



THE MESOLITHIC OF IBERIA

FOLLOWED BY FEATURE ESSAY ON:

Muge Shell Middens 164

Until the end of the Ice Age hunter-gatherer settlement in the interior of Iberia must have been as important and permanent as that of the coastal regions of Asturias, Cantabria, the Basque country, Portuguese Estremadura, and the Mediterranean arch (from Gibraltar to the eastern flank of the Pyrenees). This is best exemplified by the open-air art and habitation sites of the Douro basin, particularly those found in the Cóa River valley. After that, however, the interior *mesetas* show few signs of human occupation until almost 4000 B.C., when they were resettled extensively by farmers. No taphonomic biases that could explain this pattern have been identified, which suggests that it is indeed a genuine reflection of regional settlement histories.

The reasons behind this major reorganization of human settlement from the interior to the coasts probably are related to the abrupt climatic change that occurred at the transition from the Dryas III to the Preboreal periods (c. 9500 B.C.), when average temperatures rose by several degrees in a single generation. Another consequence of this process was the rapid flooding of the vast littoral platforms that extended beyond present-day coastlines, especially along the Atlantic. As a result an economic shift toward increased reliance on aquatic resources is evident in all coastal areas of the peninsula. It must be noted, however, that the inception of this trend can

be traced back to Magdalenian times (between c. 17,000 and c. 12,000 B.C.) in such areas as the Cantabrian coast and the bay of Málaga. In these areas, because of the abrupt submarine relief, today's coastal sites are quite close to the later Palaeolithic and Early Mesolithic seaside, permitting the preservation of an archaeological record of adaptations that elsewhere was destroyed by the rise in sea levels.

The effects of such a shift are most visible in the marked contrast that exists between the Portuguese sites located on each side of the Dryas III-Preboreal divide. Earlier, sites that were located no more than 10 kilometers away from the sea do not contain shell middens. Afterward, most sites are shell middens or else contain a significant shell-midden component, even if they are located at distances from the sea in excess of 40 kilometers. Given the distances involved, the accumulation of coastal and estuarine resources at such inland sites cannot have been related to procurement within the site's immediate environs. More likely it suggests the accumulation over time of the residues of small amounts of food transported and consumed upon arrival at or during the first days of the occupation of recurrently used seasonal or functionally specialized sites. Movement by water inside such territories must have been fairly easy and fast. Fed by precipitation well above that of the region's present-day Mediter-



Selected sites in Mesolithic Iberia.

anean climate, the rivers and streams of the Early Mesolithic flowed through freshly incised valley bottoms and therefore must have been larger and deeper, making for quite practical communication routes if canoes were used. In such a scenario the size of economic territories would have increased threefold, from about 500 square kilometers, hypothesized for the Upper Palaeolithic, to the some 1,500 square kilometers implied by the interpretation of the Early Mesolithic inland cave sites with shell middens as complementary to residential camps placed along the coast.

The critical role of aquatic foods in Preboreal times probably explains the apparent Mesolithic abandonment of the interior Iberian *mesetas*. Unlike European areas north of the Pyrenees, where contemporary occupation of the Continental hinterland is documented, the interior of Iberia lacks important lakes, and the rivers, even the largest, often dry out in the summer over extensive stretches. In any case the absence of human settlement from vast regions with a very dense temperate forest cover is documented in other parts of the world. A similar pattern, for instance, has been observed in southwest Tasmania, where at the time of contact the inland valleys had been devoid of humans from the beginning of the Holocene, despite the abundant

archaeological evidence of occupation throughout the Ice Age.

A further implication of the Portuguese evidence is that, by comparison with late Palaeolithic times, not only population densities but also the overall population size must have decreased significantly in the Early Mesolithic. In fact the area available for settlement became significantly reduced by the rise in sea level. Nevertheless the size of economic territories seems to have increased. This is the opposite of what would have happened if the same number of people settled the now smaller area available for occupation. Along the northwestern and southwestern coasts of seventeenth-century aboriginal Tasmania, individual bands of up to 50 people wintered at residential camps situated at intervals of about 50 to 100 kilometers and placed in the major estuaries of this 1,000-kilometer-long coastline. This seems to be a reasonable settlement analogy for the Iberian Mesolithic, at least along the Atlantic, where human adaptations operated under similar environmental constraints and with a similar economic basis.

THE CANTABRIAN COAST

In Cantabrian Spain the cultural transition from Azilian to Asturian stone tools takes place throughout the Preboreal, accompanying the transition

from glacial to fully temperate climatic conditions. The Azilian is a continuation of the Magdalenian with the same blade/bladelet stone technology rich in microliths but with different types of bone harpoons. The Asturian features macrolithic cobble (rock) tools. Most Asturian sites are shell middens accumulated in rock shelters and cave porches and are located in the region's narrow strip of plains and lowlands between the sea to the north and the Cantabrian Mountains to the south. The characteristic stone tool is the Asturian pick, a flat cobble (in this case a rock rolled by the sea or a river), 8–10 centimeters long, featuring a cortical (the outer, weathered, rolled “skin” of the cobble) base and a unifacially shaped point (shaped on one side only), triangular in cross section, which may have been used in the collection of plants. Food residues—mollusk shells, fish remains, and mammal bones—document the exploitation of the resources provided by the rich coastal waters, combined with the exploitation of the forests covering the adjacent hills and mountain slopes. *Patella* and *Monodonta* species (limpets) dominated among the mollusks and red deer among the land mammals, but aurochs, horses, wild boar, roe deer, chamois, and ibex also contributed to the menu. The little seasonality information that is available does not record summer occupations, suggesting that intensive shellfish gathering played a supplementary role, mostly during the cold season, when other resources (especially plant foods) were scarce or unavailable. Specialized sites high on mountains are known, as are a few occupations in intermediate territory. It is as yet unclear whether the latter sites represent logistical or seasonal establishments integrated in the settlement-subsistence system of the coastal lowlands or separate interior adaptations. The areas rich in raw materials for stone tools indicate rather small territories, which is more consistent with the second hypothesis.

No art objects are associated with the Asturian, but burial is documented, notably that of an elderly female from the Molino de Gasparín shell midden. Excavated in 1926, this woman was found in an extended position, with three picks laid on stones by her head. A mound, on top of which a fire had been lit, covered the body. Between 1985 and 1990 seven people, buried in three features, were excavated in the Los Canes cave (Asturias). The human

bones from this burial were dated by radiocarbon to the period between about 6000 and 5000 B.C. The cave contained no traces of habitation from this time period, suggesting that it was used only for funerary purposes. The bodies were placed in *decubito supino* (lying on the back) or in *decubito lateralis sinistro* (lying on the left side) in association with body ornaments—pierced red deer canines and perforated shells of *Callista chione*, *Trivia europaea*, and *Littorina obtusata*—bone tools, cobbles, and animal bones, conceivably representing meat offerings. One of the bodies a very gracile female, offered an extensive picture of dental problems, with caries, abscesses, and alveolar resorption (receding gums) affecting the upper jaw. No such pathological conditions are known in the other human remains from the regional Mesolithic, suggesting that toward the end of the period diets became richer in carbohydrates, specifically plant foods.

Pottery is present in this region from c. 4900 B.C., as evidenced by Accelerator Mass Spectrometry (AMS) radiocarbon dating of charcoal collected from the fabric of a sherd taken from Los Canes level C, above the stratigraphic horizon corresponding to the burials. Because no evidence for domesticates exists in this area before c. 4200 B.C., it would seem that such early pottery represents a technological introduction into a hunter-gatherer context, documenting the existence of exchanges with the groups of farmers that had become established in the upper Ebro basin. The survival of hunter-gatherer economies until well after 4900 B.C. is documented by Mesolithic levels in the cave sites of Pico Ramos and la Trecha, which date to as late as 4300 B.C. and contain no domesticates, animals or plants. Although the evidence at present is ambiguous and the existence of a pre-Megalithic Neolithic is suggested by different lines of evidence, it seems that in Cantabria, as well as in Galicia and northwestern Portugal, the appearance of peasant-shepherd groups roughly coincides with the beginnings of megalith building during the second half of the fifth millennium B.C. It seems clear that this is a local process, with little demographic input from the outside and high levels of cultural continuity, representing the adoption by local hunter-gatherers of economic and technological innovations acquired through trade and exchange.

Beyond the eastern border of the distribution of Asturian sites, stone tool assemblages in the coastal areas of the Basque country, labeled post-Azilian, are characterized by different kinds of flint microliths, with geometric types dominating toward the end of the sequence. Adaptations and the timing of economic changes, however, follow along the same lines documented for the Asturian, as exemplified by the stratigraphic sequence in the Santimamiñe cave from post-Azilian to Neolithic and by the beach site of Herriko Barra. The burial of a twenty-five-year-old man of average height, accompanied by a headless dog and a lamb, in level I of the Marizulo cave represents the earliest secure evidence of farming in the region; the human skeleton has been dated by radiocarbon to about 4150 B.C.

THE WESTERN FACADE

Asturian-like picks associated with other large core-and-flake stone tool assemblages made on beach cobbles and believed to date to the Early Holocene on geological or typological grounds are common finds along the shores of Galicia and northwestern Portugal. No *in situ* contexts with organic remains have been found; thus our knowledge of the period's human adaptations in these regions is scant. The continuity with the Asturian seaside in landscape and ecology, however, suggests that the Mesolithic settlement of these regions must have been organized along similar lines.

Many Preboreal and Boreal sites are known to the south of the Mondego River. Their geographic distribution is in apparent continuity with that of the latest Upper Palaeolithic, even if their other characteristics differ significantly, given the emphasis on aquatic resources and the apparent changes in mobility patterns and population sizes reviewed earlier. These changes are related to the major impact upon animal populations of the alterations in climate and vegetation: the biomass of large mammals was reduced drastically, open-space species (chamois and ibex) retreated to high mountain areas outside the region, and horses saw their habitat limited to the fluvial plains. As a result, from the end of the Dryas III (the Pleistocene or Ice Age) onward, the composition of hunted mammal faunas is dominated by red deer, along with aurochs, roe deer, wild boar, and lagomorphs (hares and rabbits).

Consideration of site size and assemblage composition indicates that sites from these periods can be divided into three groups. Extensive open-air sites containing a diversified stone tool component with several types of armatures (stone tools that can be used as arrow or spear points) are found in interior areas. Most lack organic preservation, which is an indirect indicator that subsistence activities relied on the exploitation of terrestrial resources alone. (The abandonment of mollusk remains would have created a carbonated environment favorable to the preservation of both shell and bone.) Small open-air sites containing scarce and less-diversified stone tool remains but featuring abundant remains of mollusks exist along the present-day coastline in locations that correspond to the bottoms of the estuaries of the time, when sea level was still lower than it is in the twenty-first century. A few caves and rock shelters feature organic remains related to the exploitation of food resources of terrestrial and coastal origin and tool assemblages that include several types of armatures, but the small overall size of the cultural accumulations suggests very short or rare stays. The most reasonable explanation for these differences is functional complementarity between recurrently occupied residential sites and smaller specialized or seasonal sites used or created in the framework of a highly mobile settlement system. In southern Portugal extensive sites covering many thousands of square meters and having hearth features associated with a core-and-flake macrolithic tool kit (such as Palheirões do Alegria in coastal Alentejo or Barca do Xarês in the Guadiana River region) have been dated to the Boreal. These sites correspond to palimpsests resulting from the accumulation of many different, repeated, and probably specialized occupations.

The onset of the Atlantic climatic optimum, c. 6500 B.C., brought about a major reorganization of settlement, which at that point focused on the inner parts of the estuaries of the rivers Mondego, Tagus, Sado, and Mira. Stone tool kits of the period are dominated by geometric microliths made in the framework of a sophisticated blade-bladelet production system featuring pressure flaking and indirect percussion, and they contrast markedly with those of the preceding phase, when armatures tended to be very small retouched bladelets extracted from small carinated cores. The exploitation of these re-

source-rich ecotones led to the formation of large heaps of bivalve mollusks, the extension of which (both in area and in height) significantly transformed the original topography of the terrain.

The Muge middens, in the Tagus, are the best example of this new kind of site, which is suggestive of sedentary or near sedentary residence, an inference that agrees with available seasonality evidence. The fact that these sites also functioned as cemeteries, indicating the existence of a proprietary relationship of the different bands with their territories that was transmitted across generations, points in the same direction. It is estimated that three hundred skeletons have been excavated from the different Muge sites and one hundred from those in the Sado Valley. The importance of aquatic foods is confirmed by stable isotope analysis of these skeletons, according to which such resources contributed with some 50 percent of the diet.

Occupation of these estuary habitats seems to have peaked in about 6000 B.C. and lasted until 4750–5000 B.C. From roughly 5500 B.C. these hunter-gatherers coexisted with farmers settled in the limestone massifs of the region between the Tagus and Mondego. Such earliest Neolithic groups possessed domestic sheep (whose bones were dated by radiocarbon at the cave site of Caldeirão) and are defined by a material culture that is totally lacking in contemporary Mesolithic shell middens. It includes such items as cardial-decorated pottery (Cardial Ware culture), polished stone axes, and flint tools obtained with a technology involving heat pretreatment of the rock. Among body ornaments, tear-shaped *Glycymeris* beads as well as pierced red deer canines and bone beads imitating their shape feature prominently. Caves are used as cemeteries, and stable isotope analysis of these remains indicates a fully terrestrial diet, in marked contrast to that of the people buried in the Muge and Sado middens. These two cultural packages with mutually exclusive geographical distributions must represent separate adaptive systems, not different functional or seasonal aspects of a single, highly diversified system. The similarities in culture and adaptation between the earliest Neolithic of Portugal and that of the Mediterranean regions to the east, combined with the enclave nature of its initial settlement pattern (the areas occupied are devoid of Mesolithic sites postdating the onset of the climatic

optimum), suggests that it represents a cultural intrusion not an in situ development.

The temporal, geographical, and archaeological features of the process indicate maritime pioneer colonization by small groups of farmers, their subsequent expansion leading, through intermarriage, to the absorption of the local Mesolithic groups, whose economy implied a significantly lower demographic potential. An alternative hypothesis is that of precocious adoption of the Neolithic package by hunter-gatherers living in the limestone massifs of Estremadura, while those living off the river estuaries would have retained the traditional way of life for several hundred more years. Studies of human skeletons provide results that can be construed as indicating significant continuity in populations across the Mesolithic-Neolithic boundary, in accordance with such an alternative model. No signs of the putative Late Mesolithic adopters, however, have been found in the limestone massifs (which seem to have been abandoned by humans after c. 6000 B.C., except for fleeting occupations at caves near the springs that dot its periphery).

Likewise there is no readily apparent explanation for why adaptations in the two areas followed such different strategies after the Neolithic package became available to both groups through the long-distance exchange networks in which all human groups living in coastal Portugal must have participated. Moreover significant continuity in skeletal morphological characteristics is to be expected if the external Neolithic input was small or if no significant genetically based differences in such features existed in the original Late Upper Palaeolithic Mediterranean stock from which the different groups involved in the process must have derived.

THE MEDITERRANEAN ARCH

Along the Mediterranean coast between Gibraltar and Valencia cultural continuity across the Pleistocene-Holocene boundary (c. 9500 B.C.) is clear and unambiguous. As in the better known Magdalenian-Azilian transition of the Cantabrian coast, regional late Magdalenian industries gradually evolved into what is called the Mediterranean Microlaminar Epipalaeolithic. The latter period is characterized by a decrease in the size and variety of bladelet armatures, which become restricted to a few types of backed elements, and by the scarcity,

if not altogether disappearance, of bone tools. The earliest such assemblages have been dated invariably to the period immediately before the Dryas III–Preboreal divide. They seem to have lasted until the middle of the eighth millennium B.C. By that time modest amounts of small-sized geometric microlithic armatures (crescents, trapezoids, triangles), reminiscent of the Sauveterrian phase of the Mesolithic of regions farther to the north, had been introduced in stone tool kits.

As in Portugal, the economic impact of the global climatic change is apparent in the dramatic increase in the consumption of aquatic resources. The trend was in place by later Magdalenian times, as shown by the Nerja cave sequence, which contains abundant fish remains. Their number is five times greater than that of rabbits in the Magdalenian, but, in the Preboreal levels, fish outnumber rabbits 10 to 1. The collection of sea and land mollusks as well as pine nuts and acorns also is attested to in the Early Mesolithic levels, even if the bulk of food supplies continued to be represented by the meat of red deer and ibex, as in the preceding later Magdalenian. The significant broadening of the menu also is exemplified by the remains of seals and of different species of birds, such as ducks and partridges. Available seasonality indicators suggest that Nerja was occupied in autumn and winter, which means that the exploitation of aquatic resources may have been most important during the cold season, as also may have been the case in Asturias and Cantabria. Summer camps and summer activities probably are recorded in open-air sites that remain to be identified; this exclusive representation of caves and rock shelters in the regional sample of sites significantly hinders understanding of its Early Mesolithic settlement.

After about 7000 B.C. regional stone tool assemblages change into what is called the Mediterranean Geometric Epipalaeolithic, featuring a blade/bladelet technology geared toward the extraction of blanks for the production of geometric armatures manufactured through the microburin technique. At the stratified cave site of Cocina, an earlier phase, dominated by trapezoids, can be distinguished from a later phase, dominated by triangles, mirroring the similar development apparent in the Portuguese shell middens of Muge. Ibex was the prime game animal, but this finding may be due to sample biases

because most sites of the period providing data on subsistence are located in mountainous environments. The exploitation of coastal marshes, estuaries, and lagoons, along the lines better exemplified by the Portuguese evidence, is documented by the shell midden of El Collado (Valencia), which also contained numerous burials. Fifteen individuals are reported, lying extended on their backs or their right sides. As in Los Canes, their legs were tightly flexed, and their feet were crossed or tucked together, a forced position that suggests that the corpses were somehow banded or bagged.

In all known deeply stratified cave sequences (such as Chaves, Or, and Cendres), the earliest Neolithic of the region dates to c. 5500 B.C., as proved by the direct dating of cereal remains from the sites of Mas d'Is (an open-air settlement) and La Falguera (a rock shelter). A wide variety of new types of bone tools and a new stone tool production system accompany the introduction of pottery, polished stone axes, wheat, barley, and sheep. Blade debitage probably resulted from pressure flaking, and there is evidence of heat pretreatment of the flint. Microliths are geometrics (almost exclusively trapezoid) used for the most part as sickle blades, but use of the microburin technique is not documented; instead, laminary products (stone tools with blade proportions, that is, elongated with roughly parallel edges) were systematically shortened through flexure-breaking techniques. Borers with thick, long points make their first appearance in the regional sequences. The marked discontinuity in settlement, economy, and basic technology suggests that this earliest Neolithic evidence represents a cultural intrusion, which is in agreement with its similarities to the Cardial cultural package of regions farther to the northeast. The presence of some Cardial pottery sherds in the uppermost levels of the long stratigraphic sequences of such inland sites as Cocina has been interpreted as evidence of interaction between immigrant farmers and the local hunter-gatherers, eventually leading to the adoption of agropastoral economies by the latter group.

The so-called macroschematic style of rock paintings, replicated in the decoration of ceramic vessels from Or, is another cultural manifestation of the region's first farmers. At several sites, particularly in Alicante (notably La Sarga), such paintings are

superimposed with animal motifs and hunting scenes of the Levantine art style, which for a long time was considered of Mesolithic age because of the nature of its themes. The stratigraphy of decorated panels now shows, however, that Levantine paintings date to the Late Neolithic and the Copper Age. The only positive manifestations of Mesolithic art in the region therefore are the limestone slabs decorated with linear or geometric patterns discovered at Cocina.

THE EBRO BASIN

At present the Mesolithic sites of the Ebro basin cluster in three geographically separate groups: the lower Aragon group, some 60 kilometers from the delta, including such well-known sites as Botiquería dels Moros and Costalena; the Pyrenean group, which dots the mountain range and its adjacent elevations from east (Navarra) to west (Andorra and northern Catalonia), featuring the major sites of La Balma de la Margineda and Aizpea; and the upper Ebro group, a continuation of the latter region into the province of Alava, where such sites as Kanpanoste Goikoa and Mendandia are located. The cultural-stratigraphical sequence, however, is largely uniform across this extensive area (some 85,000 square kilometers) and begins with a process of gradual transition from Magdalenian to Azilian-like small-blade assemblages akin to those of Mediterranean regions to the south. The Catalonian sites of Sant Gregori de Falset and Filador yielded two of the few portable art objects securely dated to this transitional period in Spain: a slab with the engraving of a female deer and a pebble painted with parallel lines. The appearance of notch-and-denticulate assemblages with Sauveterrian-like, very small geometrics after 8000 B.C. marks the end of the transition. Blade and trapezoid assemblages similar to those of the Mediterranean Microlaminar Epipalaeolithic arise after c. 7000 B.C. In its last stage new geometric types appear alongside the trapezoid: Cocina-type triangles in the lower Aragon sites and Sonchamps points (triangular points with inverse [inferior, ventral side] or bifacial [both sides] retouch) in the west Pyrenean sites.

Throughout the sequence the bones of land mammals (red and roe deer, ibex, chamois, wild boar, aurochs, horses, and rabbits) represent the bulk of food residues abandoned at habitation sites.

Favorable preservation conditions at the rock shelter of Aizpea allowed for the recovery of extremely abundant fish remains; contrary to the situation elsewhere in the Iberian Mesolithic, bone tools, particularly fishhooks, were numerous, suggesting that this component of the tool kit may be associated closely with the exploitation of riverine resources. Aizpea is a good example of the critical role that the use of freshwater foods must have played in the successful settlement of the region's inland areas. This area also relied on the economic exploitation of forest plants, which is indicated at the site by hazelnut shells and the remains of wild apples and other fruits recovered throughout the whole Mesolithic sequence. The land snail *Cepaea nemoralis*, whose shells are present in large numbers at many of the period's sites, probably was introduced by humans as food. The skeleton of a female lying on her back against the wall of the shelter, with no associated artifacts and dated to the latest Geometric period of occupation of Aizpea, is the only Mesolithic burial so far found in the region.

The earliest Neolithic is documented by cave sites in the Pyrenees, notably La Balma de la Margineda and Chaves, featuring levels with Cardial pottery and domesticated sheep and goats. The radiocarbon evidence suggests broad contemporaneity with the Valencian sites, and the shared features of the process indicate that the introduction of farming took place along the same lines better documented in the regions farther to the south. The lakeside village of La Draga (Banyoles, northern Catalonia) shows that, at least since about 5000 B.C. and probably well before that, Early Neolithic settlement was organized in permanent aggregates of wood houses 3–4 meters high and built from oak planks and posts.

See also **Muge Shell Middens** (vol. 1, part 2); **Caldeirão Cave** (vol. 1, part 3).

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