined in the Pyrenees at Le Mas d’Azil, at most sites (except the type site) the Azilian occupations are rather small. This is the case, for example at Duruthy, Dufaure and Isturitz, where the occupied areas are far smaller than in the Upper or Middle Magdalenian. Most Azilian levels lie atop Upper Magdalenian ones-in short, the same places were chosen for occupation. But those places were probably used rather differently, in the context of much smaller annual rounds, possibly by much smaller co-resident family bands. The increase in true woodland species (boar and roe deer), more solitary and sedentary than the gregarious, mobile open country game species of the Glacial, would have contributed to decreasing territory size and mobility on the part of the humans. Nonetheless the specialized ibex-hunting site phenomenon continued in the Azilian, with such sites as La Balma Margineda in Andorra. In the Pyrenean Azilian people were finally forced to descend the food chain and eat land snails, creating huge middens in some caves. Nuts and other plant foods also probably became crucial. The conditions of the Postglacial came as an abrupt shock to the hunters of southern France, so highly dependent on reindeer, horse and horses right up to the end in the Allerod. Thus it is not surprising to see some evidence of an early shift to the Azilian technology in some areas and a desperate hanging on to Magdalenian ways in other areas in Allerod. When the latter strategy became totally impossible, it is understandable that the entire system of widespread residential mobility, seasonally large co-resident groups, and a rich intra-regional social, symbolic and cybernetic existence came to a rather sudden end. Here the Azilian really represented a period of sharp readjustment using the technological and topographical knowledge of the past in order to survive in a radically new world.

In contrast. In Cantabrian Spain, where reindeer had never been dietarily important and where horse and bison had had only limited importance, the end of the Glacial came as much less of a shock. The same key food resources (red deer and ibex) remained. Indeed, the shift toward a diversified, “Mesolithic-type” subsistence had been gradually occurring, probably because of regional population pressure, since Solutrean times. Shellfish, crustaceans, fish, birds and probably nuts, roots, berries and seeds were not new. Azilian levels almost always lie above Upper Magdalenian ones. But by Preboreal times the coastal cave sites often became “Asturian” dumps for shells and other bulk garbage, while Azilian-type sites with their lithic armatures continued to exist in the interior hills and mountains, sometimes in association with specialized ibex hunting. Exploitation of red and roe deer, boar, birds and fish went on much as before in similarly small, only now more wooded, territories. Gone was the
cave art, but little else seems to have changed; a longstanding trend in human adaptations simply continued. By the time of the tardy arrival in Vasco-Cantabria of domesticated animals and ceramics, the preexisting societies simply seem to have grafted the new food sources and artifacts onto their already highly diversified system. Perhaps major change came only with the Bronze Age?

So two adjacent regions, at the same latitude, sharing the same mountain chain and the same technological and artistic traditions continued to go their separate ways. Their people, members of what archeologists have called the Magdalenian and Azilian traditions, were part of a broader community of interactions, but practical circumstances led them to seek somewhat different lifeways. So too in the modern European Community may the Pyrenees, Gascony, Euskadi, Cantabria and Asturias enjoy their different solutions!
ESSENTIAL BIBLIOGRAPHY ON THE PYRENEAN AND VASCO-CANTABRIAN MAGDALENIAN AND AZILIAN

Abbreviations:

BAR: British Archaeological Reports, Oxford.
CIMA: Centro de Investigación y Museo de Altamira, Santander.
SPA: Société Préhistorique de France.
SPF: Société Préhistorique Française.


N.B. For more references, consult all the works cited above.