

# BEFORE LASCAUX

The Complex Record  
of the  
Early Upper Paleolithic

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# Subsistence Organization in the Early Upper Paleolithic: Reindeer Hunters of the Abri du Flageolet, Couche V

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## 1. INTRODUCTION

The Early Upper Paleolithic (EUP) is emerging as a distinct phenomenon of study in Pleistocene archaeology. This period has long been lumped with the Late Upper Paleolithic, which was characterized by spectacular parietal and mobiliary art, into a unitary, monolithic block thought to represent the advances of anatomically modern humans over their archaic Neanderthal forebears. I propose that the EUP was, in certain aspects, not so different from the Middle Paleolithic as previously thought. Important changes thought to characterize the entirety of the Upper Paleolithic did not occur until the Late Upper Paleolithic, after the Glacial Maximum at around 18 to 20,000 B.P. Perhaps the most important among these changes concerns subsistence organization, entailing technological, social, and economic organization. This chapter examines EUP reindeer hunters in an effort to determine if their subsistence organization is like that proposed for Late Upper Paleolithic specialized reindeer hunters.

## 2. THE MIDDLE TO UPPER PALEOLITHIC TRANSITION

Considerable recent Paleolithic research has examined the nature of the Middle to Upper Paleolithic transition (Allsworth-Jones 1986; Clark and Lindly 1989; Farizy 1988; Gilman 1984; Harrold 1981; Marks 1983; Mellars 1973, 1989; Orquera 1984, 1985; Trinkaus 1983a, 1983b; White 1982, 1983). This transition is crucial to the understanding of the evolution of modern human adaptive patterns. It has become apparent that a model of biological replacement of Neanderthals by anatomically modern humans is inaccurate or insufficient to explain that transition. Modern forms have been found associated with Middle Paleolithic industries at Skhul (McCown and Keith 1939) and Qafzeh (Vandermeersch

1981), while Neanderthal skeletal remains have been found in association with Upper Paleolithic industries at St. Césaire (Lévêque and Vandermeersch 1981) and Arcy-sur-Cure (Leroi-Gourhan 1958). There is also evidence that anatomical evolution has continued since the Pleistocene (Frayer 1980). Trinkaus (1983b) suggests that the transition may be most productively viewed as a complex interaction between biological and cultural factors, that is both temporally and geographically variable.

Primary characteristics that distinguish the Middle from the Upper Paleolithic include differences in stone and bone technology, personal adornment, subsistence, site size, seasonality of occupations, long distance contacts, and population densities (Mellars 1973; White 1982). Although fundamental changes in human society took place, it is now clear that the transition to fully modern forms and behaviors was not a simple replacement process across the board of all of these aspects at the beginning of the Upper Paleolithic. It has been noted that a biological change was not concurrent with the transition. Additionally, there appears to be considerable evidence for continuity in lithic industries between the Mousterian of Acheulean Tradition B and the Chatelperronian (Bordes 1961; Harrold 1981). Straus (1983) strongly contrasts the Mousterian with the Magdalenian, but suggests that the EUP may not have been so different from the Late Middle Paleolithic. The contrast between the Early and Late Upper Paleolithic is also expressed by Laville et al. (1980), Gamble (1986), Hoffecker and Wolf (1988) and Trinkaus (1989). Therefore, many of the questions that had been previously posed concerning the Middle to Upper Paleolithic transition can now be asked about the Early and Late Upper Paleolithic.

### 3. UPPER PALEOLITHIC VARIABILITY

How does the EUP differ from the Late Upper Paleolithic? The interassemblage variability among Upper Paleolithic industries has usually been described in terms of the presence or absence of certain lithic artifacts, *fossiles directeurs*. These have been used to identify technological evolution or succession within the blade tool tradition of the Upper Paleolithic (Laville et al. 1980:30), as well as to identify ethnic differences manifest in the archaeological record (David 1973). More recently, the interpretation of lithic industrial variability has been challenged by those who view such variability in terms of functional differences between sites or levels, or even between different areas within a single level (Binford 1973; Rigaud 1978; Simek 1984; Straus 1978). Despite the ongoing debates, one point is clear: we do not really understand what variability in the presence or relative proportions of tool types means with reference to understanding patterns of cultural adaptation or changes in subsistence organization. At present there are no reliable means of relating temporal or spatial patterns in lithic variability to changing modes of subsistence (David 1973; White 1985). Indeed, Vierra's (1975) study indicates that lithic assemblage composition and typological variation may be insensitive to changes in overall subsistence organization. This leads to the conclusion that alternative data sets may be more appropriate for addressing questions about variability within the Upper Paleolithic.

### 4. SUBSISTENCE ORGANIZATION

It has been suggested (Binford 1980; Davidson 1983; Orquera 1984) that organizational properties of behavior may be a more appropriate framework for understanding the operation of cultural systems, variability between cultural systems, and evolutionary change within cultural systems. Subsistence organization is the basic adaptive mechanism that combines behavior with technology, not only of individuals but also of groups. It is the direct link

between humans and their environment. Subsistence organization has been described by Binford (1980) as ranging from foraging to logistical collecting. The former is characterized by encounter hunting and immediate consumption, while the latter is characterized by planned hunts of larger numbers of animals that can be stored for long-term consumption. Of course, neither of these polar extremes represents the entire organization of any modern hunter-gatherer group, nor can it be expected to characterize accurately that of any prehistoric group. The model can, however, be useful in investigating the organizational mix of these characteristics to increase our understanding of Paleolithic subsistence organization in general.

Simek's (1987:39) spatial analysis suggests that the transition might be characterized by a shift from Mousterian foraging to Upper Paleolithic logistical collecting. If, however, as suggested by Straus (1983) and others, some of the more important organizational changes occurred with the Glacial Maximum at 18,000 B.P., that contrast may be evident between the Early and Late Upper Paleolithic. Therefore, we can look for evidence for foraging, or lack of logistical collecting, in the EUP.

How do we arrive at an understanding of Upper Paleolithic subsistence organization? Although analysis of faunal assemblages has been characterized as the most underutilized of studies of human behavior in the Upper Paleolithic (Harrold 1988:182), it can be used to make robust inferences about the organization of subsistence systems of Paleolithic hunter-gatherers. S. R. Binford (1968), Mellars (1973, 1989), and White (1982, 1983) note marked changes in subsistence at the Middle to Upper Paleolithic transition. Although there was a broadening of the subsistence base to include fish and birds, a notable change was a greater emphasis on the hunting of a single species of animal, particularly reindeer in France (Spiess 1979). While differential preservation of fragile fish and bird bones from the considerably earlier Middle Paleolithic sites may well be a very large factor in the absence of evidence for their consumption in earlier times, the concentration on single species prey is often noted as the hallmark of a shift in organizational strategies for the Upper Paleolithic. Mellars (1989:357) argues that the "highly specialized exploitation of reindeer . . . documented throughout virtually the whole of the Upper Paleolithic sequence in western France" was significantly more systematic, intensive, and logistically organized than the exploitation of reindeer by earlier, Middle Paleolithic hunters.

There is no question that significant faunal assemblages with very high proportions of reindeer exist in not only the Late Upper Paleolithic, but also in such Early Upper Paleolithic (32 to 34,000 B.P.) sites as Abri Pataud, Roc de Combe, La Gravette, and Le Piage (Boyle 1988, cited in Mellars 1989:357). The question is whether large percentages of reindeer necessarily mean an exploitation strategy as part of a logistical collecting subsistence organization. This particular species provides the opportunity to be treated by prehistoric hunters, either as territorial game or as migratory game. Reindeer thereby exhibit a potential for both immediate consumption, like many other prey, and for planned, mass kills and bulk storage during certain seasons of the year. Therefore, reindeer offer us a special window on the past, one that can be examined for subsistence systems organized in a foraging mode or in a logistical mode. An archaeological case from the EUP that exhibits a predominance of reindeer in its faunal assemblage, level V of the Abri du Flageolet, was selected for such an examination.

## 5. ABRI DU FLAGEOLET

The Abri du Flageolet I is a small, west-facing rock shelter on the north side of the Dordogne Valley, near Saint-Cyprien. It was excavated for about fifteen years by Rigaud (1982). The shelter comprises a series of Upper Paleolithic strata in eleven major sedimen-

tary units. Level V, dating to  $25,700 \pm 700$  B.P. (Mellars et al. 1987:132), sedimentologically indicates a cold period, known as the Tursac event, during otherwise milder and more humid climate (Laville et al. 1980:258). An Upper Périgordian (Gravettian) lithic assemblage is dominated by burins. This level is relatively thin (less than 20 cm) and stratigraphically homogeneous, suggesting a single occupation (Simek 1984:409). It covers approximately 32 square m within the rockshelter.

The faunal assemblage from level V of the Abri du Flageolet I consists of 1900 identifiable specimens. This assemblage is highly fragmented, with shaft splinters from long bones making up the vast majority of the assemblage. Scavenger or carnivore damage appears to have played a very small role in the attrition of this assemblage. Only 62 of the 1900 specimens exhibit any morphological evidence of gnawing, so that the data discussed here are deemed to be almost entirely the results of human behavior.

## 6. SUBSISTENCE ORGANIZATION AT ABRI DU FLAGEOLET

What kinds of data can inform us about the nature of subsistence organization at Le Flageolet? It has already been suggested that species selection may have been important. The specialization of single species hunting may be indicative of an organization that focuses on mass kills for subsequent storage, or it may be simply a reflection of prey generally available in the local environment. This single species focus must be compared with other pertinent data including seasonality, age and sex profiles, element representation, cutmarks, and bone breakage patterns in order to draw conclusions concerning the subsistence organization of EUP reindeer hunters.

### 6.1 Species Present

Of the 1900 identifiable specimens, the predominant species was reindeer (*Rangifer tarandus*), making up 95% ( $n = 1801$ ) of the assemblage. The remainder consisted of red deer (*Cervus elaphus*:  $n = 22$ , 1.2%); horse (*Equus caballus*:  $n = 20$ , 1.1%); bos/bison ( $n = 9$ , 0.5%); chamois (*Rupicapra rupicapra*:  $n = 6$ , 0.3%); ibex (*Capra ibex*:  $n = 4$ , 0.2%); pig (*Sus scrofa*:  $n = 1$ , 0.05%); and large bird (*Cygnus?* sp.:  $n = 1$ , 0.05%). The proportional representation of species is very similar to that derived by Delpech (1975, 1983) from a sample of this level. The predominance of a single species is in marked contrast to the underlying level VII, that also has an Upper Périgordian industry, but is characterized by a milder climate and a much more diverse faunal representation, including 50% red deer, 36% reindeer, 8% bos/bison, 2% chamois, 2% horse, and smaller amounts of roe deer, ibex, and other species (Delpech and Rigaud 1974:48).

### 6.2 Seasonality

Seasonality is a critical variable in understanding the exploitation of reindeer. In a migratory species like *Rangifer*, the season of acquisition is linked to the availability as well as the predictability of encounter of the prey species (see Pike-Tay, Chapter 7, this volume). In winter, reindeer forage in small groups for dispersed and thin lichen resources. Due to resource depletion, the winter foraging area shifts around. The net result for hunters is low predictability for encounters with reindeer bands. Likewise in the summer, bands will be widely dispersed over a large range, and predictability of location is low. In the spring and fall, however, reindeer are found on well-defined routes between summer and winter ranges. At this point, topography becomes very important in predicting reindeer location. On an open plain, bands may have a lot of latitude in the exact paths they follow.

TABLE 1  
Le Flageolet Level V *Rangifer tarandus* Epiphyseal Fusion  
Sequence

Element	Age	% Unfused (n)	% Fused (n)
Phalanx 3	<12 months	0	100 (1)
Rib	<12 months	22 (2)	78 (7)
Scapula	<12 months	0	100 (1)
Phalanges 1 & 2	14 months	11 (1)	89 (8)
Radius proximal	26-27 months	0	100 (8)
Tibia distal	26-27 months	7 (1)	93 (1)
Metacarpal distal	29-35 months	50 (2)	50 (2)
Metatarsal distal	29-35 months	60 (3)	40 (2)
Radius distal	34-60 months	17 (1)	83 (5)
Tibia proximal	34-60 months	0	100 (1)
Vertebra	<60 months	43 (6)	57 (8)
Sacrum	>60 months	0	100 (1)

They are likely to follow any number of paths, particularly since trampling along a given route results in the destruction of forage for a number of years. Burch (1972:351-359) cautions against the assumption that herds follow the same routes annually. With many possible routes, hunters must be dispersed to increase the probability of successful encounter. But with certain kinds of topography such as mountain passes, rivers, or lakes, the number of alternative routes is reduced, so larger numbers of animals can be predicted more reliably.

Observations on dental eruption and wear can provide insight into the season of death for some portions of the level V assemblage. The problems associated with this kind of seasonality determination have been discussed by Spiess (1979:70-81). Eruption and wear patterns of the younger specimens suggest deaths distributed between September and February. Additionally, a *bois de massacre*, a female cranium with attached antler, indicates a winter death.

### 6.3 Age Profile

Two lines of evidence have been pursued to investigate the age profile of this assemblage. These are (1) epiphyseal fusion and (2) dental eruption and wear. The first of these, epiphyseal fusion, is incompletely established for *Rangifer*. Spiess (1979:92) has suggested that the sequence of fusion in white-tailed deer (*Odocoileus*) is reasonably close enough to that of reindeer, and can be used to estimate ages in archaeological samples. It must be noted, however, that age profiles based on such samples of fauna may seriously underestimate the number of youngest individuals, due to differences that bone density may have on preservation (Binford and Bertram 1977; Lyman 1987).

Inspection of the level V epiphyseal fusion data (Table 1) reveals that there are actually very few bones with sufficient representation or preservation to give a good idea of the age class distribution of this assemblage. There are a few individuals in their first year represented by unfused ribs and phalanges, but a good many more individuals with those elements fully fused. One specimen exhibits an unfused distal tibia, representing an individual less than two years old, but fourteen specimens are completely fused. The distal metapodials fuse during the third year; half of these are unfused, and half are fused. The distal radius and proximal tibia fuse during the fourth or fifth years; one specimen is unfused, and six are fused. The vertebral epiphyses generally fuse before the fifth year; slightly more than half of the specimens are fully fused. The sacral elements fuse after the fifth year; one

## LE FLAGEOLET COUCHE V AGE PROFILE

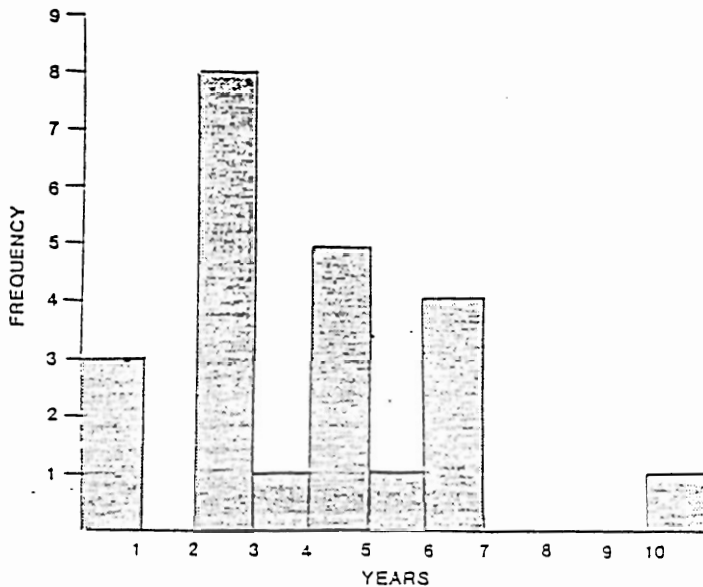


Figure 1. Age distribution of *Rangifer tarandus* individuals from level V of Abri du Flageolet based on dental eruption and wear. Two patterns are apparent in this illustration: (1) the dominance of prime age animals; and (2) the jagged profile, varying widely from one year to the next, which is typical of species in highly seasonal environments.

specimen was fused. Thus we see a heterogeneous age profile, with a few specimens of young age, most in the two- to six-year range, and a few in the older range.

One must ask whether such an age profile is biased by uneven preservation of younger individuals (Binford and Bertram 1977; Lyman 1987). To answer that question, we can turn to the dental eruption and wear data. The problem of poor preservation of the bones of younger animals is less serious for the use of dental eruption and wear data. Teeth are simply harder and denser than bones. While it is difficult to derive season of death for a but the youngest individuals, due to variation in growth and abrasion rates within and between populations (Spiess 1979:70-78), eruption and wear data can be used to place specimens in broad age classes and should give us a clue as to the reliability of the fused data. The answer in this case is a very similar picture of age distribution (Figure 1). There are indeed only a few individuals in their first year, and there appear to be none in the second year. The majority are prime-age adults from three to seven years, while there is one very aged individual, probably ten or more years old.

The interpretation of mortality profiles has received great attention in the archaeological and paleontological literature (e.g., Frison 1978; Klein 1978, 1982; Kurtén 1953; Lyman 1987; Reher 1970, 1978; Stiner 1990; Voorhies 1969; Wilson 1980). Most models distinguish between two types of profiles. The first is the U-shaped mortality curve with juveniles most abundant, prime-age adults most rare, and old individuals more frequent than prime-age adults, but significantly less than juveniles. This is frequently called the attritional mortality profile. The second is the straight-line mortality curve of a living population, with juveniles most abundant, fewer but fairly well-represented prime-age adults, and fewer old individuals. This is called the catastrophic mortality profile. Stiner (1990) adds an additional profile, the prime-dominant mortality profile, with prime-age adults most abundant, and very few juveniles or old individuals.

This prime dominated-age profile is what one would expect with selective hunting of single individuals. Chasing or encounter stalking with short-range or inefficient weaponry should result in an attritional profile with very young and old well represented, and few prime adults. Nonselective encounter ambush or mass kills, like bison jumps of the North American plains (Frison 1970), should result in a more catastrophic mortality profile with age classes in proportion to their occurrence in living populations. Selective ambush or cooperation to control or prevent flight should result in a prime-dominant mortality profile. Stiner (1990) notes that selective ambush hunting arose during the Italian Late Middle Paleolithic and characterized the subsequent Upper Paleolithic sites in the region and suggests that it is related to (1) increased calorie and fat needs during increasing cold of the last glacial after 38,000 B.P. and (2) increased social interaction and cooperation, even without improved weaponry in the Middle Paleolithic cases. Driving groups of animals into pounds or natural traps (Frison 1974) would give hunters the opportunity to select the biggest and fattest individuals. The same pattern could also emerge from the use of an efficient or more long-range weaponry by individual hunters that would allow them to choose and kill a favorable animal from a group or to be more selective in the taking of individually ambushed or encountered prey. The bias for prime adults in level V suggests selective ambush or stalking with efficient weaponry.

#### 6.4 Sex Ratios

A number of osteological measurements are clearly sexually dimorphic. These include overall length of the mandible, mandibular diastema length, distal metapodial width, and atlas vertebral width. Unfortunately for this assemblage, very few of these measurements could be taken. No atlas vertebrae were found. Distal metacarpal and metatarsal measurements were restricted to two apiece. No whole mandible halves or diastemas were found. Spiess's (1979:82) measurement 107 of mandibular diastema length, designed to account for archaeological fragmentation patterns, could be taken on only three specimens. One was long (male) and two were short (female), clearly too small a sample to yield reliable sex ratios in the archaeological population. All we can say is that both males and females are present in this assemblage.

Further inference may be drawn from the age data. Tooth eruption indicates the presence of three calves in their first year. These would have been in the company of their mothers, as yearling calves are not driven away by the cows until the birth of the next year's calves (Espmark 1975:409). Thus, cow and calf bands were part of the target population. There are, then, more indications of the presence of cows than of bulls. This would be consistent with winter season hunts. Bulls lose most of the summer's accumulation of fat and up to 20% of their body weight during the rutting season; cows are nutritionally superior prey from that time through the winter.

#### 6.5 Element Representation

The element representation at Le Flageolet shows a bias for the appendicular skeleton over the axial skeleton (Table 2; Figure 2). This appears to be a transported assemblage, representing the consumption locus for prey killed elsewhere. The most commonly occurring element is the tibia, followed by the metatarsal, humerus, femur, radiocubitus, and metacarpal. Notably absent or occurring in very low frequencies are the vertebrae, scapula, carpals, patella, tarsals, astragalus, calcaneum, and phalanges. How do we account for those skeletal elements that were selected for transport?

When we refer to Binford's (1978:23) meat utility index (Figure 3), it is apparent that meat alone cannot account for the elements that were selected for. Of course it must be

TABLE 2  
Element Representation

Element	NISP	Left	Right	MNI	MAU	Indexed MAU
Antler	39	—	—	1	1	.02
Cranium	33	—	—	1	1	.02
Mandible	52	10	22	22	16	.39
Atlas vertebra	0	—	—	0	0	.00
Axis vertebra	0	—	—	0	0	.00
Cervical vertebra	4	—	—	1	1	.02
Thoracic vertebra	5	—	—	1	0.38	.01
Lumbar vertebra	4	—	—	1	0.67	.02
Pelvis	9	4	2	4	3	.07
Rib fragments	132	—	—	—	—	—
proximal	18	0	—	1	0.69	.02
Scapula	3	0	1	1	0.5	.01
Humerus	111	—	—	—	—	—
proximal	10	2	3	3	2.5	.06
distal	62	26	24	26	25	.60
Radiocubitus	148	—	—	—	—	—
proximal	29	11	16	16	13.5	.33
distal	41	13	10	13	11.5	.28
Carpals	12	1	2	2	1.5	.04
Metacarpal	140	—	—	—	—	—
proximal	17	9	7	9	8	.19
distal	43	9	9	9	9	.22
Femur	152	—	—	—	—	—
proximal	53	10	9	10	9.5	.23
distal	38	11	20	20	15.5	.37
Patella	1	0	1	1	0.5	.01
Tibia	254	—	—	—	—	—
proximal	110	40	43	43	41.5	1.00
distal	73	27	18	27	22.5	.54
Tarsals	7	1	2	2	1.5	.04
Astragalus	0	0	0	0	0	.00
Calcaneum	3	2	0	2	1	.02
Metatarsal	406	—	—	—	—	—
proximal	79	43	30	43	36.5	.88
distal	52	17	9	17	13	.31
Phalanx 1	8	—	—	1	1	.02
Phalanx 2	12	—	—	2	1.5	.03
Phalanx 3	1	—	—	1	0.12	.002

remembered that the meat utility index was derived from a prime bull taken in August, at the apex of its nutritional state. It does not reflect the overall weight and fat loss during the rut and the winter. Moreover, loss of quality in the meat does not occur uniformly over the body. According to Eskimo informants, the forelimb, neck, and tenderloin suffer first (Binford, L. 1988). This suggests that axial skeleton portions with nominally high meat utility, indicated by the vertebrae, scapula, and ribs, may not have been selected because of deteriorated nutritional state during the winter.

If we look at the marrow utility index (Figure 4), the pattern makes more sense. The element representation corresponds fairly well to what Binford (1978:81) calls a gourmet curve, that is, selection for parts with high marrow values and abandonment of those with moderate to low values. Speth's (1983) arguments concerning the desirability of fat in the diet are particularly pertinent for cold climate hunter-gatherers in the winter. The fat in marrow can supply twice as many calories per gram as protein, and allows for efficient

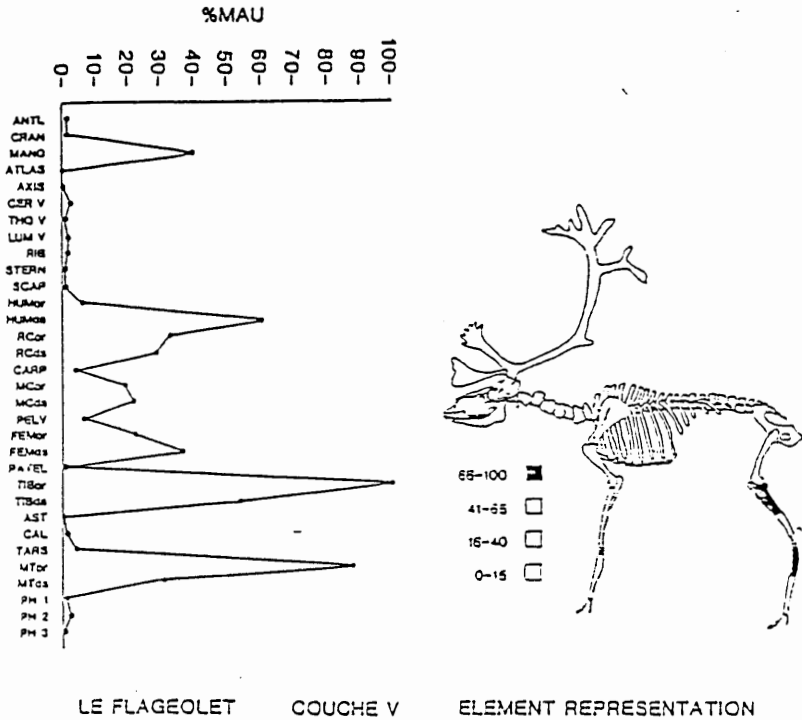


Figure 2. Standardized skeletal element representation by minimum animal units. The highest frequency element is expressed as 100%, and other elements expressed as a percentage of that. Note the virtual absence of axial or low utility elements, and the dominance of hind limb elements over forelimb elements.

metabolism of the protein from meat. The environment suggested by the sedimentology and by the predominance of reindeer in level V would place a premium on sources of dietary fat.

Binford's (1978:74) modified general utility index (Figure 5) combines the properties of meat and marrow utility. The level V assemblage breaks down into two groups. The elements present in higher frequencies appear to correspond to a relatively unbiased utility curve (Thomas and Mayer 1983), reflecting selection for elements in relation to their utility for meat, marrow, and grease.

The second group includes those elements that have been drastically culled from this assemblage (Figure 5). These appear to reflect some severe limit on transport. Only high-utility parts have been transported. Low-utility parts that might have traveled as "riders" between parts of higher utility have been removed prior to transport. For example, the femur and tibia, elements with substantial amounts of meat, are very well represented, as is the metatarsal, which is high in marrow content; the intervening patella, tarsals, astragalus, calcaneum, and phalanges are very poorly represented. Apparently a good deal of labor had been invested in removal of those low-utility elements. This suggests that there was no organized or cooperative labor force for transport, implying that single hunters were transporting only the most useful parts of their prey over a considerable distance.

### 6.6 Cutmarks

The placement of cutmarks on the elements represented in the assemblage of level V strongly suggests an emphasis on carcass dismemberment. Only 3% of the specimens carried cutmarks. Although there had been selective destruction of most of the articular ends, over 60% of the cutmarks indicated skinning and carcass dismemberment. Meat removal was

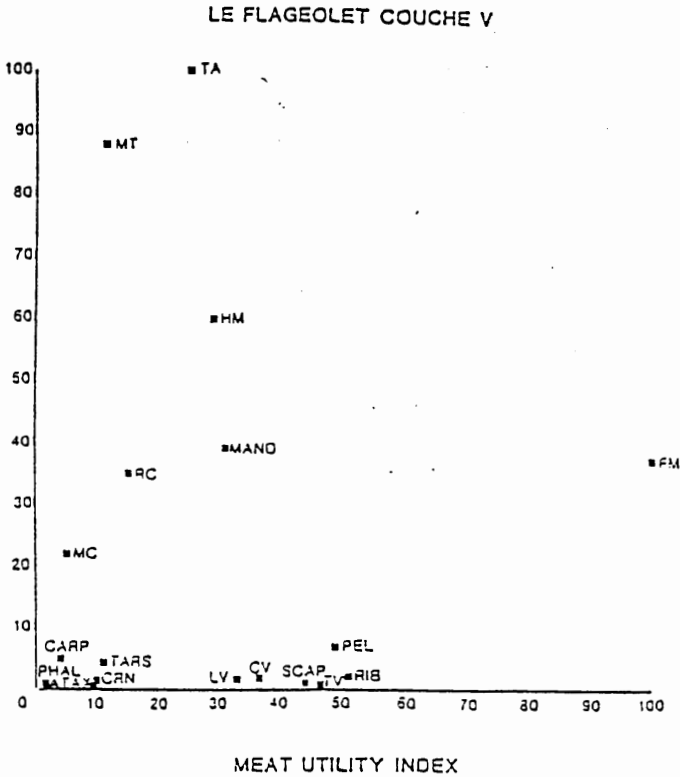


Figure 3. Relationship between level V %MAU and meat utility index. Note the very low representation of axial skeletal elements, carpals, tarsals, and phalanges across the bottom of the graph.

indicated by 32% of the cutmarks, and the remainder were in anomalous locations. This implies that carcass partitioning for transport, sharing, or consumption was much more important than meat removal for drying or storage.

## 6.7 Breakage Patterns

Further processing of the bones was indicated by the breakage patterns. As previously mentioned, this assemblage was highly fragmented. Marrow removal is clearly one of the primary goals of this processing. However, the breakage patterns do not appear to be very systematic. Impact cones on the diaphyses seem to be distributed randomly up and down the shaft. Multiple points of impact, suggesting repeated blows, are frequent. The resulting fragments average 4.7 cm in length. These patterns are consistent with marrow extraction during meals integrated into the consumption of the meat, as opposed to simultaneous and systematic mass processing of the marrow bearing elements of a large number of kills after meat had been removed for drying. Also, the ratio of rib heads or proximal ends to rib fragments is 0.14, and the mean fragment length with green breaks at both ends is 3.6 cm. These suggest consumption of fresh meat, because the blood and fibrous contents of stored ribs tend to be putrid, so consumers avoid breaking them (Binford 1978:468).

Long bone shaft splinters account for 1308 specimens, while fragments of articular ends account for only 129. This gives a shaft splinter to articular end ratio of 10:14. That ratio increases to 21:30 when we consider those elements most suitable for bone grease processing: the proximal humerus, proximal and distal femur, and proximal tibia (Binford 1978:33). This does not appear to be due to carnivore or scavenger presence at this site, as

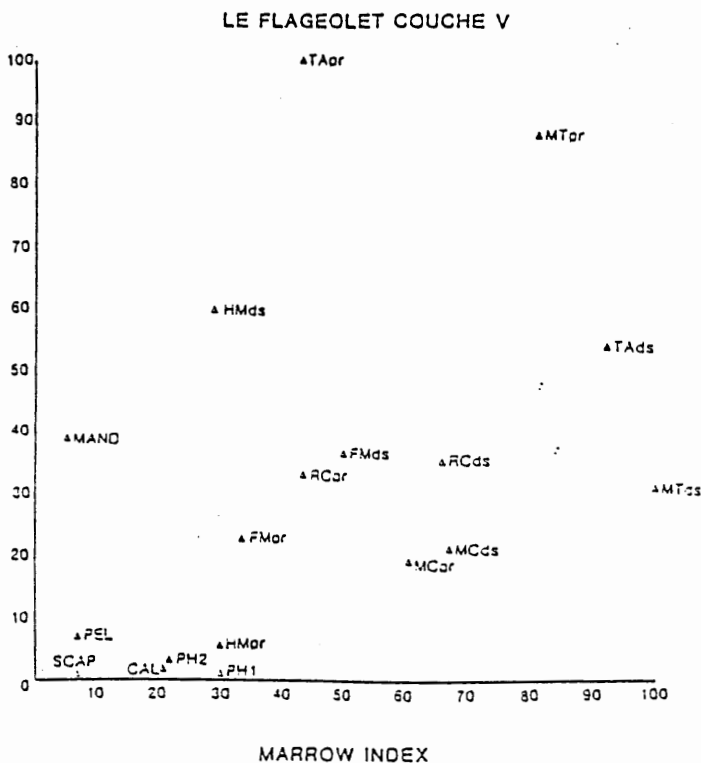


Figure 4. Relationship between level V %MAU and marrow utility index. Low-utility value parts are poorly represented, while high-utility value parts are better represented.

there are virtually no gnawing marks on the bones. Rather, this removal of articular ends is more consistent with processing of bone grease (Binford 1978:157-163; Delpech and Rigaud 1974).

## 6.8 Summary

To summarize, several lines of evidence suggest that EUP hunter-gatherers who occupied the Abri du Flageolet during the accumulation of level V practiced a subsistence organization more like that of foragers than that of logistical collectors. Kills are distributed throughout the winter, when it would be difficult to find and kill a large number of reindeer at one time. The age distribution suggests selection for prime adults, implying individual ambush kills. The sex ratio is difficult to determine. Although both sexes are present, indications of females are more numerous. Again, this is consistent with individual encounter hunting in the winter. Element representation indicates a consumption location, but with a strong bias for meat and marrow utility. The intensive culling of low-utility parts positioned between high-utility parts indicates a severe limitation on transport. These factors, although not conclusive in themselves, combine to suggest an emphasis on successive procurement of individual kills spaced throughout the winter, and on immediate consumption. There are no indications of a planned logistical labor organization in terms of procurement, nor in terms of processing or consumption. Although there is overwhelming predominance of a single species, reindeer, that appears to be due to climatic factors rather than a planned mass kill of a target species.

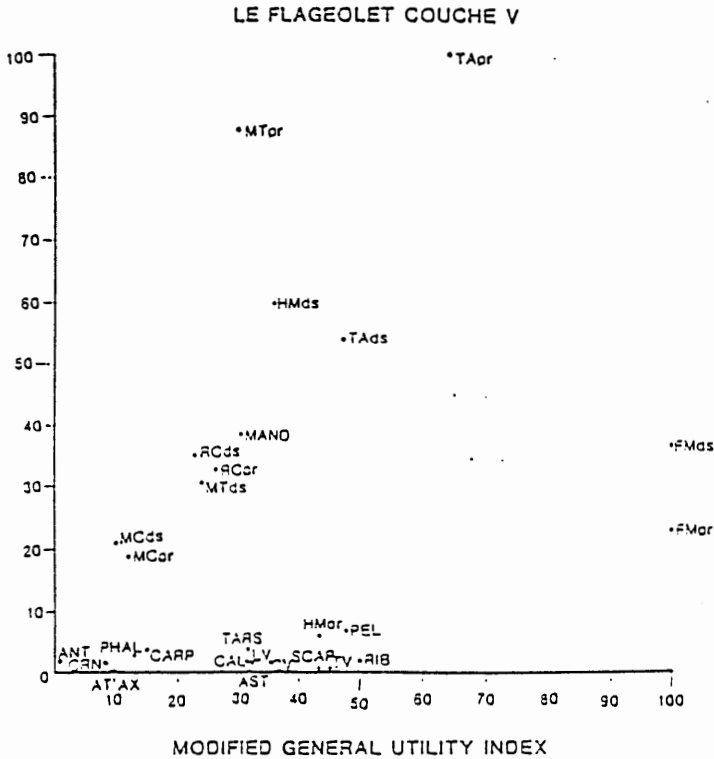


Figure 5. Relationship between level V %MAU and modified general utility index. Note the unbiased representation of the major appendicular skeletal elements, after removal of axial skeletal elements at a transport threshold.

## 7. CONCLUSIONS

The empirical case presented here suggests that the Middle to Upper Paleolithic transition was not a matter of the evolution of subsistence organization from foraging to logistical collecting. Materials left by hunters who occupied level V of the Abri du Flageolet do not fit the model expected of logistical collectors. Rather, the patterns presented here seem more similar to those of the Late Middle Paleolithic. While it is unlikely that any part of the Middle Paleolithic was characterized by logistical collecting (Mellars 1989:357), it does not of necessity follow that all of the Upper Paleolithic was so organized. The capacity for enhanced cultural behavior does not necessarily result in expression of it. Modern tropical foragers are neither stupid nor of limited ability to plan or organize into more complex subsistence patterns; rather they are adapted to their environment on the basis of need. In the same manner, EUP hunter-gatherers could organize to the level of their economic requirements. Indeed, they probably had more potential for diverse behavioral patterns than their Neanderthal forebearers. At the same time, it remains to be demonstrated that Late Upper Paleolithic reindeer hunters, such as the Magdalenians, were actually organized as logistical collectors. In all likelihood, their subsistence organization would have been made up of a combination of various aspects of organization, perhaps including foraging and logistical collecting as seasonal components. The point has been made here that the subsistence of at least part of the EUP does not meet the expectations of the preconceived model of the Upper Paleolithic as a monolithic entity. The evolution of modern human patterns of adaptation has been a much more complex process that has yet to be completely defined.

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