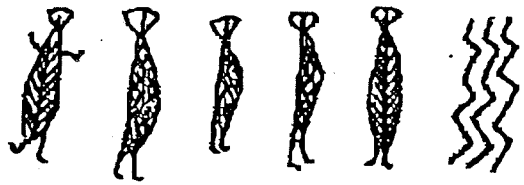

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RESEARCH REPORTS

THE AZILIAN OF ABRI DUFAURE (SORDE-L'ABBAYE, LES LANDES, FRANCE)

A Preliminary Note

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Introduction

Since the Azilian was first discovered and defined in the late 19th Century along the northern flank of the French Pyrenees at le Mas d'Azil and La Tourasse, it is ironic that this important transitional manifestation is relatively poorly known from the region. Besides the two "type" s[illegible] other important Azilian loci were al[illegible] excavated early in the history of scientific archaeology, with a resultant loss of much valuable information (e.g., le Trou Violet, Montfort). Relatively few Azilian deposits have been excavated in recent years; fewer have been dated, subjected to multidisciplinary analyses or adequately published. (A partial exception to this is the site of Rhodes II near Tarascon-sur-Ariège.) Few details are available for example on the crucial Tardiglacial-early Postglacial sequence at Poemaü in Béarn, under excavation for over thirty years. This situation (and the nature of Azilian chronology and interassemblage variability) is detailed in recent review of the Azilian problem in the Franco-Cantabrian region (Straus n.d. a, b, c).

For this and other reasons it is useful to report preliminarily on the excavation of a limited deposit attributable to the Azilian at Abri Dufaure. The abri is part of a cluster of four sites at the base of the Pastou Cliff, six km upstream along the Gave d'Oloron from its confluence with the Gave de Pau, some 60 km north of the crestline of the Navarrese Pyrenees. Of the other three sites (Grand Pastou, Petit Pastou and

Duruthy - all with major Magdalenian deposits), only the latter has also yielded definite evidence of an Azilian occupation.

The Duruthy Azilian

The excavations conducted at Duruthy since 1958 by R. Arambourou (1978) have uncovered a small remnant Azilian deposit about 20 cm thick, strictly limited to the terrace immediately in front of the small rockshelter (an area of approximately 40 m^2) was (along with the overlying Chalcolithic ossuary and the underlying Magdalenian sequence) entirely dug out in 1874 by Lartet and Chaplain-Duparc - before the existence of the Azilian was demonstrated by Piette. Arambourou (1978) found only 106 stone tools: 40.6% endscrapers, 18.9% burins, 3.8% perforators, 14.2% backed bladelets and Azilian points. There are no geometric microliths or Azilian harpoons (or any other bone/antler artifacts). Not dated per se, Couche 2 overlies a thick, extensive, highly anthropogenic terminal Magdalenian deposit (Couche 3) dated by radiocarbon, thermoluminescence, palynology, and sedimentology to the Alleröd (top of Couche 3: 11,150±220 BP). The sediments of couche 2 were deposited under humid conditions, at first cold and later temperate, with evidence of pedogenesis, leaching, and erosion (Thibault 1978). From an AP level of about 20% at the base of the level, the arboreal pollen percentage increases to about 52% at the top, and hazel, oak, and other thermophilic taxa increase dramatically as grasses decrease (Paquereau 1978). The lower part of Couche 2 corresponds to Dryas III and the upper to Preboreal. Nonetheless, the small ungulate faunal collection includes 24.2% reindeer remains - five in the lower part of Couche 2 and two in the upper part (Delpech 1978). This was not, in fact, the first instance of reindeer associated with the Azilian in the Pyrenean region; rare remains of Rangifer tarandus were found at the base of the Azilian sequences at Mas d'Azil and the nearby Trou Viol[illegible] the Plantaurel foothill range of non[illegible] Ariège (Bahn 1984: 396, 398). The Duruthy Couche 2 fauna is dominated, however, by red deer (Cervus elaphus), with traces of roe deer (Capreolus capreolus), boar (Sus scrofa), ibex (Capra pyrenaica), and bovines (Bos/Bison).

The Dufaure Azilian

The Dufaure rockshelter (also an area of some 40 m^2) was entirely dug out in a week in 1900 by H. Breuil (then a 23 year old seminarian, probably conducting his first Palaeolithic excavation) and P. Dubalen. Near the top of their "foyer supérieur", which overlay the cobble-stone-paved, Magdalenian harpoon-bearing "foyer inférieur", Breuil and Dubalen (1901) found the tip of a bilaterally barbed, flat-section harpoon and two ochre-stained cobbles. Near the base they found two iron oxide fragm[illegible] with traces of scraping, along with engraved stone plaquettes - one clearly representing a horse head. (The objects from the base of the "foyer supérieur" could have been in contact with the terminal Magdalenian pavement.) The top and the base of the "foyer supérieur" were separated by a layer of large roof fall blocks in a rocky, yellowish silt matrix. The blocks apparently lay just atop the pavement of the "foyer inférieur".

Between 1980 and 1984, thirteen months were spent excavating intact archaeological deposits on the sloping terrace in front of the rockshelter (and disturbed deposits at the foot of the talus) (e.g., Straus 1983, 1985). The plan of these excavations is shown in Figure 2. Underlying a surface layer of humus and backdirt from the old excavations (Stratum 1) and recent colluvial silt with [illegible]-Roman to modern ceramics ([illegible]um 2), we uncovered a wedge-like stratum composed of large blocks, comminuted éboulis and reddish to yellowish brown silt (Stratum 3), thicker near the shelter and cliff than downslope and also thicker toward the east than toward the west (Figure 1). The largest blocks, at the base of this stratum, were in direct contact with the topmost cobble pavement of Stratum 4. Stratum 3 was dug over an area of about 35 m2 in a block excavation (and in a series of test pits and trenches). The stratigraphy, particularly in the "I11-13" row of squares adjacent to the old excavations, confirms the admittedly rather confused observations of Breuil and Dubalen.

Stratum 3, unfortunately, cannot be radiocarbon dated. Seven large samples of bone fragments failed to yield sufficient collagen (J. Evin, personal communication). This is apparently due to leaching - not surprising given the high humidity of this region during the Holocene and the superficial position and "porous", blocky nature of this deposit. However, underlying Stratum 4, with a classic Upper Magdalenian lithic industry and three cylindrical-section harpoons

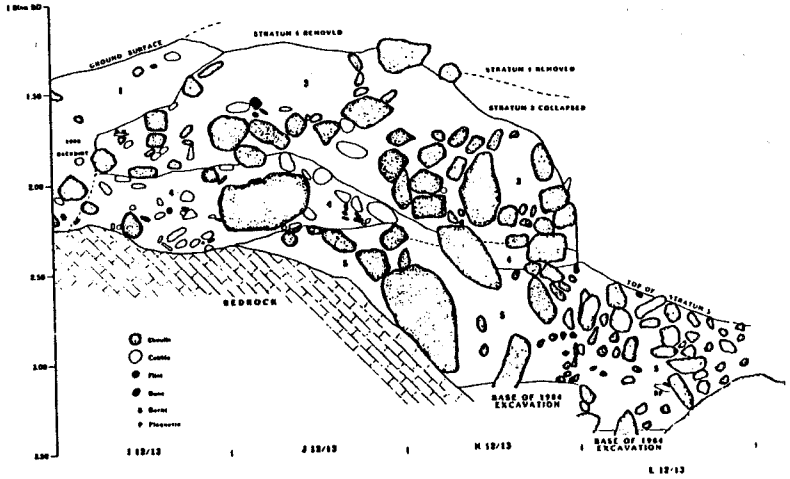

Figure 1. Stratigraphic section between the 12 and 13 rows at the top of the terrace, showing the position of the Stratum 3 occupation surface (marked by a line of cobbles and a large flint core).

(like those found by Breuil and Dubalen and those found in Couche 3 at Duruthy), is radiocarbon dated to between 11,000 and 12,000 BP by a set of four coherent determinations. As at Duruthy, the sedimentology and palynology coincide in attributing the formation of Stratum 4 to the Alleröd - with humid, relatively temperate climatic conditions (H. Laville and M.-M. Paquereau, personal communication). (As at Duruthy, Stratum 4 is underlain by a series of "Middle Magdalenian" levels dating as far back as Dryas I.) The blocks at the base of Stratum 3 could have fallen from the cliff during the Dryas III "cold snap". The AP falls as low as 35% (down from 53% in upper Stratum 4) and there are now few thermophilic taxa, attesting to Dryas III cold conditions. However, the upper part of the stratum, with fewer large blocks, shows a dramatic increase in all arboreal pollens and those of thermophile taxa in particular (hazel, oak, etc.). The upper part of Stratum 3 was thus probably laid down in Preboreal and/or early Boreal. While the sedimentological and micromorphological analyses of H. Laville and D. Marguerie, respectively, are still in progress, it appears that the Dufaure sequence closely matches that of Duruthy, 230 m to the west.

The faunal analyses are also underway, but preliminary identifications by J. Altuna and A. Spiess show the presence of reindeer in Stratum 3, confirming the observations made at Duruthy of a late survival of at least small groups of Rangifer in this region. The Stratum 3 fauna is, of course, heavily dominated by red deer, although it is by no means as rich or well preserved as the fauna of Stratum 4, itself dominated, like that of Duruthy Couche 3, by reindeer - despite Alleröd environmental conditions.

Stratum 3 artifacts and faunal remains were, for the most part, found scattered in small patches and lenses among the blocks on the terrace slope, with no clear indication of significant occupation surfaces or archaeological features (Figure 3). It is likely that most of these finds represent objects tossed or washed out of the limited habitation area in the rockshelter per se. (Both Duruthy and Dufaure thus show clear evidence of the retraction of actual living site area between Upper Magdalenian and Azilian times.) However in an area of no more than 4 m^2 (squares I12-13, J &K 12), on the flat space just outside the shelter dripline and atop the basal Stratum 3 blocks, a possible Azilian occupation surface was uncovered. (This probably corresponds to the culturally rich lens in the upper part of of the "foyer supérieur" which, at the eastern end of the rockshelter - adjacent to our squares - yielded the flat-section harpoon to Breuil and Dubalen.) The surface consisted of a "pavement" of only one layer of cobblestones which were not closely packed together (in contrast to the series of 8-12 densely packed Stratum 4 pavements). Associated with this [illegible] were relatively numerous chipping debris, stone tools, and faunal remains.

In total, Stratum 3 yielded 8722 pieces of lithic debitage (including percentages of cores and decortication flakes/blades unusually high for Dufaure: 5.5 and 6.2%, respectively) and only 272 retouched tools. The ratio of debris to tools is 32.1:1 by far the highest in the whole sequence. No geometric microliths or bone/antler tools were found in Stratum 3. Alone among the

Dufaure assemblages, this one has more endscrapers (14.7%) than burins (11.4%) and virtually no perforators (0.7%). Backed bladelets, microgravette and Azilian points make up fully 51.5% of the tools. Two pebbles of goethite (an iron oxide) with traces of scraping were found near the base of the level, along with two use-striated river cobbles - somewhat reminiscent of the finds from the year [illegible]0. While present in the terminal Magdalenian assemblage (1.0%), "Azilian" points per se are in fact relatively more abundant in Stratum 3 (5.5%). Thus, at least in this case and that of Duruthy, some of the normative distinctions between Upper Magdalenian and Azilian industries hold true, although their significance remains obscure.

Conclusion

While analyses of many sorts are still underway, the interest of Azilian Stratum 3 at Dufaure is assured due to (1) its careful excavation, (2) its secure chronology and evidence that it straddled the Pleistocene-Holocene boundary, (3) its strict chronostratigraphic comparability to Duruthy Couche 2, (4) the presence of terminal Glacial and possibly even initial Postglacial reindeer, (5) its distinctive artifact assemblage with emphasis on primary reduction, and (6) its remnant occupation surface.

Acknowledgements

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n.d. a Chronostratigraphy of the Pleistocene-Holocene transition: the Azilian problem in the Franco-Cantabrian region. **Palaeohistora** (in press).

n.d.b. Human adaptations across the Pleistocene-Holocene boundary in southwest Europe. Paper to be presented at the XI Congress of the UISPP, Southampton, September 1986.

Figure 2. Plan of the Dufaure site, showing location of 1900 and 1980-84 excavations. Contour interval is one meter.

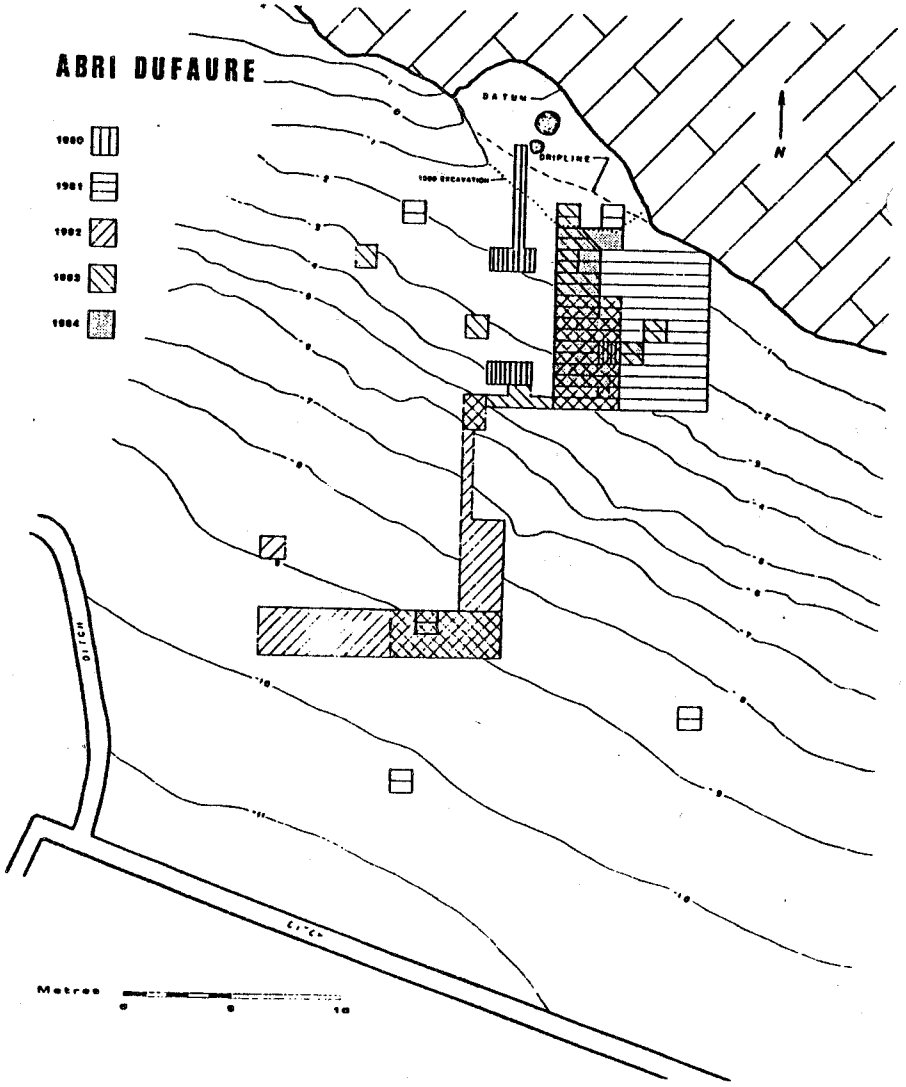

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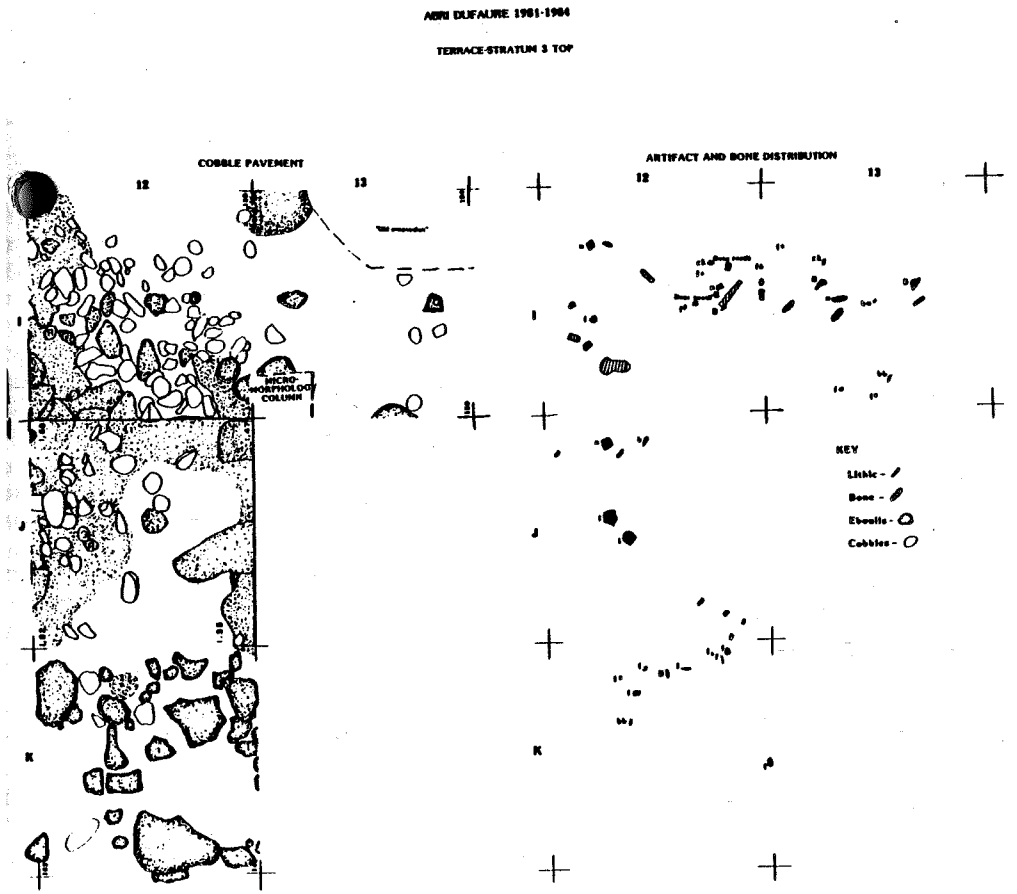
Figure 3. Abri Dufaure, Stratum 3, Occupation Surface Remnant.



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A Note

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The two articles printed below and concerned with the dating of Mesolithic skeletal remains are the first in a series of reports regarding such finds. I plan to discuss a number of topics in future articles, including new finds, new dates, new information on older finds, and the more general topics of data analysis and interpretation. I also hope that such articles will engender debate and further questions.

As many of you will know I am a physical anthropologist by training, but have always been interested in that part of the subject which overlaps with archaeology. A major focus of mine for the past decade has been the European Mesolithic and its relationships to earlier Upper Paleolithic and later Neolithic populations. At the present time I am engaged in the study of the classic Muge series from Portugal, and I am about to begin analysis of the Vedbæk collection in Denmark this fall. It has been my conviction that work with human skeletal populations can yield more information of use to prehistorians than has often been realized. This can be seen in the recent advances on the topic of dietary information in bone. I hope that this series may assist in ongoing dialog between archaeologists and osteologists such as myself.

Though I will, at certain times, discuss my own ongoing work, I also hope to be able to comment on other material of interest as it appears. I would also welcome suggestions for topics that people would like to see discussed in the pages of Mesolithic Miscellany. In relationship to the two articles published in this issue, I would be interested in obtaining information on recently published C14 dates releavnt to human skeletal material that I have missed in this initial survey. I would also be interested in obtaining information on relevant dates that have not yet been published. Any correspondence can be sent to me directly at the address above.

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Old Bone, New Dates: Recent Radiocarbon Results From Mesolithic Human Skeletal Remains

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This report is concerned with the annotation of recently published 14C dates relating to Mesolithic skeletal materials. All of the data reported below have been published since 1978. This cut-off date is related to the end of the preparation of the catolog of Mesolithic skeletal remains, published in 1979 by Newell et al. I have carried out this annotation in order to bring together in one place all of the published materials known to me that are relevant to an update of the absolute dates in the catalog. I have not presented any unpublished dates. I am in the process of collecting information on further dates in both categories.

The 1979 catalog attempted to bring together in one place a full listing of all sites that had yielded skeletal remains believed to be of Mesolithic age. It then proceeded to evaluate those claims. The result was the production of a main catalog and three sub-catalogs. The main catalog consisted of those finds of demonstrable Mesolithic age, in archaeological, stratigraphical and/or chronological terms. The sub-catalogs consisted of those materials demonstrably older than the Mesolithic, those materials demonstrably younger than the Mesolithic, and those materials for which no objective assessment of age was possible. The further data presented here serve two primary purposes. The first is the addition of information pertaining to whether the finds are indeed of Mesolithic age or not. The second is the more specific question of the age of the material within the Mesolithic. The first is of course critical if fully secure comparative samples are to be used in any study. As the original cataloging process indicated, a number of comparative analyses have used skeletal finds that are demonstrably not of the age often assumed. This is a source of difficulty in any area of archaeological analysis. The second is of importance if sub-samples of Mesolithic materials are to be extracted from a full Mesolithic data set, or if trend analysis is to be undertaken in which estimates of absolute age are required for all samples. Materials simply identified as Mesolithic cannot be used in such an approach.

I have arranged the annotations below into groups. The first consists of finds already securely identified as of Mesolithic age, for which confirmation and additional resolution is now available. The second consists of new finds whose Mesolithic affinity is unquestioned. The

third consists of finds with affinity that was not clear in 1979, but for which a Mesolithic affinity is now clear. The fourth group consists of a find previously reported to be on non-Mesolithic age but which now appears to be Mesolithic. The last group includes a find of previously questionable age that can now be clearly excluded from the Mesolithic.

As an immediate comment on the cataloging process, it is gratifying to note that no finds previously accepted as Mesolithic age have now to be excluded. As well, some previous estimations of age on archaeological or stratigraphical grounds have been shown to be quite accurate. On a less sanguine note, it is somewhat disturbing to have to report that finds evaluated as demonstrably older that the Mesolithic must now be brought back into the fold, suggesting that other excluded finds should possibly be re-evaluated. However, as will be seen below, one of the cases involved has previously proved intractable to rational analysis. Finally, a most happy note is the recognition that further 14C analysis has permitted the clear resolution of s[illegible] problem cases for which no an[illegible]r appeared to be forthcoming in simply archaeological or stratigraphical terms. Also to be noted is the use of the newer accelerator dating method, permitting the use of very small samples. I sincerely hope that this breakthrough will permit the analysis of a number of finds whose chronological position has proven intractible.

ANNOTATIONS

a) Finds Confirmed as of Mesolithic Age

Site: Culoz sous Balme 2, Ain, France
Type of Date: Direct (?) collagen date of human bone.
Predicted Date: 6000-7200 bc on the basis of associated Sauveterrian lithic assemblage (Newell et al. 1979: 110-114).
Date: 8640±380 bp (6690±380 bc), no ∂13C value (Ly-1668)

Source: **Radiocarbon** 21: 439. 1979.

This is one of two burials securely associated with a pure Sauveterrian assemblage. Both appeared to be in securely sealed stratigraphical contexts, although burial 2 is more so. The excavator (R. Vilain) considers that this date, and the burial, mark the end of the occupation of the site. There is no discrepancy between the new date and the archaeological assessment.

b) New Finds of Unquestioned Mesolithic Affinity

Site: Skateholm, Scania, Sweden
Types of Dates: Direct collagen dates of human bone (CO) or associated charcoal (CH).
Predicted Date: ca. 4000 bc on the basis of association with early Ertebølle settlement. There are three associated sites distinguished as I, II, and III.
Dates:
SK I 6240±85 bp (4290±85 bc) ∂13C = -20.1 °/°° (Lu-1834) (CO Grave 4)
SK I 5930±125 bp (3980±125 bc) ∂13C = -24.3 °/°° (Lu-1886) (CH Grave ?)
SK I 6220±100 bp (4270±100 bc) ∂13C = -23.7 °/°° (Lu-1888) (Ch Grave 9)
SK I [illegible]270±70 bp (4320±70 bc) ∂13C = -16.8 °/°° (Lu-2109) (CO Grave 37)
SK I 5990±70 bp (4040±70 bc) ∂13C = -25.5 °/°° (Lu-2116) (CH Grave 26)
SK I 6180±70 bp (4230±70 bc) ∂13C = -25.1 °/°° (Lu-2347) (CH Grave 43)
SK III 5850±90 bp (3900±90 bc) ∂13C = -18.6 °/°° (Lu-2156) (CO 1932 Grave)

Sources: **Radiocarbon** 24:205-206, 1982; 26:405-406, 1984; 28:155, 1986. Additional series 25:887, 1983, contains no dates directly associated with the graves.
Additional Souces: Larsson 1983/84; Persson and Persson 1984.

The Skateholm burials constitute the most spectacular Mesolithic skeletal finds of the decade and have been well reported in this newsletter by the excavator [Lars Larsson, Mesolithic Miscellany vols. 2(1), 3(1), 4(1), 5(1), 6(1)]. I have reported, for ease of access, the dates that are indicated as being directly associated with the graves, as opposed to those from the settlement. For the full list of dates see the four lists published in Radiocarbon. Six of the seven dates are from Skateholm I, the first of the sites to be excavated in the 1980s. The seventh is for a burial recovered in the 1930s at Skateholm III. No direct dates for the burials from Skateholm II have been published as yet. The total suite of dates places both the burials and the associated settlements within a clear Ertebølle context, with a probable sequential chronology of Skateholm II, Skateholm I, and Skateholm III.

Site: Tybrind Vig, Fyn, Denmark
Ty[illegible]of Date: Direct (?) collagen date on human bone
Pr[illegible]ted Date: The materials are clearly associated with a submerged Ertebølle midden. Earlier recovered scattered finds are expected to have a date of ca. 3500 bc (Newell et al 1979: 76-77).
Date: 6440 bp (4490 bc), no error limits or ∂13C values reported (K-3558).

Source: Andersen 1985.

Amateur divers recovered materials from this submerged Ertebølle site in 1976. Excavation was carried out by S.H. Andersen from 1978 to 1984 and the grave of a late adolescent female with newborn infant was recovered during that period (Andersen 1985). This initial report of a direct dating of the female individual indicates that the burial lies near the base of the site, in Dyrholmen I or early Ertebølle context.

c) Find Demonstrated to be of Mesolithic Age (Previously Undocumented)

Site: Grotta dell'Uzzo, Sicily, Italy
Types of Dates: 14C dates of charcoal from archaeological deposits in the cave and Aspartic Acid Racemization of human bone.
Predicted Date: Reported as burials within the Mesolithic levels of the site with upper disturbed Neolithic levels (Newell et al. 1979: 191).
Dates:
7910 ± 70 bp (5960 ± 70 bc) ∂13C = +1.11±0.31°/°° (P-2734)
8330 ± 80 bp (6380 ± 80 bc) ∂13C = +0.99±0.28 °/°° (P-2735)
9030 ± 100 bp (7080 ± 100 bc) no ∂13C value (P-2556)
9180 ± 100 bp (7230 ± 100 bc) no ∂13C value (P-2557)
9300 ± 100 bp (7350 ± 100 bc) no ∂13C value (P-2558)
10070 ± 90 bp (8120 ± 90 bc) no ∂13C value (P-2736)
8600 bp (6650 bc) no lab indication, direct date of Uzzo burial I
9500 bp (7550 bc) no lab indication, direct date of Uzzo burial IV

Sources: **Radiocarbon** 23: 230-231, 1981; Borgognini-Tarli and Repetto 1985; Piperno 1985.

The dates reported here are all associated with the pre-Neolithic levels of the site. Two further dates in the fifth millennium bc relate to overlying Neolithic levels. As in the previous 1979 assessment, it still remains for detailed stratigraphic allocation of the burials to be published. Though the essential contemporaneity of the burials and the cultural materials was not in doubt, it was not possible to exclude the possibility that the associated Epi-Gravettian was of Pleistocene (and pre-Mesolithic) age. These published dates appear to clarify the matter. The two aspartic acid dates from the burials themselves are not significantly differnet from the 14C dates from the archaeological levels associated with the burials (P-2556, 2557, 2558) (Borognini-Tarli and Repetto 1985). Though the period between various burials may be upwards to a millennium or so, all appear to be in clear post-Pleistocene, Mesolithic, context. They are thus later than the series of late Pleistocene, Epi-Gravettian burials at sites such as Arene Candide, Ortucchio, and San Teodoro.

Site: Holmegaard-Jutland, Jutland, Denmark
Type of Date: Amino Acids from human bone, collage from human bone, and associated shell of Ostrea.
Predicted Date: Later Mesolithic or early Neolithic burial. The skeletal material was within a Mesolithic shell midden but a Neolithic intrusion could not be excluded (Newell et al. 1979: 56-58).
Dates:
6280±130 bp (4330±130 bc) ∂13C = -11.9 °/°° (OxA-118) Human bone
6080±80 bp (4130±80 bc) ∂13C = -11.9 °/°° (OxA-533) Repeat of 118
6020±100 bp (4070±100 bc) ∂13C = -11.9 °/°° (K-3559) Human bone
5870±95 bp (3920±95 bc) ∂13C = +0.6 °/°° (K-3099) Oyster shell

Sources: Andersen et al. 1986; Gillespie et al. 1984; J.A.J. Gowlett, pers. comm.

This burial posed the problem of whether a secondary intrusion was involved. The excavator (S.H. Andersen) was unable to exclude the possibility at the time of excavation. Direct dating seemed the only possible solution. The results show clearly that the burial is primary, though the find is somewhat earlier than might have been expected. It would appear to date to the earlier part of the Ertebølle.

Site: Kams (Lummelunda), Gotland, Sweden.
Type of Date: Direct collagen date on human tibia
Predicted Date: Possible association with the Mesolithic. Site contains no diagnostic Mesolithic artifacts with the burials (Newell et al. 1979: 163).
Date: 8050±75 bp (6100±75 bc), ∂13C = -18.0 °/°° (Lu-1983)

Source: **Radiocarbon** 25: 887, 1983.

Three graves were recovered from this site in 1939 and 1947. A possible Mesolithic age for Kams 3 was suggested because of the presence of a small triangular stone axe in the grave. No datable materials were found with Kams 1 or 2. Unfortunately the axe in association with Kams 3 is not diagnostic. The submittor of the dated materials (L. Larsson) suggested a date of 6000 bp and a late Mesolithic assocaition. The doubt about the Mesolithic age of the material is partly removed. At least one burial is Mesolithic. (It is not stated which burial was dated.) It is not clear whether the date can be extrapolated to the other two individuals in the absence of evidence for their contemporaniety.

Site: Vænge Sø, Jutland, Denmark
Type of Date: Amino Acids from human bone and associated fauna
Predicted Date: Late Mesolithic or Early Neolithic. The material was recovered from the interface between the two periods (Newell et al. 1979:171).
Dates:
5475 ± 130 bp (3525 ± 130 bc) ∂13C = -19.3 °/°° (OxA-117) Fauna
5390 ± 80 bp (3390 ± 80 bc) ∂13C = -19.3 °/°° (OxA-532) Repeat of 117
5500 ± 70 bp (3550 ± 70 bc) ∂13C = -11.2 °/°° (K-3920) Male Skeleton
5540 ± 65 bp (3590 ± 65 bc) ∂13C = -11.1 °/°° (K-3921) Female Skeleton

Sources: Andersen et al. 1986; Gillespie et al. 1986; J.A.J. Gowlett, pers. comm.

The two skeletons from Vænge Sø represent the problem of burials located at the contact zone between two cultural levels, in this case at the interface between a Mesolithic and a Neolithic shell midden. Upon excavation it was impossible to associate the burials with one as opposed to the other context. A direct 14C determination provided the only approach to the dilemma, as at Holmegaard-Jutland (above). The date clearly demonstrates the late Ertebølle context of both burials.

d) Finds Previously Excluded from Mesolithic Affinity

Site: Los Azules, Cangas de Onis, Asturias, Spain
For discussion of this Azilian burial, now demonstrated to be of early Preboreal age, see the following article (Meiklejohn and Straus 1986).

Site: Ofnet, Bayern, West Germany (BRD)
Type of Date: Direct (?) collagen date on human bone
Predicted Date: Believed to be Upper Paleolithic on basis of earlier 14C date. Other archaeologically based estimates range from Upper Paleolithic to Neolithic (Newell et al. 1979: 155-157).
Date: 7720±80 bp (5770±80 bc), no ∂13C value (Kn-2034)

Source: **Radiocarbon** 28: 137, 1986; Gerhardt 1983; Naber 1974; Protsch 1976; Protsch and Glowatzki 1974; Tayler et al. 1985

The age of the Ofnet "skull-nests" has provided one of the most difficult provenience problems for the European Upper Paleolithic/Mesolithic. At the time of 1979 the Mesolithic catalog, two grounds were given for supporting an Upper Paleolithic attribution to the finds. A direct 14C date of 13100±100 bp (11150±100 bc) (UCLA-1783) was supported by an Amino Acid Racemization date of 11050 bc (see Newell et al. 1979 for details). This provided the most unequivocal estimate. The Pleistocene age was supported by the presence of Alces, Panthera, and Gulo in the faunal assemblage (the latter two are unknown in Mesolithic contexts elsewhere). A Mesolithic age was supported by the associated lithics and the presence of Columbella rustica. No grounds could beused to support a Neolithic association. On the above evidence it was decided to support the Upper Paleolithic evidence. The dilemma that arose when first 14C dates were published has been discussed by Naber (1974).

The new date under discussion here suggests that the attribution made from the lithics is the most viable one. It would appear that the earlier UCLA date is overestimating the actual age. It is instructive that the earlier date was done using similar methodology to that used for the Laguna Beach and Los Angeles skeletal materials, originally dated to the Pleistocene and clearly reassigned to the Holocene (Protsch 1976, Taylor et al. 1985). For this reason it seems clear that the new date and a Mesolithic attribution for the remains should be accepted.

It should be pointed out that the radiocarbon entry errs in making reference to the date UCLA-1869 (18200±200 bp) as referring to the clear Mesolithic burial from Schellnecker Wand, Altessing. The date quoted refers to the Upper Paleolithic burial from Mittleren Klause at Neuessing, and provides no clear light on the accuracy of the Ofnet determination.

e) Finds Removed from Further Consideration as Mesolithic in Age

Site: Hylliekroken, Scania, Sweden
Type of Date: Direct collagen date on human bone
Predicted Date: Late Mesolithic or early Neolithic in association with Baltic transgression levels between 3750 and 2800 bc (Newell et al. 1979: 162-163).
Date: 4360±80 bp (2410±80 bc), ∂13C = -20.0 °/°° (Lu-2345)

Source: Radiocarbon 28: 156, 1986

Although this material, discovered in the 1940s, is clearly associated, the boundaries of that association overlap between the Mesolithic and the Neolithic. On that basis it was impossible to assign a clear Mesolithic age to the finds. The date obtained is slightly later than expected but the effective end result is to clearly associate the material with a Neolithic age and to remove it from further consideration.

Conclusions
The above dates and annotations stand essentially on their own. As well as the dates themselves and their laboratory numbers, I have also included the ∂13C determinations, where available. I do not intend to analyze these results here but some brief comments can be made regarding the difference between the values from Denmark and those from Sweden. These presumably reflect the importance of marine resources in the diet of the Danish material. Thus, very low ∂13C figures are found for the Holmegaard-Jutland and Vænge Sø remains. For the Swedish materials, differences in diet annd the fresh to brackish properties of the developing Baltic seem to be infolved in the considerably higher values found at Skateholm, Kams, and Hylliekroken.

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Further Radiocarbon Dates Relevant to an Azilian Burial in Spain

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This report considers recent radiocarbon evidence related to the human burial in an Azilian context from the Spanish site of Los Azules. Though originally associated with apparent Holocene dates, it was evaluated as being of probable Pleistocene age beacause of the cultural association (Newell et al. 1979), an assessment that can now be shown to be doubtful (Straus 1986b). We therefore provide a new assessment based on this recent evidence, following in format the design of the preceding article (Meiklejohn 1986).

The assessment stems from a common interest in firmly establishing the proper chronological boundaries of the Azilian complex. It is not specifically related to the problem of the definition of the Mesolithic, but has implications in that area. It is more directed at the identification of materials that are clear temporal equivalents. It is also relevant to the nature of cultural complexity at the Pleistocene/Holocene boundary.

In the late 1970s one of us was concerned with the establishment of a fully secure data set of Mesolithic human skeletal materials (Newell et al. 1979). The definition for the beginning of the Mesolithic was established as the Younger Dryas/Preboreal boundary, ca. 8300 bc, a definition more recently employed for somewhat similar reasons by Mellars (1981) and Price (1983). Information available suggested that the Azilian was of terminal Pleistocene age, contemporary with the late Magdalenian in France and various Epi-gravettian industries in Italy. For this reason, all Azilian skeletal materials were excluded from the 1979 catalog. In any study of biological trends it was felt that Azilian materials should be placed in a sample with other demonstrably late Pleistocene finds, rather than with a Mesolithic/ Holocene sample. To do otherwise appeared to produce samples that were chronologically overlapping, rather than sequential, thus confounding any pattern or trend.

More recently it has been shown that the position taken in 1979 was premature. Though a reasonably large number of Azilian occurences are clearly of late Pleistocene age, there is now increasing evidence that the "culture" extends into

the Preboreal (Straus 1986b), thus overlapping the Pleistocene/Holocene and thus the Upper Paleolithic/Mesolithic borders (the latter as defined above). It thus becomes necessary to re-examine the chronological position of burials found within Azilian contexts, if they are to be used as part of any study of trends. They cannot be placed in toto within either a terminal Pleistocene or Holocene sample. We are not trying to rigidly define a cultural border. Continuity across this period is clear (Straus 1986a). Rather it is a heuristic device for correct chronological placement of samples in the analysis of trends, or which require the collapse of data from a number of sites in order to obtain an effective sample size. Lack of such a definition in the past has resulted in such analytical problems as the placment of skeletal samples with dates as late as 8500 bc within the Upper Paleolithic (late Magdalenian), while samples with dates as early as 12500 bc have been considered as within the Mesolithic (early Azilian or Epigravettian) and as such sequential to the former.

Site: Cueva de los Azules, Cangas de Onis, Asturias, Spain
Type of Dates: Wood charcoal (CSIC) and bone collagen dates of faunal samples (BM) (no further information)
Predicted Date: Either late Pleistocene or early Holocene on basis of new information on the Azilian (Straus 1986b). Previously assumed to be of Pleistocene age (Newell et al. 1979: 156-160).
Dates:
Level 3a: 9430 ±120 bp (7480±120 bc) no ∂13C value (CSIC 216)
Level 3d: 9540 ±120 bp (7590±120 bc) no ∂13C value (CSIC 260)
Level 3d (basal): 10400 ±90 bp (8450±90 bc) ∂13C = -21.3 °/°° (BM-1879)
Level 3e: 10330 ±190 bp (8380±190 bc) ∂13C value = -21.7 °/°° (BM-1875)
Level 3e: 10700 ±190 bp (8750±190 bc) ∂13C value = -18.6 °/°° (BM-1876)
Level 3e: 11190± 350 bp (9240±350 bc) ∂13C value = -21.6 °/°° (BM-1877)
Level 3f: 10720±280 bp (8770±280 bc) ∂13C value = -21.2 °/°° (BM-1878)

Sources: **Radiocarbon** 24: 283, 1982. Fernández-Tresguerres, pers. comm Fernández-Tresguerres 1980.

Discussion

The Los Azules Azilian sequence, characterized throughout by the presence of typical Cantabrian Azilian buttonhole-perforated uniserial harpoons and painted pebbles, is ≥1 m in thickness and, from top tobottom, consists of Levels 2, 3a, 3b, 3c, 3d, 3e, and 3f. (As a group, 3a-3d have been called "3 upper" where they could not be distinguished.) It overlies a sterile clay level (4) and two Magdalenian levels (5 and 6). The Los Azules burial (with associated grave goods) was overlain by intact Azilian Levels 2 and 3a and, in turn, overlay intact Level 3d.

From the above information it is clear that the new set of BM dates are for levels beneath the burial, while CSIC-216 overlies the burial. On this basis the burial can be most probably designtaed as of early Preboreal age. The chronological gap between CSIS-260 and BM-1879, both from Level 3d, is high, suggesting that both CSIC dates may be slightly too young. A date of approximately 8000 bc seems probable. In this Preboreal date it is congruent with several other late Azilian deposits in northern Spain and southern France (Straus 1986b).

The Preboreal age of the upper part of the Los Azules Azilian sequence appears to be confirmed by the as yet unpublished pollen analysis, which shows high AP percentages with a variety of thermophile taxa in the upper stratigraphic subdivisions of Stratum 3 (Fernández-Tresguerres 1980:128). The presence of a dozen shells of Modiolus barbatus is absolutely not an indicator of Pleistocene age as claimed by Newell et al. (1979; cf. Straus 1986b).

The lower part of the Azilian sequence dates to Younger Dryas times. Despite slight inversiions in the stratigraphic order of the central tendencies of some of the radiocarbon determinations and the relatively high age of BM-1877, the dates clearly span the period between about 10300 and 11000 bp when standard deviations are taken into consideration.

Conclusion

The Los Azules Azilian, like the Azilian culture-stratigraphic unit in general, straddles the traditional Pleistocene-Holocene boundary and lies in a position both chronologically and technologically between the Magdalenian and the Mesolithic of southwest Europe (Straus 1986b). The Los Azules burial is of Preboreal age and should be used in comparison with other burials in Mesolithic context dates to the very early stages of the Holocene.

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AN EARLY MESOLITHIC MICROLITHIC INDUSTRY IN SOUTH-WESTERN NORWAY

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Since Svein Indrelid wrote his article "Mesolithic Economy and Settlement Patterns in Norway " (in Mellars 1978) there has been a further development towards establishing a chronological sequence for the mesolithic in Southwestern Norway.

Important contributions have come from Tore Bjørgo, Asle Bruen Olsen and Sigmund Alsaker. The current sequence has been developed by Hein B. Bjerk (unpublished thesis 1983).

Three phases have been recognized: Early Mesolithic (older than 9000 BP), Middle Mesolithic (9000-7000 BP) and Late Mesolithic (7000-5200 BP). The Early Mesolithic corresponds roughly typologically to the "Fosna culture" and the Late Mesolithic to the "Nøstvet culture." The terms Fosna and Nøstvet are no longer used. There is no sharp division between the phases but a gradual transition. The Middle Mesolithic contains elements from both Early and Late Mesolithic.

Before 9000 BP. The Early Mesolithic industry is characterized by forms like flake- and core-axes, small tanged points, burins, microliths, coarse flakes, unilateral blade-cores, heterogeneous and broad blades, and the extensive use of flint as a raw material.

Flake-axes are more numerous than core-axes. Single barbed points are more common that double-edged tanged points. Burins are mostly large with a relatively wide edge. Microliths are coarse, mostly obliquely blunted points (Hein B. Bjerk 1985).

9000-7000 BP. The Middle Mesolithi (Early microblade tradition) industry is characterized by ground stone adzes, burins, microliths, borers, whetstones, multilateral blade-cores, narrow homogeneous blades, and a dominance of flint as a raw material.

Burins are normally small, mostly on blade-fragments and with a narrow edge. Microliths are of geometric form, mostly triangles, but the use of microliths in Western Norway seems to be limited (Hein B. Bjerk 1985).

7000 - 5200 BP. The Late Mesolithic (Late microblade tradition) is characterized by ground and pecked stone adzes, borers, whetstones, anvils, multilateral microblade cores, an extensive use of bipolar cores and microblades, In Western-Norway the use of small sinkers and an extensive use of local rock is common (Hein B. Bjer 1985).

The Late Mesolithic is well documented by a wide distribution of excavated and C14-dated sites. At present there are few known sites from the Middle Mesolithic. The Early Mesolithic has a wide distribution of sites, many of them excavated during the last 10 years . But so far no reliable radiocarbon dates exist.

The sites are dated on a basis of typology and in relation to shoreline displacement curves. The sites are open with no organic material.

Early Mesolithic sites in the southern part of Norway lie along a 1000 km stretch on the West Coast, from Bodø in the north to Haugesund in the south, and in a smaller area east of the Oslofjord. The la[illegible]f sites in the intermediate area has be[illegible] attributed to submergence of the coastline due to the eustatic rise in sea level.

If we take the county of Rogaland, situated just south of the distribution area, we see that this explanation is not correct. It is only in the southernmost part of the county, around Eigersund, that the coastline has been submerged. Preboreal coastal sites are expected to lie about 8 - 10 m below the present surface. On the coastline along the flat landscape of Jæren, between Eigersund and Stavanger, Preboreal coastal sites would have been transgressed and covered by thick beach deposits. But north of Stavanger such sites would be intact.

There is agreement that the first people to settle in Southwestern Norway must have come from the North Sea continental shelf. Theoretically this could have taken pl[illegible]as soon as the ice had retreated en[illegible]h to expose sufficient land areas for settlement and exploitation by arctic hunter-gatherers. At present we have no sites older than 10,000 BP, except for a possible site at Blomvåg, north of Bergen dated 12700 ±350 BP.

Rogaland has a strategic position in relation to the North Sea continental shelf and if this theory is correct then one should expect to find early sites there.

We have had some stray finds indicating Early Mesolithic sites both from Jæren and North-Rogaland. Two localities have given more material. At Utvik on Karmøy a disturbed Neolithic site was excavated, and among the material recovered were several flake axes and tanged points from the same small area within the excavation. And at Ognøy a test pit uncovered a flake axe, an obliquely blunted point and a burin, No further investigation took place here.

The reason why we previously had so little material from the Early Mesolithic must be that we did not look for sites in the proper places. The distribution of these sites further north on the coastline indicates a strongly maritime adaptation, and it seems reasonable to assume that the beach zone has been an important localizing factor. Support for the hypothesis that coastal Mesolithic sites in Norway are localized close to the beaches, come from investigations showing correlation among typological elements and shore line. It therefore seems fair to assume that this is a general pattern.

The picture of the sea level changes in Late Glacial and Post glacial time in Western Norway is complicated. To be able to understand how the isobases have shifted in the coastal areas of Rogaland it is necessary to construct precise shore line displacement curves for limited areas. At the Archaeological Museum in Stavanger there is a long-term project with the aim of mapping the shorelevel changes in the county. This will give us a better basis for looking for specific sites.

In 1978 a new site was discovered. In connection with the general survey for the economic map some areas on the small island Bjerngøy in northern Ryfylke were selected for shovel testing. Among the sites discovered was Dyrnes, which at that time was noted because of 3 oval pits containing flint waste. The flint waste gave no clear indication of being Early Mesolithic, but the site was situated 27 meters above the present sea level and interpolation of shorelevel data from an area further north suggested a possibility of an early age.

A test excavation took place in 1983, confirming the hypothesis of this being an Early Mesolithic site, The excavation continued in 1984. The site is situated on a northern headland on a beach-deposit close to a former bay.

33m^2 have been excavated and a total of 12, 684 flint artifacts have been recovered. 1.91% have been secondarily worked.

Microliths comprise 68.87% of the distinct tools, and microliths + microburins 42.98% of secondary worked flints.

This is clearly a microlith-dominated industry, which is something quite new in an early mesolithic context in Southwestern Norway.

Microliths are represented on the early mesolithic sites in South-Western Norway, but only with a few samples on each site. Microburins are almost non-existent. Dyrnes is the first where microliths are abundant and

Cores	55	Core Axes	9
Core fragements	39	Flake axes	5
Blades	129	Tanged points	3
Blade Fragments	671	Microliths	73
Microblades	90	Microburins	31
Microblade fragments	233	Burins	9
Waste	11,225	Scrapers	7
		Blades with Retouch	47
		Flakes with Retouch	58
Sum (primary worked)	12,442	Sum (secondary worked)	242

numbers that can be compared with South Scandinavian sites. Further the micro-burin technique is well documented here. 62 of the microliths are obliquely blunted points. The remaining 9 have additional retouch towards the bas on the opposite side. Several of the mic are close to the Danish "Vig points".

The closest parallels that can be found in Denmark in the inventories of the Barmose-group suggesting a date around the transition between the Preboreal and the Boreal period. This date can be confirmed by typological analysis related to the Southwest Norwegian sequence. The fine chronology within the Mesolithic is based on an analysis of the blade material (Hein B. Bjerk 1983). A cumulative diagram of blade-width places the site at the end of the Early Mesolithic. The local shoreline displacement curve points in the same direction.

The site is not transgressed, so its maximum age can be determined by the Younger Dryas regression. When taking the topography into consideration, it seems reasonable to postulate that if the distance to the shore was more than 4-5 meters, they would have choosen another locality. The regression was rapid, thus giving us a brief time span.

Unfortunately the radiocarbon dates did not give the expected results. And this has implications for the interpretation of the structures on the site.

The site covers an area about 200m^2. Within this area were 3 oval pit structures. The internal area measuring 3 x 6.5 m, 2.5 x 5.5 m, and 2 x 4 m. One of these was excavated. The artifact density was highest within the oval depression and fell sharply outside the elevated banks. There were 3 different concentrations with microliths and microburins within the oval depression. Symmetrically placed was one fireplace and a smaller concentration of charcoal (Salix, Betula, Corylus and some Pinus).

There were no visible traces of any secondary disturbances, and no traces of an old surface within the banks. The profile was a homogeneous podsol-profile and 74% of the lithic material was deposited in the alluvial zone. Grain size analysis defines the deposits as a beach sediment on top of moraine. The cumulative curve indicates that the banks are not natural formations. The leaching has been extreme. Phosphate tests gave no result, and pollen tests from the site were worthless.

C14 from the fireplace gave a date of 2510+70 BP. This gives us three possible interpretations. A) This dates the fireplace and the oval structure. We have a Bronze Age/pre-Roman Iron Age hut on top of an Early Mesolithic site. B) This dates only the fireplace. The structures are contemporary with the Early Mesolithic lithic material. C) The C14 date is not reliable. Both the fireplace and structure are contemporary with the Early Mesolithic material.

An argument supporting interpretation C is the fact that nothing has been recovered except the Early Mesolithic lithic material. The distribution of the lithic material is another factor. We have a correlation between the density of lithic material and the oval depression. Tests from the other structures indicate the same pattern. It is unlikely that this is merely a coincidence. And even if they had happened to settle on the same spot, such a secondary disturbance would have redistributed the lithic material, so that the highest density would be in the banks.

Hut or no hut, the importance of this site rests with the lithic inventory. Many have pointed out the similarities between the early mesolithic inventories in Southwestern Norway and the Tanged Point Complex in Northern Europe. But still the differences are too great to postulate a direct link. Anders Fisher (1978) has described the missing link between the Tanged Point Complex and the Early Maglemose and the "Fosna-Hensbacka material."

If we take into consideration the similarities in technology and toolkit in the areas bordering the North Sea continental shelf, both concerning the Tanged Point Complex and the the early Maglemose and see this in relation to the history of the North Sea, it is possible to conceive that Southwestern Norway has been part of a common development, representing coastal adaptations within this area. Contact across the Norwegian channel must have been possible for a long time.

When this contact is broken , there is a change towards local developments in technology. This change comes earlier in Southwestern Norway than further south, and is contemporary with the retreat of the the North Sea continental coast (Jelgersma 1979). Dyrnes might represent the last phase of this contact, and is the first site that clearly ties up with South Scandinavia.

Our priorities now must be to localize sites both at the upper and lower level of the Early Mesolithic. Several promising sites have been discovered in Rogaland in the last years.

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BOOK REVIEWS

European Economic Prehistory: A New Approach. 1985. Robin Dennell. London: Academic Press. 217 pp., illustrations, index. $27.

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Robin Dennell has produced a most valuable and, to a certain extent, revolutionary addition to our knowledge of European prehistory from an economic-ecological perspective. The monograph is not a descriptive source of information but rather offers an explanatory and theoretical approach, incorporating recent models. The monograph is a reevaluation of the traditional classificationof archaeological assemblages, sites, and stages often utilized in the comparative techno-typological method of analysis. In classifying archaeological data, it seems more appropriate to me to consider first the relationship of human groups to subsistence needs, inferring rational principles of human economic behavior. Artifacts, technology, dwellings, and the [illegible]are the result of human-environment interactions and can be very similar even when there are no geographical or intellectual contacts between people; broadly similar archaeological material can be found in Western Europe, Africa, and North America. Probably material culture is more similar where the behavioral or adaptive strategies within ecosystems are alike.

The monograph includes a preface, introduction, nine chapters and a summary. It is well structured and adequately illustrated. Dennell focuses here on four major themes: (1) emergence of hominids and the colonization of Europe in the Lower and Middle Paleolithic, (2) the appearance of Homo sapiens and their adaptive behavior, (3) environmental changes of the last deglaciation and their effect on human society, and (4) hunter-gatherer adaptation during the Early Holocene up to the origin of agriculture and complex society. Following these themes, Dennell likely could make clearer division and more extensive treatment of prehistoric archaeology in different geographical regions of Europe, particularly in the east. Problems of ethnogenesis and cultural continuity of various archaeological traditions in relation to the main themes could also be appreciated.

In spite of technical subject matters, the monograph is very well written and I believe it will provide a useful guide for professionals and non-professionals alike.

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CONFERENCE REPORT

Symposium on Postglacial Hunter-gatherers in Europe

Society for American Archaeology
New Orleans, Louisiana
24 April 1986

A symposium on the subject of Postglacial Hunter-gatherers in Western Europe was held in New Orleans, Louisiana, on 24 April at the annual meeting of the Society for American Archaeology. The session was organized by T. Douglas Price and Marek Zvelebil. Participants in the symposium and the subject of their presentation are given below, followed by a conference report.

Hans Peter Blankholm, Late Mesolithic Hunter-gatherers and the transition to farming in Southern Scandinavia
Clive Bonsall, Late Pre-agricultural societies in the north-west of England: the evidence from Eskmeals
Erik Brinch Petersen, Recent Mesolithic excavations in Zealand
Geoffrey A. Clark, Status differentiation in West European Mesolithic and Neolithic burial data
Clive Gamble, Discussant
Peter Gendel, Style and evolution in postglacial northern Europe
Lars Larsson, Dead men seated and ritually interred dogs: tradition and innovation in Mesolithic mortuary practices of Southern Scandinavia
Paul Mellars, Social, economic, and ecological relationships in early postglacial Britain
Steven Mithen, Modelling foraging activity on Oronsay
Signe Nygaard, Subsistence strategies and settlement patterns in the Mesolithic period along the west coast of Norway
Douglas Price, The Mesolithic of Western Europe: dynamics in time and space
Martin Wobst, Discussant
Peter Woodman, The Irish Mesolithic - the development of an insular tradition
Marek Zvelebil, The Mesolithic of temperate Europe and Asia: Questions of time, scale, and organization.

HURRICANE CITY

Now you don't cross the Atlantic in a dug-out, so unfortunately not all were able to make it, but for those who did make it, it was quite something as they say over here. Between Margaritas and Hurricanes, there was also time to expose the European Mesolithic to an American audience.

Scholars in the Mesolithic fraternity from Ireland, Scotland, England, Norway, Sweden, and Denmark collaborated together with Americans working in Europe to the success of that particular morning session. Eleven years of work was presented in 20 minutes, "make it snappy if you can, preferably 15 minutes! OK?" There were those who kept repeating the well-known sites (well-known at least to the Mesolithic Mafia) ad nauseam and there were those model

builders from whom words like intensification and diversification came dripping like sweet honey. But to most, and also apparently to the American audience, the more recent advances within the field were both fantastic and revolutionary. The Mesolithic was recognized as no longer a period of impoverished strandloopers, but a [illegible] of the successful hunter-gatherer, who in his own subtle way had discovered everything from permanent settlements to aggression.

However, some of us find it difficult to be converted to this perspective. Apparently, it is only in those countries where you have a preceding highly developed Paleolithic that the Mesolithic has been downgraded. In the northern countries, with only a final Palaeolithic, the Mesolithic has always been held in the highest esteem. It is therefore perhaps natural that most of the recent progress, new finds, and new approaches have taken place in this very same area.

Outside of the meetings we were all doing our best to raise our individual levels of ∂13C, and that was an easy task with all the gorgeous seafood available. Even oysters here are about the double in size of those back home. We and the Ertebølleans would probably call them class super AA. Why don't they have a Mesolithic here, right under them feet walking down Bourbon Street, New Orleans, Louisiana?

Finally, the reviewer must be permitted one post-symposium reflection. At the Edinburgh meeting someone with an Irish accent said that there was a danger in the fact that a lot of us originally started out with grand ideas, but now are burying ourselves in the problems of a particular site - we don't look beyond the profiles of the excavation. This spring semester, engaging in teaching the "Mesolithic of Europe" (how original!), I not only found it impossible to locate a good introduction to the subject, I also had problems with the remainder of the literature. Actually, the literature on the Mesolithic is appalling. And if I as a specialist cannot find my way around the publications, and if I do read 6 or 7 different languages, how can a non-specialist in command of fewer languages, find her way around? Or, maybe you have to be a non-Mesolithic, and a non-microlithic, aficionado in order to teach the dammed subject. Someone or somebody must get started now - a Mesolithic textbook would be the ultimate success story for the Mesolithic Mafia.

Sunday the 26th of April
somewhere over the prairie between Dallas and Winnipeg,
ultimately bound for Madison,

yours,
Drink More Tuborgs

Δ Δ Δ Δ Δ

Microcomputer Applications in Archaeology

Forbes College, Princeton University
Princeton NJ 08544

On April 5, 1986, a symposium entitled Microcomputer Applications in Archaeology was held at Forbes College, Princeton University. 35 participants heard nine papers on a variety of archaeological uses of microcomputers, including data recording, database management, fieldwork applications, and graphics. Both user-written and commercial software applications were discussed

Further questions about the symposium should be addressed to Peter Bogucki, Forbes College, Princeton University, Princeton 08544.

FORTHCOMING PUBLICATION

Bonsall, C. (Ed) 1986. **The Mesolithic in Europe: Proceedings of the Third International Symposium, Edinburgh 1985.** Edinburgh, University of Edinburgh, Department of Archaeology (December).

Contents

S. Andersen et. al., Making cultural ecology relevant to Mesolithic research: I. A database of 413 Mesolithic faunal assemblages.

N. Arts, Archaeology, environment and the social evolution of later band societies in a lowland area.

E. Avellino, A. Bietti et. al., A new Dryas II site in southern Latium: Riparo Salvini. Thoughts on the late Epigravettian in middle and southern Tyrrhenian Italy.

P. Bahn, The early Postglacial period in the Pyrenees: some recent work.

S. Bang-Andersen, Mesolithic adaptations in the southern Norwegian Highlands.

I. Barandiaran and A. Cava, The evolution of the Mesolithic in the north east of the Iberian Peninsula.

J. Barta, Hunting brown bears in the Mesolithic: Evidence from the Medvedia Cave, near Ruzin Slovakia.

P. Biagi, R. Maggi and R. Nisbet, Liguria: 9000-5000 bc.

C. Bonsall, D.G. Sutherland, R. Tipping and J. Cherry, The Eskmeals Project: late Mesolithic settlement and environment in north-west England.

V. Boroneant, Thoughts on the chronological relations between the Epipaleolithic and the Neolithic of the Low Danube.

E. Brinch Petersen, Vaenget Nord: excavation, documentation and interpretation of a Mesolithic site at Vedbaek, Denmark.

G. M. Burov, Some Mesolithic wooden artifacts from the site of Vis 1 in the European north east of the U.S.S.R.

J. Chapman, Demographic trends in Neothermal south-east Europe.

G. Clark, Site functional complementarity on the Mesolithic of northern Spain.

[illegible]oggins, T. Laurie and R. Young, The late [illegible]er Palaeolithic and Mesolithic of the northern Pennine Dales, England, in the light of recent fieldwork.

T. Constandse-Westermann and R. Newell, Social and biological aspects of the Western European Mesolithic population structure: a comparison with the demography of North American Indians.

A. David, Some aspects of the human presence in west Wales during the Mesolithic.

M. Deith, Clams and salmonberries: interpreting seasonality data from shells.

L. Domanska, Elements of food-producing economy in the late Mesolithic of the Polish Lowland.

J. Dumont, Star Carr: the results of a microwear study.

K. Edwards, Meso-Neolithic vegetational impacts in Scotland: palynological considerations.

E [illegible]glestad, Mesolithic house sites in arctic Norway.

J.A. Fernandez-Tresguerres, Thoughts on the transition from the Magdalenian to the Azilian in Cantabria: evidence from La Cueva de Los Azules, Asturia, Spain.

A. Fischer, Hunting with flint tipped arrows: results and experiences from practical experiments.

I. Gatzoff, Results of investigations of early Holocene flint assemblages from the Bulgarian Black Sea Coast.

D. Geddes et. al. Postglacial environments, settlement and subsistence in the Pyrenees: The Balma Margineda, Andorra.

P. Gendel, The analysis of lithic styles through distributional profiles of variation: examples from the western European Mesolithic.

M. Gonzalez-Morales, Asturian resource exploitation : recent perspectives.

B. Gramsch and K. Kloss, Excavations at Friesack: an early Mesolithic marshland site on the northern plain of Central Europe.

C. Grigson, Bird Foraging patterns in the Mesolithic.

O. Gron, General spatial behaviour is small dwellings. A preliminary study in ethnoarchaeology and social psychology.

K.L. Kvamme and M. Jochim, The environmental basis of Mesolithic settlement.

M. Kobusiewcz, Procurement of flint in the Mesolithic of the Polish Plain.

S. Kozlowski, A survey of early Holocene cultures in the western part of the Russian Plain

L. Larsson, Late Mesolithic settlements and cemeteries at Skateholm, southern Sweden.

A. Legge and P. Rowley-Conwy, Some preliminary results of a re-examination of the Star Carr fauna.

J. Lewthwaite, Isolating the residuals: the Mesolithic basis of man-animal relationships on the Mediterranean.

D. Lubell, M. Jackes and C. Meiklejohn, Archaeology and human biology of the Mesolithic-Neolithic transition in southern Portugal.

H. Matiskainen, The chronology of the Finnish Mesolithic

J. Morais-Arnaud, The Mesolithic communities of the Sado Valley, Portugal in their ecological setting.

A. Morrison and C. Bonsall, The early post-glacial settlement of Scotland.

S. Nygaard, Settlement patterns and adaptations in the Pre-boreal and Atlantic Periods along the western coast of Norway: preliminary results.

S. Oshibkina, The culture of the Veretye-type sites to the east of Lake Onega, U.S.S.R.

S. Palmer, Mesolithic sites of Portland, England and their significance.

T.D. Price, The reconstruction of Mesolithic diets.

J. Roche, The organisation of space in the Mesolithic sites of Muge, Portugal.

J.G. Rozoy, The revolution of the bowmen in Europe.

A. Saville, A Mesolithic flint assemblage from Hazelton, Gloucestershire, England and its implications.

T. Schadla-Hall, The Vale of Pickering in the early Mesolithic in context.

R. Schild, The formation of homogenous occupation units (ksheminitsas) in open-air sandy sites, and its consequences for the interpretation of Mesolithic flint assemblages.

I. Simmons, J. Turner and J. Innes, An application of fine resolution pollen analysis to later Mesolithic peats of an English upland.

B. Skar and S. Coulson, A case study of Rornyr II: a Norwegian early Mesolithic site.

C. Smith, British Antler Mattocks.

D. Srejovic, The Mesolithic of Serbia and Montenegro.

K. Valoch, The Mesolithic site of Smolin, south Moravia.

P. Vermeersch, Ten years research in the Mesolithic of the Belgian Lowland: results and prospects.

B. Voytek and R. Tringham, Rethinking the Mesolithic: the case of south-east Europe.

S. Welinder, Mesolithic based forest clearance in Scandinavia.

C. Wickham-Jones, Recent work on the island of Rhum, Scotland.

L. van Wijngaarden-Bakker, Faunal remains and the Irish Mesolithic.

P. C. Woodman, The Mesolithic of Munster: a preliminary assessment.

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Deith, Margaret R. 1986. Subsistence strategies at a Mesolithic camp site: evidence from stable isotope analyses of shells. **Journal of Archaeological Science** 13: 61-78.

Hypotheses concerning shellfish-gathering strategies at the temporary Mesolithic camp of Morton in southeastern Scotland are developed, based on principles of time scheduling. The modelling gives prominence to thefunctio nof settlements in determining strategies appropriate to the situation. The hypotheses are tested on the data by means of stable isotope analysis of both $^{18}O/^{16}O$ ratios and $^{13}C/^{12}C$ ratios and by means of growth-line analysis of shell material. The shell analyses support the hypotheses that the Motray Water and the Tay (but not the Eden) were used for shellfish gathering, that the full extent of the shores was used and that collection took place at whatever times of the year the site was visited. The view that shellfish gathering was an embedded activity subordinate to stone collecting is supported by the evidence.

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Recent excavations at the site of Helchteren-Sonnisse Heide 2 revealed a small concentration of chipped stone artifacts, sandstone, and carbonized organic remains dating from the Mesolithic. Analyses of the archaeological material suggest that the site was a brief occupation characterized by a specialized set of activities. The site is described and its significance in relation to the Mesolithic period in lowland Belgium and neighboring regions is discussed.

Hartz, Sönke. 1985. Kongemose-Kultur in Schleswig-Holstein? **Offa** 42: 35-56.

Juel Jensen, Helle. 1986. Unretouched blades in the Late Mesolithic of South Scandinavia. A functional study. **Oxford Journal of Archaeology** 4:19-34.

While most microwear analyses of flint artifacts have involved formal retouched tools, this paper concentrates on unretouched blades from 4 South Scandinavian Mesolithic sites, seeking to establish how frequently and on what materials such pieces were used and whether they were selected for identifiable morphological reasons. The results are based on a study of 496 specimens from various archaeological contexts. The materials processed ranged from soft to medium hard and most blades were used only once, as disposable tools. Their role relates more to 'manufacturing' than 'subsistence' activities. Blades seem to have been selected mainly according to their edge angles, with specific tasks in mind (a situation for which ethographic parallels can be quoted) and they were evidently deliberately struck with a view to use rather than being chosen from random débitage.

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Larsson, Lars. 1985. Of house and hearth. The excavation, interpretation & reconstruction of a late Mesolithic house. **Archaeology and Environment**, 197-209. Department of Archaeology, University of Umeå.

In the course of the archaeological investigation of the grave-field and occupation layer at the Late Mesolithic site of Skateholm I in southern Scania, Sweden, an extensive disturbance of the subsoil was registered within the research area. This disturbance - designated as Construction 10 - measured 11 x 6 m and featured several smaller constructions in the form of post-holes and hearths. On the basis of the post-hole traces, as well as the makeup of the find contents and

the distribution of artifacts, Construction 10 has been interpreted as the remains of a house dateable to an early part of the Ertebølle culture. The house construction has been reconstructed, relying on the documented structural details.

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Table of Contents

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John V. Dumont, Tool form and function: aspects of the Mount Sandel and Star Carr microwear research in relation to other comparable studies

Andrew Steward and Michael Jochim, Changing economic organization in Late Glacial southwest Germany

David Geddes, Michel Barbaza, Jean Vaquer, and Jean Guilaine, Tardiglacial and postglacial in the Eastern Pyrenees and Western Languedoc (France)

Lawrence Guy Straus, The end of the Paleolithic in Cantabrian Spain and Gascony

Daniel Kaufman, A reconsideration of adaptive change in the Levantine Epipaleolithic

Nancy Coinman, Geoffrey A. Clark, and John Lindly, Prehistoric hunter-gatherer settlement in the Wadi Hasa, West-Central Jordan

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Research conducted at the Balma Abeurador and a complex of related Epi-paleolithic and Mesolithic sites in the western Languedoc and eastern Pyrenees Region of France (Abri de Dourgne, Grotte Gazel, Balma Margineda) reveals the complex processes of cultural and economic development during the early Holocene at a time of signficant environmental change. Mesolithic groups expanded their subsistence base into a veritable "broad spectrum" economy including the hunting of large mammals, small game and birds; seasonal fishing for salmonids; collecting terrestrial and marine molluscs; and the gathering of wild legumes, fruits and nuts. The identification at Abeurador of lentils, peas and chick peas morphologically indistinguishable from the early cultigens of Southwest Asia raises the question of incipient cultivation practices in the west Mediterranean as early as 10,000 b.p.

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General

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Sites Mentioned in the Text

1. Abri Dufaure
2. Dyrnes
3. Morton
4. Helchteren-Sonnisse Heide 2
5. Skateholm I
6. Uzzo
7. Balma Abeurador
8. Los Azules

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TABLE OF CONTENTS

Page	Topic
1	The Azilian of Abri Dufaure, Lawrence Straus
8	A Note, Christopher Meiklejohn
9	Old Bone, New Dates: Recent Radiocarbon Results From Mesolithic Human Skeletal Remains, Christopher Meiklejohn
17	Further Radiocarbon Dates Relevant to an Azilian Burial in Spain, Christopher Meiklejohn and Lawrence Guy Straus
20	An Early Mesolithic Microlithic Industry in South-Western Norway, Jane Floor
25	Book Review
26	Conference Reports: Symposium on Postglacial Hunter-gatherers in Europe
28	Microcomputer Applications in Archaeology
28	Forthcoming Publications
31	Recent Publications
35	Index to Mesolithic Miscellany Volumes 1 through 6.

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SUBSCRIPTION INFORMATION

Mesolithic Miscellany appears twice a year, in May and November, as an informal communication for individuals interested in the Mesolithic of Europe. The yearly subscription is US$3 or £2. European subscribers should send payment to Clive Bonsall, Department of Archaeology, 16-20 George Square, Edinburgh. North American subscribers should apply directly to the editor. Individuals for whom currency exchange may be difficult should write to Clive Bonsall. **Subscriptions for 1986 are past due.**

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