

9. Hunter-Gatherer Food Sharing: Social and Economic Interactions

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Abstract: Food sharing has been proposed as a sine qua non for the evolution of human behavior and as a universal characteristic of modern hunters and gatherers. Various theoretical models attribute this behavior to ideological or ecological bases. Other models contrast immediate vs. delayed consumption, or sharing vs. storage, with the inference that they may be seen as mutually exclusive phenomena. Survey of the ethnographic literature indicates quite a range of variation in actual practice of food sharing among modern hunters and gatherers. Most ideological models are very difficult to test in the archaeological record. The difficulty lies first in establishing that food sharing took place, as opposed to mere assertion that it did, and second in demonstrating linkages between perceived patterns in the archaeological record and explanatory models said to account for the practice. Faunal remains from two late Upper Paleolithic archaeological sites are used to examine food sharing. The spatial patterning of portions of individual reindeer carcasses indicates aspects of food sharing in stages of multitiered distribution, contrasting resource acquisition at a kill site (Verberie) with consumption at a residential site (Pincevent). An integration of ideological and ecological theory is proposed for Late Magdalenian hunter-gatherers.

Food sharing has been an essential aspect of modern hunter-gatherer studies for a long while and has carried considerable interest for studies of prehistoric hunter-gatherers. In 1966, with the resurgence of hunter-gatherer studies at the Man the Hunter conference in Chicago, researchers tried to formulate a general picture of hunters that could be used for a reconstruction of life in the past. A consensus was achieved that food sharing was an essential element of the "Nomadic Style," in which "[t]he economic system is based on several core features including a home base or camp, a division of labor—with males hunting and females gathering—and, most important, a pat-

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tern of sharing out the collected food resources" (Lee and DeVore 1968:11; emphasis added). Thus, food sharing was characterized as a universal and most important aspect of hunter-gatherer behavior.

Food sharing has not only been seen as a universal characteristic of modern hunters and gatherers, but it has also been proposed as a *sine qua non* for the evolution of human behavior. A fundamental issue in Paleolithic archaeology concerns the origins of food sharing by early humans. Arguments about food sharing concern our earliest ancestors and the very process of hominization (Leakey 1971). Owen Lovejoy (1981) proposed that bipedalism had evolved in order to free the hands of males for carrying food back to a base camp to solidify pair-bonding with females. Glynn Isaac (1978a, 1978b), drawing on ethnographic generalizations of hunter-gatherers, generated an argument that the cooccurrence of stone tools and animal bones in archaeological sites implies the presence of a home base, a division of labor, transport of food resources, and food sharing. The purported ancestral importance of food sharing for all hominids further strengthened the idea that the practice was not only universal but also probably innate for humans. The origins or universality of food sharing are beyond the scope of this essay. What will be discussed is the nature of food sharing, the potential variation in the practice of food sharing, and the possibilities for investigating food sharing in the archaeological record.

Bases of Food Sharing

The theoretical underpinnings for the perceived universality of food sharing are quite varied. Models generally fall into two camps, attributing the behavior to either ecological or ideological bases, both of which have been examined in various ethnographic settings.

Ecological Models for Food Sharing

The ecological models focus on quantitative aspects of food resources and attribute sharing to scarcity, abundance, or both. The case for scarcity is obvious. For example, Kishigami notes that the Inuit of Akulivik practice food sharing "especially during periods of reduced food availability" (2000:176). As for abundance, in many climates, spoilage precludes long-term storage of any accumulated surplus of many types of food. The occasional, serendipitous acquisition of a surplus of any food resource, such as a larger animal, may be the occasion for feasting, sharing with one's family and friends, potentially building social prestige or obligation.

Risk reduction by reciprocal obligation is another potential reason for food sharing. If acquisition was based on opportunistic encounters with prey, then nonsynchronous inputs of food would offer advantages for those who share. They could count on receiving a share on days that they did not acquire food themselves (Hawkes 1993:345). Others have argued that if risk reduction entails the expectation of sharing today, and receiving a share tomorrow, it is not

always empirically supported. Hovelsrud-Broda (2000:194) notes that shares also go to people not involved in food acquisition.

The structure of resource availability in the environment may condition either the necessity for sharing or structural aspects of food-sharing practices among various groups of hunter-gatherers. Tropical forests are characterized by relatively ubiquitous distributions of small-body-size prey. Among highly mobile forest hunter-gatherers, food resources are generally dispersed and unpredictable in location or encounter. One cannot count on acquiring large quantities, and when a windfall arrives, it is likely to spoil quickly. Sharing, therefore, allows one to exploit short-term luck efficiently, reducing the costs of acquisition for those invited sharers. Cooperative hunting may necessitate the size or organization of a workforce to acquire large animals, especially in grassland environments where large herbivores represent the majority of available food. Such environments require cooperative labor, if not for the actual killing or acquisition, then for the transport of the meat.

Ingold (1980) models the intensity of food-sharing behavior along an axis from famine to plenty (Figure 9-1). When resources are plentiful, it is easy to be generous, to share often with many others in the group. But as resources become scarcer, sharing declines. As long as everybody has something, people are more frugal, taking care of their own selves or families first. As resources decline further, sharing increases again, perhaps quantitatively reduced but distributed more evenly, making sure that everyone has at least something. Further declines, however, reach a theoretical threshold where there may not be enough for everyone to have something (indicated by the question mark in the graph), where resources are so scarce that sharing collapses and people hoard precious resources for their own consumption. Under this theoretical perspective, we should not expect any normative, universal pattern of food sharing, whether among hunter-gatherers or any other societies.

Ideological Models for Food Sharing

Ideological models do not look to economics or ecology to explain practices of food sharing among human groups. Rather, they look to ideas or values of social cohesiveness to justify the existence of such practices. They are essentially the integrating mechanisms of interlocking obligations that Mauss (1954) called the "system of total prestations," unifying a given society on the basis of obligatory giving and receiving. Service identified sharing as "an expectation of the moral order, . . . a keynote of the value system" (1966:16). Bird-David (1992) suggests that that expectation might originate from perspectives on the environment as a giving or nurturing mother who shares with her children, thus establishing an ethical norm to be emulated by members of society. Some suggest that food sharing is a function of an ideological ethic within a given society (e.g., Gould and Watson 1982), in which the strength of the sharing ethic varies among societies.

Food sharing may have broader functions, particularly in the modern world. Some see food sharing as a means of maintaining social identity within a larger sociopolitical world, sharing services and skills as well as distributing

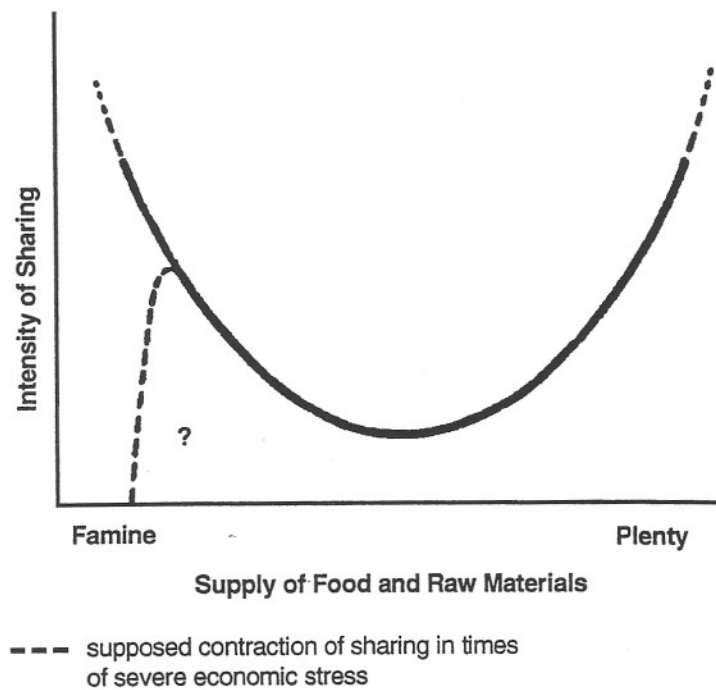


Figure 9-1. *Theoretical relationship of food sharing and food availability (after Ingold 1980:Figure 19. Reprinted with the permission of Cambridge University Press).*

large packages of meat, protecting internal integration, “resisting hegemonic pressures of assimilation from surrounding hierarchical societies” (Fortier 2000:139). East of Hudson Bay, traditional seal hunting required and maintained cooperation and sharing among the Nunavik, making “possible the reproduction of socioeconomic relationships in the contemporary context” (Kishigami 2000:171).

In a recent volume of essays initiated at the Eighth Conference on Hunting and Gathering Societies (CHAGS 8), Wenzel and colleagues note a modern perspective on subsistence as social economy, emphasizing a shift in perspective from resource extraction as exemplified by Steward (1955:40–41) to “an analytical focus toward how the means and methods by which resource allocation and appropriation are organized” (Wenzel et al. 2000:1). This shift might be seen as a contrast between the focus on subsistence said to characterize processual archaeology and that on social agency said to characterize a number of postprocessual perspectives on archaeology.

Clearly, whether we subscribe to ecological or ideological models for food sharing, “we should not expect to find one explanation for sharing” (Kelly 1995:180). Food sharing may act to increase diet breadth, reduce risks of food shortages, or enhance social relationships within any group, all of which can

be adaptively selective and can increase the probability of group and individual survival and thus the maintenance of a cultural identity. The poles of ideology and ecology are not actually so distant from each other. As Leslie White (1959) pointed out, the ideological, social, and subsistence realms of any society are integrated. We cannot understand any one of them by neglecting the others. There are, however, problems for archaeologists in this perspective. Most ideological models are very difficult to test in the archaeological record. The difficulty lies first in establishing that food sharing took place, as opposed to mere assertion that it did, and second in demonstrating linkages between perceived patterns in the archaeological record and explanatory models said to account for the practice.

Variation in Food-Sharing Patterns

Survey of the ethnographic literature indicates quite a range of variation in the actual practice of food sharing among modern hunters and gatherers. A reading of the ethnographic literature makes it clear that food sharing is neither universal nor uniform. Societies are organized in different ways to provision their members with sustenance. Some models contrast immediate vs. delayed consumption (e.g., Testart 1982, 1988), or sharing vs. storage, with the inference that these practices may be seen as mutually exclusive phenomena. There are also variable conditions that operate within societies to change how food is shared. Carcasses may be divided according to different sets of rules, such as nominative portions (Figure 9-2) attributed to recipients according to their role in the hunt (e.g., Bahuchet 1984:364) or partitioned according to kinship rules (e.g., Altman 1987:135) or simply by coresidence (e.g., Jarvenpa and Brumbach 1983:178, 181–182). In other cases, it is not freshly procured carcasses that are partitioned and shared, but rather accumulated stores that are privately owned and occasionally shared in instances of need (e.g., Binford 1991:101).

Among modern hunter-gatherers, the primary social and economic relationships are defined by kinship. The closest family ties are exhibited in the daily provisioning and consumption of food in the immediate family, be it a nuclear or an extended unit. There are, however, other social and economic relationships important in subsistence organization that are most often expressed in terms of food sharing. For instance, cooperative hunting of seals during the winter by the Netsilik Eskimo involves a set of hunting partners who have reciprocal obligations of sharing prey when only one or a few hunters have been successful (Balikci 1970). Among the Ache in the South American tropical forest, meat brought into the camp is shared with everyone (Kaplan and Hill 1985). Among the Nunamiut Eskimo, who subsist largely on stored caribou meat during the winter, sharing of stored meat is very limited since all hunters have virtually equal access to migrating caribou. Fresh meat, usually Dall sheep (*Ovis dalli*), brought into the camp during the winter is much more widely shared, distributed along the lines of the kinship network (Binford 1978b).

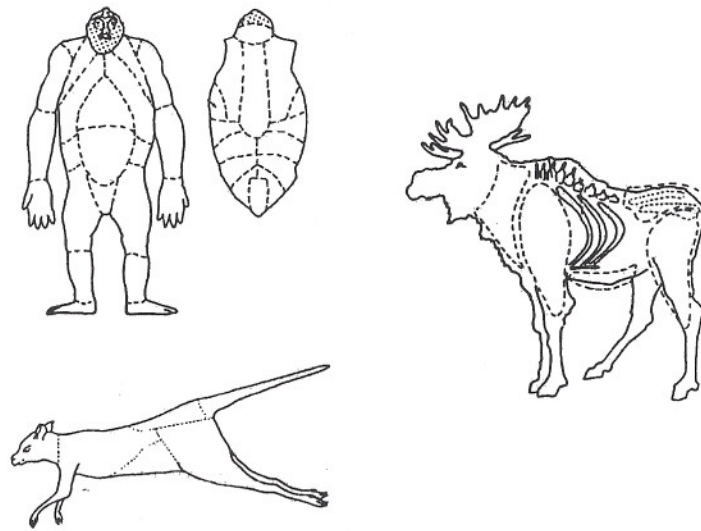


Figure 9-2. Examples of nominative carcass partitioning schemes (after Altman 1987:Figure 18; Bahuchet 1984:Figure 114; Jarvenpa and Brumbach 1983:Figure 6. Permission Arctic Institute of North America).

Stages of Food Sharing

Clearly, food sharing is a multistage phenomenon or process. In almost every ethnographic account, varied rules and contingencies operate at stages of acquisition, transport, redistribution, and consumption (Bahuchet 1984, 1990; Bodenhorn 2000:30–44; Hovelsrud-Broda 2000:198–202; Kishigami 2000:176–180; Kitanishi 2000:154–155; Wenzel 2000:63–67; Yellen 1977a). For example, Yellen (1977a) documents the distribution of a kudu carcass at one of the !Kung short-term campsites (Figure 9-3). The carcass was divided among three hunters and transported back to camp. There, each hunter gave some to his parents or in-laws, largely passing up one generation. Those recipients gave to siblings or in-laws, generationally lateral. Finally, some was passed back down between generations from an uncle's household to a cousin in the last household in the camp, so everyone was eventually supplied. What is important about the pattern is perhaps not so much that everyone received a share of the meat but that the pathways for the distribution were socially structured. With larger populations in the camps or with smaller meat packages, the distribution may not have been so complete and would have gone only through the earlier distribution levels. Yellen (1977a:304) notes that "there is significant variation in the treatment of animals according to their size."

Of interest to archaeologists is how those different stages of food sharing might be distributed or displayed across the landscape, with different stages occurring at different places. Primary distribution may occur at the kill site, as a carcass is partitioned for transport or divided according to various rights of

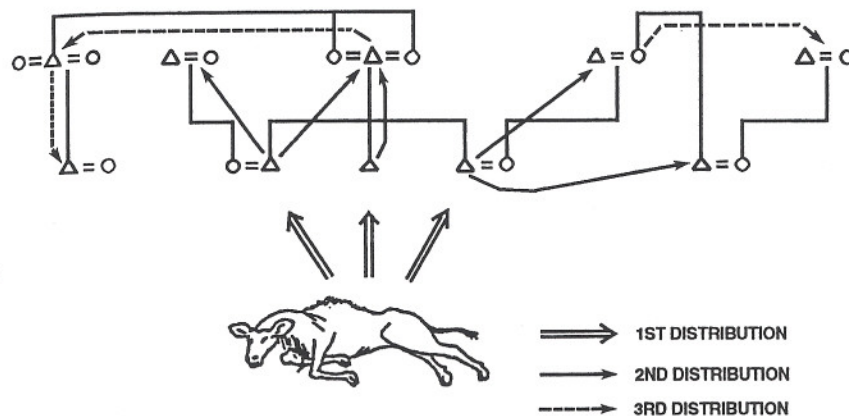


Figure 9-3. Multistage sharing among !Kung (after Yellen 1977a:Figure 14.2. From *Experimental Archeology*, edited by Ingersoll, Yellen, and Macdonald. Copyright © 1977, Columbia University Press. Reprinted with permission of the publisher).

individuals, as suggested above. Secondary sharing may include redistribution to kinfolk after food has been returned to the campsite or consumption location. Distribution may be continued as multiple steps as food is distributed through the kinship network, including various kinds of non-kin partnerships. Tertiary sharing may occur at the level of invitations to dinner. For example, for stages of food sharing among Aka and Baka observed by Kitanishi (2000:154), first distribution among hunters was regulated by strict rules; second-stage distribution in camp was less formally regulated; third-stage sharing took place at cooking and consumption. While food tended to be shared throughout small camps, it became more variable in large camps. Analysis of group sharing in larger camps shows that food was shared with those having close kinship and located in spatial proximity (Kitanishi 2000:160), just as Gargett and Hayden (1991) suggest.

Looking at how food distribution patterns are displayed differently across the landscape might help identify the roles of different sites in subsistence or social systems. In multistage sharing, bones may not make it all the way to the end of the sequence: carcass portions to cuts of meat to invited dinner guests (doggie bags?). Thus, our ability to see the entire sequence may be limited, with only the first or second segments preserved in the archaeological record.

Searching for Food Sharing in the Archaeological Record

After considering variation in food sharing in ethnographic cases, we can turn to the search for food sharing in the archaeological record. How would we recognize it? What are the material correlates of the great variety of

the social and economic practices involved in food sharing? There have been a number of researchers who have made inferences about food sharing in the archaeological record based on direct observations of archaeological remains. Certain of those have been theoretically informed by models of human evolution, while others have been more empirically oriented.

Isaac (1978a, 1978b) proposed that spatial association of stone tools and animal bones indicates transport of artifacts and meat to activity foci, which constitutes a "sufficiently sound . . . inference that meat from numerous, initially dispersed carcasses was brought back as an active process of *food-sharing*" (Isaac 1978b:319, emphasis in original). Isaac offered no warranting argument for the interpreting of artifact association as having been the necessary result of postulated human behavior.

Bunn and Kroll (1988) argued for evidence of sharing in the archaeological record by means of observations on anatomical-element frequencies and cut marks. They asserted (without ethnoarchaeological support) that multiple bone units of the same carcass were carried to the FLK "Zinjanthropus" archaeological site and that the amount of meat and marrow represented by those units was more than a single hominid could consume. Their conclusions are that systematic butchery and substantial quantities of meat and marrow imply sharing on a significant scale. The link between acquisition of a quantity of meat and marrow and resultant sharing behavior is, unfortunately, not provided, but assumed.

Both of these cases have been justly criticized on taphonomic bases, as carnivores and scavengers other than hominids were the agents for accumulation of the majority of animal bones.

Parmalee and Klippel (1983) looked at the distribution of white-tailed deer (*Odocoileus virginianus*) at the Rhoads site in Illinois. They suspected that "any consistency in the deposition of a particular element or set of elements in any given feature [pit] . . . might suggest a specific division of parts of the deer carcass among individuals or families" (1983:286). Their results were not clear-cut, because pits contained multiple elements from various portions of carcasses. If the distribution of deer carcasses was a result of sharing practices, the patterning was not as simple as their expectations. The real value of their research is in suggesting that spatial distribution of carcasses in the archaeological record might be indicative of economic interaction within a campsite. None of the examples could firmly ground the interpretations in arguments of necessity concerning the facts of the archaeological record and the inferences or interpretations drawn from them. Methodologically, they risk epistemological ambiguity.

Our problem is the articulation of such theoretical constructs with the data available in the archaeological record. That articulation calls for the development of methodologies utilizing the contents and the configuration of archaeological remains that can be demonstrated to represent particular kinds of behaviors. The problem is the need for a firm foundation for the interpretive inference, with an emphasis on material remains that are (1) unambiguously the result of sharing behaviors and (2) available in archaeological deposits.

Ethnoarchaeological Approaches to Food Sharing

Perhaps for the most reasonable solution to this problem we must turn from the purely ethnographic and archaeological records to the ethnoarchaeological record (Gould 1978, 1980; Kramer 1979; Yellen 1977b). It is only in such control cases that we can associate actual human behaviors with their material remains. This type of research is self-consciously searching for the needed inferential linkages that would allow us to identify and differentiate between various patterns of food sharing.

Gould and Watson (1982) looked to butchering patterns for a clue to food sharing. They note that on more than 70 observed occasions, the Ngatatjara of western Australia always divided carcasses into the same initial nine pieces. "The strict adherence to a fixed pattern of initial division of meat was explained . . . with reference to social relations based upon kin-based sharing of food and access to resources" (1982:367). The rigidity of butchering practices, in contrast to the situational variation reported by Binford (1978) for the Nunamiut, was seen as evidence that food sharing and its archaeological consequences "must be referred to the ideational domain to achieve a satisfactory explanation of all the behavior that was observed" (Gould and Watson 1982:368).

In reply, Binford states that "there is no necessary relationship between the strength of the sharing ethic and the lack of variability in butchering pattern" (1984:240). The Nunamiut do indeed practice sharing, but their butchering practices are much more variable according to such circumstances as means of transport or anticipated length of storage (Gubser 1965:81). There is not a nominative system of identifying carcass portions with a distribution network as noted with the Aka (Bahuchet 1984). "No particular cut of meat or part of an animal is associated with or customarily reserved for any particular relative" (Gubser 1965:82). Sharing takes place at the time of consumption or, in particular, in distribution of local game hunted individually in the summer (Binford 1984:238). Therefore, observation of a rigid butchering pattern is insufficient as the recognition criterion for food sharing.

Site Structure

General site structure offers several clues as to how we can look at the archaeological record as it relates to food sharing. Having examined the organization of ethnographically recorded hunter-gatherer campsites, Polly Wiessner suggests that site structure is responsive to the risk-reduction strategies employed by site occupants. Aside from the more obvious features like storage facilities, "societies which practice noncommunal storage would be expected to have a more 'closed' site plan . . . [including] widely spaced household units or closed-in eating and storage areas. . . . Among those who pool risk and share what is brought into camp daily, . . . an 'open' site plan . . . makes it possible for members of each household to see what others have brought in and gauge their requests accordingly" (1982:173).

Other ethnoarchaeological research has striven to associate material patterning with behavioral dynamics. Robert Gargett and Brian Hayden state that "through the analysis of site structure (the distribution on the landscape of habitations, activity areas, refuse areas, and other features), it is possible to make inferences about past social interaction, thus enabling archaeology to make a significant contribution to the study of prehistoric cultural adaptations and dynamics" (1991:11).

Following suggestions by Whitelaw (1983:55) that interhousehold spacing in !Kung sites was a good indicator of social distance between occupants and observations by O'Connell (1987:86) that nearest neighbors in Alywara camps most often had primary genealogical links, Gargett and Hayden investigated the relationship between kin distance and physical distance in a Pintupi camp in the Australian Western Desert. This relationship is made more explicit for food sharing in that "although it may not be possible to determine the precise kinship system of prehistoric societies, the results of this and other studies should make it possible to determine the importance of sharing in communities on the basis of settlement patterns. It is this more basic behavioral adaptation that should be accessible through the archaeological record" (Gargett and Hayden 1991:28).

Their analysis consisted of a comparison of distances between household structures at the main Pintupi camp at Papunya with genealogical relationships, recorded with the help of a native interpreter. To avoid the problem of the likelihood of some kind of kinship relation between practically all members of an aboriginal camp, their analysis focused on primary genealogical links, those between parents and their children and between siblings. Their results of the relationship between kin distance and spatial distance are shown in Figure 9-4. They concluded that most of the relationships expected to result in close spacing do manifest predictable spatial configurations (1991:15).

Although they did not directly monitor food-sharing behavior and its relationship to spatial arrangement, they note that "sharing occurs predominantly along primary kinship lines among the Pintupi, and it is precisely along these lines that residence location choices are most often made" (Gargett and Hayden 1991:28). The implications for evidence of food sharing in the archaeological record are less direct than Gargett and Hayden might have wished. Their analysis is based on untested assumptions about the role of food sharing in determining campsite organization. Although I suspect that they are right in their assumptions—that degree of closeness indicates degree of economic interaction and that that has something to do with relatively more-open subsets of relatively more-closed site organization, in the sense of Wiessner's arguments discussed above—all they have demonstrated is that closeness of kinship links is spatially reflected in camp layout. Further inferences about quantity or degree of food sharing are not addressed. When linked with independent means of demonstrating food sharing, indications of kinship structure from the spatial organization of archaeological sites may have greater interpretive utility for explaining economic and subsistence organization at the camp level. In contrast, Binford (1991:128) argues from his analysis of Nunamiut camp sites that structure was determined by the organization of the

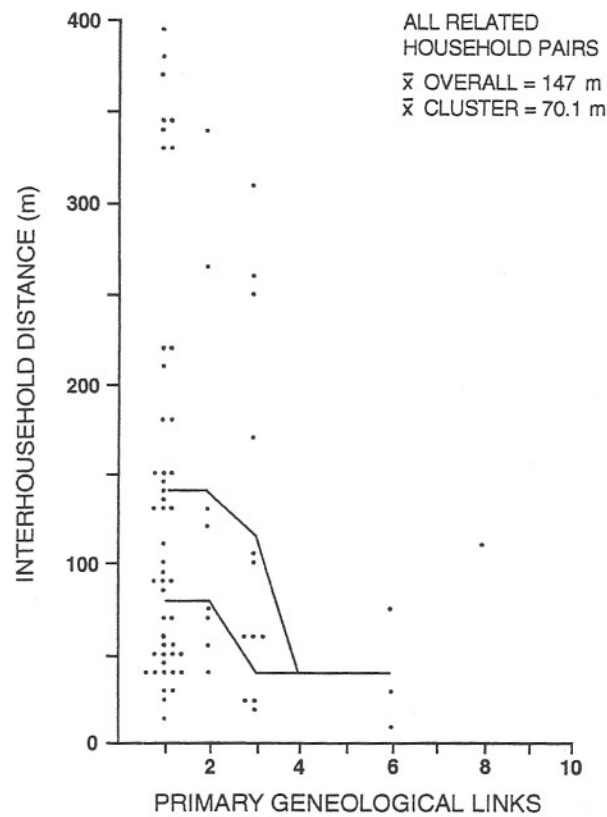


Figure 9-4. Relationship between interhousehold distance and genealogical distance (after Gargett and Hayden 1991:Figure 2).

workforce and consumers rather than by kinship. Acquisition partnerships are more important in spring and summer camps, when resources are dispersed and require numerous small cooperative hunting teams; distances between households are greater, averaging around 70 m. Consumption of stored resources from fall-migration hunting is more important in fall and winter camps; interdependent households are spaced more closely, averaging less than 30 m. I agree with Gamble (1999:80) that social relations of production, whether based on kinship or on partnership, can be preserved in spatial patterning.

Butchering Patterns

Another way of examining the archaeological record for subsistence and social organization is to look at butchering patterns, that is, the partitioning of carcasses into units of sharing, distribution, and consumption. Binford (1984) examined data collected in two ethnoarchaeological control

cases (Binford 1978; Yellen 1977b). He notes for sheep carcasses shared among the Nunamiut that "anatomical parts common at the residence of one family are generally low or absent on the locations of other consumer units within the same site" (1984:246). Among the !Kung at Camp 10, anatomical parts from two gemsbok are similarly differentially distributed among the separate residential units within the community (1984:250); they are compared in Figure 9-5.

The most explicit way of examining the archaeological record for evidence of sharing patterns is to look at the spatial distribution of faunal remains of different species. Very explicit information is provided by Yellen's (1977a, 1977b) ethnoarchaeological work among the !Kung San:

Polly Weissner has demonstrated that the spatial distribution of faunal remains reveals something of the nature of the sharing and distribution process. Figure 14.4 [Figure 9-6, this volume] shows the distribution of gemsbok remains at Camp number 10; gemsbok, like all large animals, are shared among all members of a camp, and this is clearly reflected in the dispersal of gemsbok bones near all of the huts. For comparison, Figure 14.5 [Figure 9-7, this volume] presents the distribution of porcupine remains from Camp 11. These two camps were occupied sequentially, and their membership was identical. A porcupine belongs to the man who kills it and generally porcupine meat is not shared—a fact reflected in the concentration of porcupine remains in front of a single hut (Yellen 1977a:305).

Here we can see a very significant difference in archaeological patterns resulting from different sharing and consumption behaviors. This visible difference in spatial patterning can serve as one of the best guides for investigating the Paleolithic archaeological material.

Jean Hudson (1990) offers another explicitly ethnoarchaeological study of the potential of archaeological analysis to identify meat sharing among prehistoric hunter-gatherers. Her fieldwork among the Aka included observations of food-sharing activity by living humans in Aka campsites and archaeological collection of remains from those camps after they had been abandoned. Whole carcasses were usually brought into camp. Initial butchering divided the carcass according to participation in the hunt. "The second level involved social and economic and/or *perceived needs*" (1990:3; emphasis added). Preparation and consumption constituted the third level, with cooperative cooking and communal consumption from a shared pot being common in a residential camp. Hudson observed the spatial distribution of bone debris from three short-term occupation camps according to a number of aspects, including bone refits (Enloe and David 1989, 1992), clustering of bones at household locations, counts of specimens and species at each household, and MNI (Minimum Number of Individuals) ratios per household. The specimen counts and clustering, like those of Wiessman, do not always offer sufficient resolution for identifying the patterns of interaction among households.

The MNI ratios constitute a means for tackling a particularly thorny problem when bone refits do not allow identification and assignment of compo-

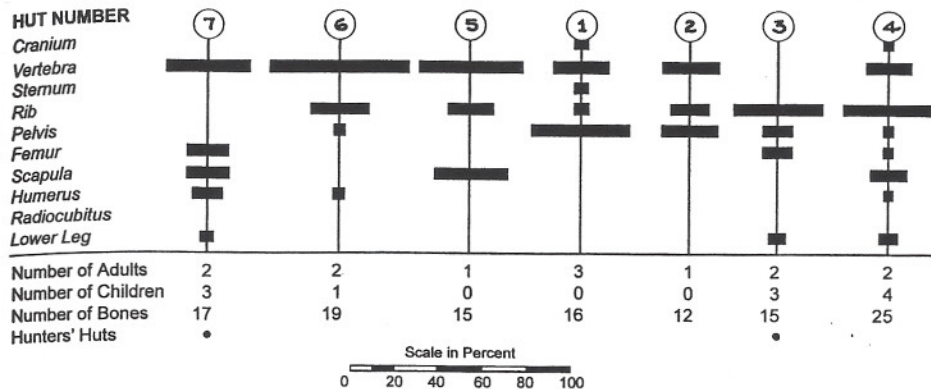


Figure 9-5. Distribution of gemsbok fragments at Camp 10 (after Binford 1984:Figure 2. Copyright © 1984, with permission from Elsevier).

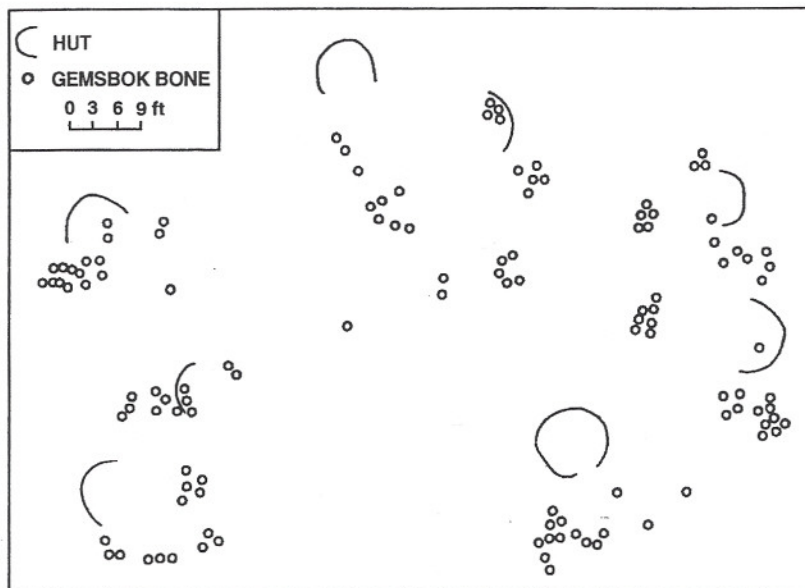


Figure 9-6. Gemsbok remains at Camp 10 (after Yellen 1977a:Figure 14.4. From *Experimental Archeology*, edited by Ingersoll, Yellen, and Macdonald. Copyright © 1977, Columbia University Press. Reprinted with permission of the publisher).

nents to individual carcasses. When the site or assemblage MNI of a given species is equal to one, this provides the least ambiguous evidence of meat sharing when using counts per species. Multiple carcasses of the same species can in general result from two situations. Each household may acquire and consume its own carcasses, as in most cases of Nunamiut caribou consump-

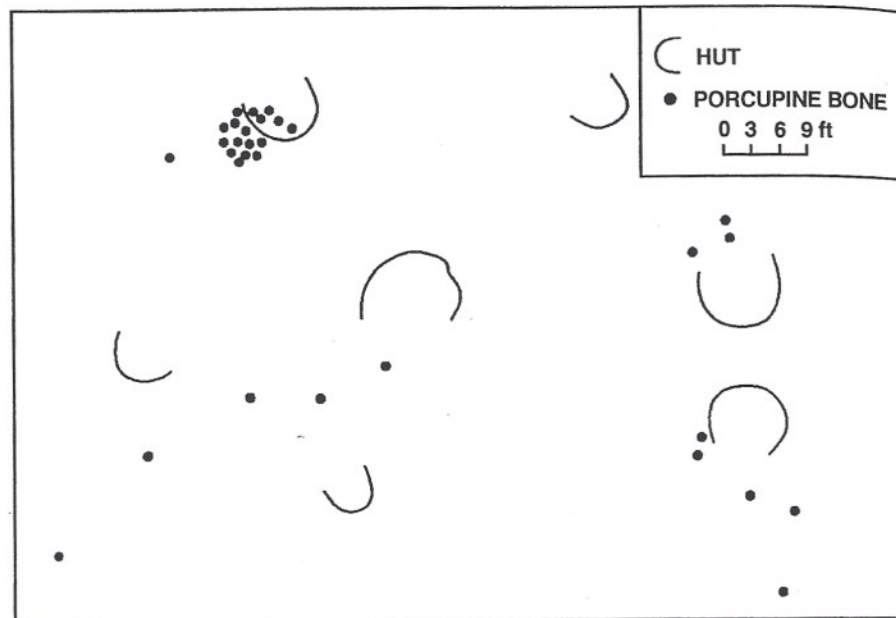


Figure 9-7. Porcupine remains at Camp 11 (after Yellen 1977a:Figure 14.5. From *Experimental Archeology*, edited by Ingersoll, Yellen, and Macdonald. Copyright © 1977, Columbia University Press. Reprinted with permission of the publisher).

tion (Binford 1978), or carcasses may be sequentially introduced to the camp and distributed to multiple households. Distinguishing between these patterns may be accomplished by comparing site MNI with household MNI. Hudson (1990:8) developed an index she calls the "redistribution value" to measure this relationship:

$$\text{redistribution value} = \frac{\sum (\text{household MNI})}{\text{site MNI.}}$$

If there is no sharing of that species, the redistribution value would equal one, that is, the total number of carcasses present at households would equal the total number of carcasses at the site. If, however, carcasses acquired by members of each household were equally distributed among all other households, the redistribution value would be far greater than one. The total of minimum numbers of carcasses for each household would greatly exceed the total as calculated for the site as a whole. This redistribution value index is a very useful technique for investigating food sharing at archaeological sites where assemblages are too fragmented or poorly preserved for individual carcass identification or where the number of potential individuals in the assemblage is too great for confident verification of individual carcass identification. Although

there are some promising techniques, it is clear that a more explicit means of recognizing the practice of food sharing from archaeological remains is needed.

The Archaeological Cases: Pincevent and Verberie

Ethnoarchaeology has demonstrated that the distribution of carcasses, or portions of carcasses, can give us a warranted inference about food-sharing practices of prehistoric campsites, putting in place a method for using archaeological data for interpreting human social behavior. An example can now be given of the application of ethnoarchaeological lessons to the specifics of a purely archaeological case. Given the foregoing discussion of ethnographic cases, it is evident that there is a great deal of variation in patterns of food sharing among different cultures, with concomitant variation in the patterns of archaeological deposition of food debris. For anatomically modern *Homo sapiens*, we can expect substantial variation in behavior, activities, and campsite organization *within* a single culture (Binford 1980). The goal of this essay is to evaluate the potential for different spatial distribution of food residues at archaeological sites of the same culture, in light of implications for different food-sharing behavior at sites of different functions or, conversely, to use the information from carcass distribution and food sharing to help diagnose site function. Faunal remains from two late Upper Paleolithic archaeological sites are used to examine food sharing. Pincevent and Verberie are very well documented sites with sufficient preservation of spatial structure to investigate the relationships among contemporaneous domestic units on intact occupation surfaces (Audouze and Enloe 1997; Leroi-Gourhan and Brézillon 1972). The faunal assemblages of both sites are dominated by reindeer, a species suitable for sharing under certain conditions of acquisition. The spatial patterning of portions of individual reindeer carcasses indicates aspects of food sharing in stages of multitiered distribution, contrasting resource acquisition at a kill site with consumption at a residential site.

Methods for Recognizing Food Sharing

Osteometrics and anatomical morphology were used to identify the portions of individual animal carcasses. Examples illustrated here are from Pincevent (Enloe 1991; Enloe and David 1989, 1992). Certain skeletal elements were demonstrated to be useful in identifying portions of reindeer carcasses that belong to various individual animals. For example, refits of adjacent articulating elements (Figure 9-8) were used to identify elements derived from a particular individual carcass but with excavated proveniences separated by substantial distances.

The distribution of those carcass portions can then be inspected to provide information about patterns of consumption (Enloe 1992, 1994a; Enloe et al. 1994). Figure 9-9 shows the distribution of upper-forelimb elements, humerus and radiocubitus. A right forelimb represented by refitting humerus and ra-

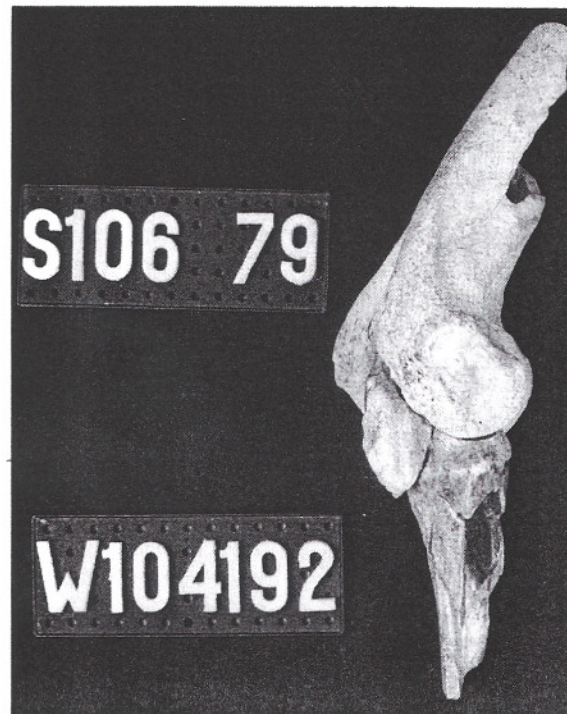


Figure 9-8. Articulating distal humerus and proximal radiocubitus.

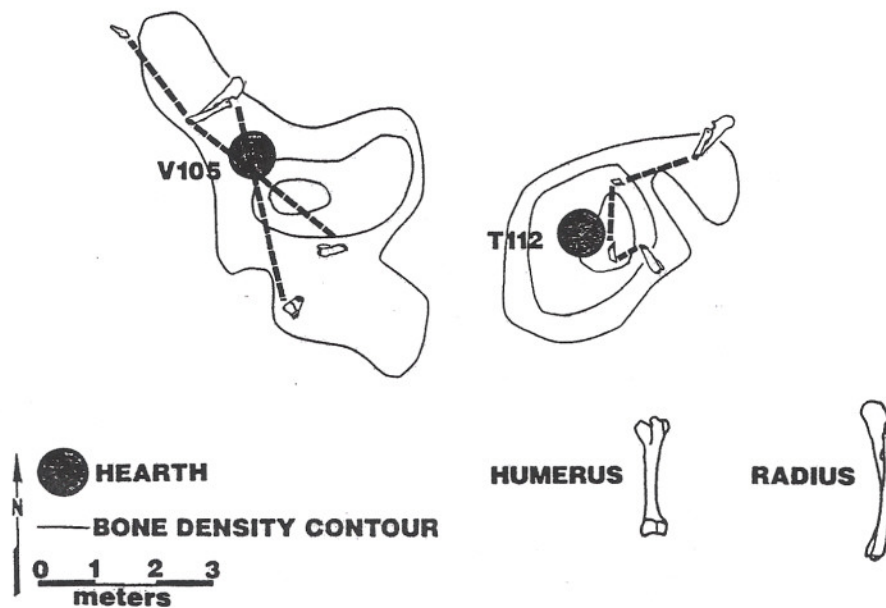


Figure 9-9. Refitted forelimb elements of a single individual reindeer.

diocubitus fragments is located adjacent to hearth V105 on the left, while its left-side pair represented by refitting radiocubitus elements is located in association with hearth T112. Such a distribution suggests sharing of a single individual between two domestic hearths.

Bilateral pairs, such as the distal metatarsals illustrated in Figure 9-10, can be matched to identify portions of discernibly different individual reindeer carcasses. Clear differences in distal breadth, diaphysis diameter, and epiphyseal fusion can be seen to distinguish between individuals.

Another example of the spatial configuration of refits is shown in Figure 9-11: in this case, the distribution of matched bilateral pairs of distal metacarpals from a number of individual reindeer carcasses. Pairs from five individuals were found adjacent to hearth V105 on the left, and pairs from four other individuals were found adjacent to hearth T112 on the right. Note that the matched bilateral pairs from each individual are both associated with only one hearth, a point that will be reexamined later. Once the method of examining the distributions of various elements and individuals has been established, we can move on to a larger-scale examination of the two sites.

Carcass Distribution at Pincevent

At Pincevent, level IV-20 corresponds to a single-occupation surface, well demonstrated by sedimentary micromorphology and confirmed by refits of lithic debris and fire-cracked rock. In Figure 9-12, we can see the concentrations of artifactual debris associated with hearths E74, M89, V105, T112, L115, and O123. Each exhibits a very redundant pattern of spatial structure around the major hearth that strongly suggests that each is the locus of a domestic household (Leroi-Gourhan and Brézillon 1972). Elements from numerous reindeer carcasses were differentially distributed among six domestic households. Significant numbers of carcass portions were partitioned among households, indicating that substantial food sharing indeed took place during the occupation of the site. Figure 9-12 demonstrates the distribution of refits among upper-forelimb portions of several individuals. The lines indicate linkages between the locations of refitting fragments, articulations or bilateral pairs deriving from individual reindeer carcasses represented by the humerus and radiocubitus, as discussed above. It can be seen that upper-limb elements that carry substantial quantities of meat were most often shared between domestic units. Not only does substantial interaction between hearths E74, M89, V105, T112, L115, and O123 demonstrate contemporaneity among those households, but the differing levels of intensity of that interaction can also be seen to correlate with their spatial distance.

While some long-distance links exist, links are far more numerous between hearths that are close to one another. Figure 9-13 depicts the relationship between distance and intensity-of-sharing evidence between those hearths. The degree of sharing or economic interaction appears to be closely correlated with spatial distance between the domestic units, which suggests that food sharing was perhaps determined by or reflective of kinship distance between inhabitants of the camp. While we cannot be sure what the nature of the link-

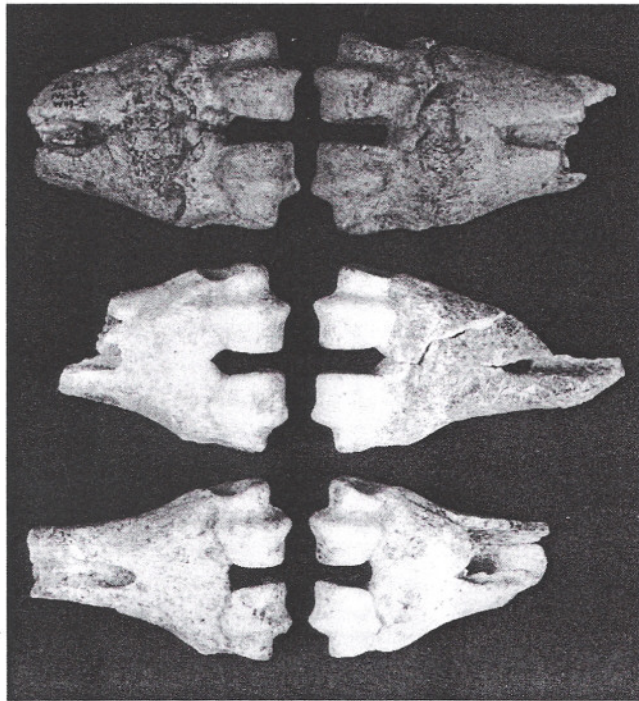


Figure 9-10. Matching pairs of distal metatarsals.

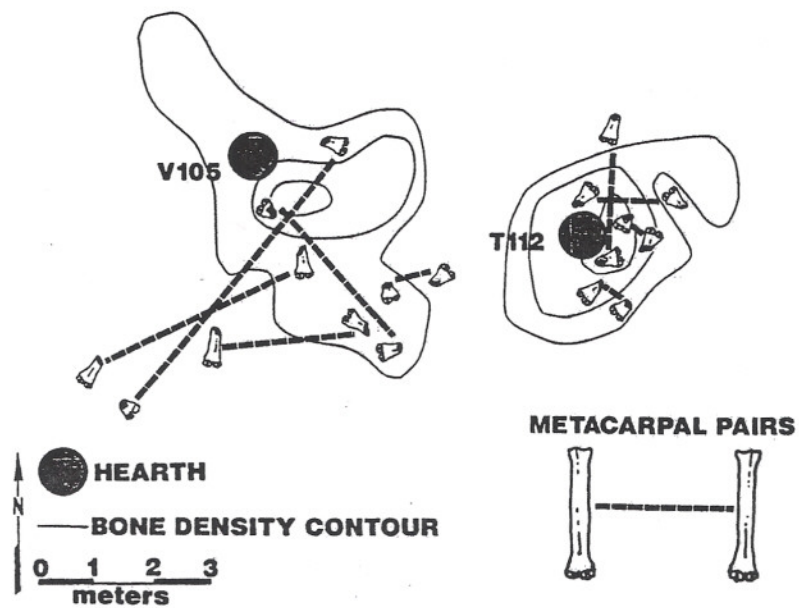


Figure 9-11. Matched bilateral pairs of distal metacarpals.

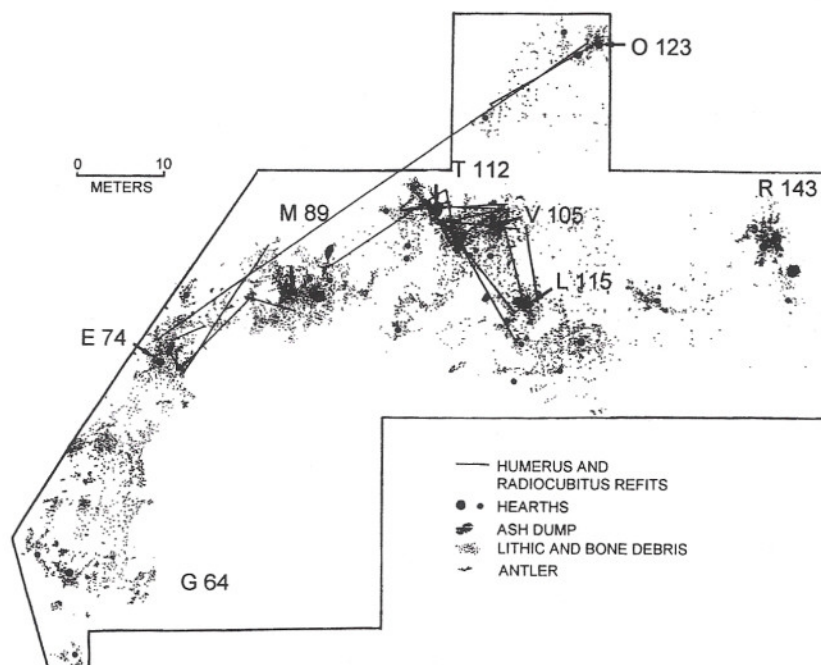


Figure 9-12. Spatial distribution of humerus and radiocubitus refits between hearths, level IV-20, Pincevent.

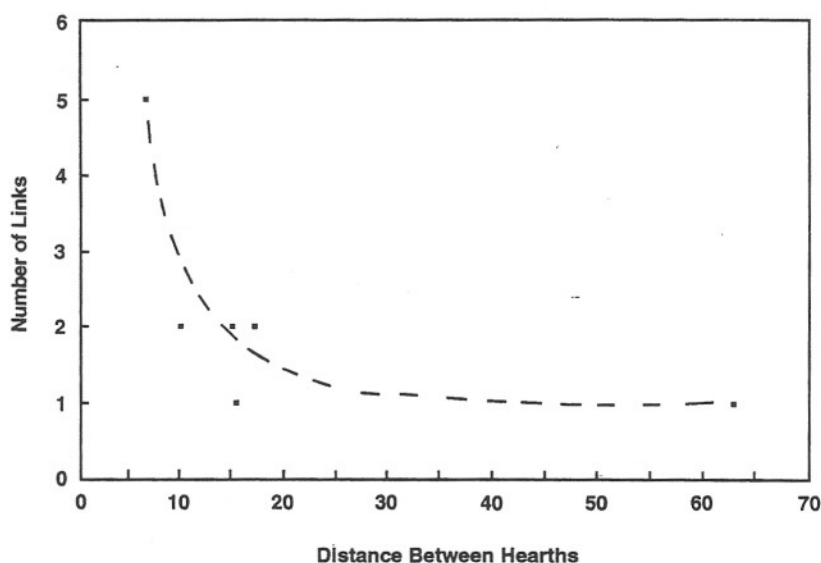


Figure 9-13. Relationship between degree of interaction indicated by frequency of refitting linkages of upper-forelimb elements and distance between domestic hearths, level IV-20, Pincevent.

ages might be, this is exactly the kind of spatial, economic, and possibly kinship relationship postulated by Gargett and Hayden (1991) and by Gamble (1999).

Returning to a previously mentioned point, we can see that carcass portions circulated differentially as well. The meat-rich food packages represented by the upper-forelimb elements of the humerus and radius were widely circulated—not true of all carcass portions. Figure 9-14 shows the distribution of lower forelimbs, the pairing of distal metacarpals. As previously noted, it can be seen that the pairs belonging to any given individual carcass are almost exclusively associated with a single household. The elements have little or no meat on them and are primarily valuable for their marrow content. Such elements, as well as heads and metatarsals, are frequently reported in the ethnographic literature as the hunter's portion. They are rich in fats, with twice the calories per gram of lean meat, and are thus a very desirable food source. At Pincevent IV-20, they were rarely distributed between households, a finding that may give some insight into the locations of the more successful hunters' households.

Those marrow-rich elements are concentrated at hearths M89, V105, and T112, which perhaps are hunters' households. They are also those who participated most intensively in the sharing of other meat-rich elements. The anomalous hearth is E74, which is located southwest of the other hearths. It had already been identified by the excavators at Pincevent as being curiously different from the other domestic hearths. The general spatial structure was similar, but the artifactual content was poorer, not only in quantity but also in quality. Certain types of tools, particularly the backed blades associated with weaponry and any significant amounts of flaking debris for all kinds of tool manufacture, were very poorly represented. Their poor representation raised doubts about whether E74 should be interpreted as a hunter's household. When we examine the distribution of faunal materials, we see two things: not only are the metacarpals generally missing but also in the circulation of meat-rich upper-limb elements, the portion at hearth E74 is most often the lower, leaner portion, the radius from a meatier humerus located at one of the presumed hunters' households. That household was participating in the asymmetrical circulation of meat, perhaps at the third distribution suggested by Yellen (1977a), i.e., food that is shared with nonproducers, such as widows or grandparents, via the intermediaries of producers' kin or partners.

The distribution of the meaty forelimb portions of reindeer carcasses among several domestic hearths at the residential site of Pincevent clearly shows that food sharing was taking place at the point of consumption (Enloe and David 1989). Portions of a single carcass have been discovered at hearths separated by up to 63 m (Enloe 1992). The hearths are dispersed over a large campsite area, of which over 4,000 m² of contemporaneous space have been exposed in excavation. Individual animals were partitioned between domestic hearths, frequently in asymmetrical distributions, with apparent donor and recipient hearths, and with differential sharing according to the value of the food utility of various portions of the reindeer carcasses (Enloe 1991). Multiple tiers of distribution stages are probably represented at the residential consumption site,

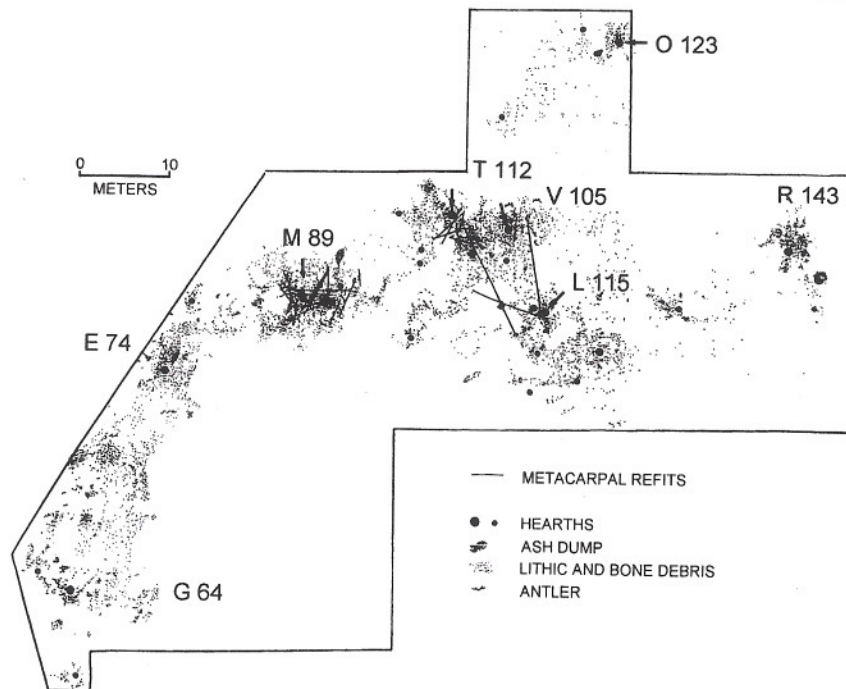


Figure 9-14. Distribution of matching bilateral pairs of distal metacarpals, level IV-20, Pincevent.

indicating that rather complex social and economic interactions were taking place there.

Carcass Distribution at Verberie

Verberie shares much in the way of preservation, content, and excavation methods with Pincevent. They are closely contemporaneous with typologically identical Magdalenian lithic assemblages; both assemblages are dominated by reindeer at the 95% to 98% level. The same refitting analyses were applied to reindeer carcass elements. One notable difference between the two sites is that numerous intact segments of vertebral columns have been found at Verberie and are notably absent from Pincevent (David 1994; Enloe 1994b). Françoise Audouze (1988) has hypothesized that Verberie was a hunters' camp, occupied by a specific task group, in contrast to the residential camp, occupied by consumers as well as producers, at Pincevent (Baffier et al. 1982; Julien et al. 1987; Leroi-Gourhan and Brézillon 1972).

The content of archaeological sites has often been used to infer site function. Body parts represented in faunal assemblages have been used to contrast kill sites and primary butchering sites with residential consumption sites. Perkins and Daly (1968) argued that differential representation of upper vs. lower elements of limb bones was indicative of transported assemblages. Wissler's

(1910) reports of North American bison butchering by the Blackfoot implied that axial skeletal elements and feet would be abandoned at kill sites. Ethnoarchaeological observations on the Hadza by O'Connell and colleagues (1992) suggest that body size of the prey greatly influences what proportion of a carcass will be transported or abandoned but that species, independent of body size, determines *which* elements are transported. It is clear that any single model cannot be used for a blanket inference of site function based on faunal assemblage content. O'Connell and associates (1988) have shown that the decision to abandon or transport bones is dependent on a number of contextual considerations such as prey body size, distance from home, and number of carriers. Marshall's (1993) ethnoarchaeological research among the Okiek also suggests that differential hunting success and food sharing between households can create body-part profiles similar to those commonly attributed by archaeologists to differential transport of animal carcasses.

Therefore, it can be suggested that site content should be combined with site configuration, incorporating the ethnoarchaeological information about the spatial organization of sites to inform us about site function. Audouze (1988) has employed ethnoarchaeological information to interpret site function at Verberie. She used Binford's (2002:Figure 60) maps (Figure 9-15) and descriptions of the Anavik butchering site of the Nunamiut, which included empty spaces for the dismemberment of individual carcasses with waste products distributed in a circle around the carcass. She applied that model to Verberie and identified relatively empty areas surrounded by skeletal elements of low nutritional utility (Figure 9-16), such as vertebrae and phalanges. There are also a number of flint blades in the center of the bone-free zones. Keeley (1981) identified meat polish on such unretouched blades, strengthening the inference of butchering as a primary activity at the site.

If the campsite at Verberie is correctly identified as a hunters' butchering camp, it should exhibit an overall spatial structure different from that at Pincevent, because the occupants at Verberie would have been a specialized task group of hunters rather than a number of entire families, including women and children, which characterize the occupation at a residential site such as Pincevent. Pincevent is characterized by a number of similar hearth-centered domestic units, each with its associated debris midden, auxiliary hearths, and other features. This kind of structural organization appears to contrast with that of Verberie.

But one question remains. As O'Connell's (1987) ethnoarchaeological work among the Alyawara seems to suggest, is this apparent difference in overall site structure a function of the relatively small area excavated at Verberie, when compared to the area excavated at Pincevent? One way of looking at the difference is by comparing the MNI of reindeer that contributed to the refitting. A total 571 specimens of humerus and radiocubitus fragments were analyzed for the largest occupation level at Verberie. This yielded minimum element (MNE) counts of at least 29 humeri and at least 29 radiocubiti. There are 12 paired and articulated individuals, 5 unpaired left articulations, and 7 unpaired right articulations, totaling 24 individuals, a substantial portion (82.75%) of the calculated MNI of 29 for the entire occupation level and very

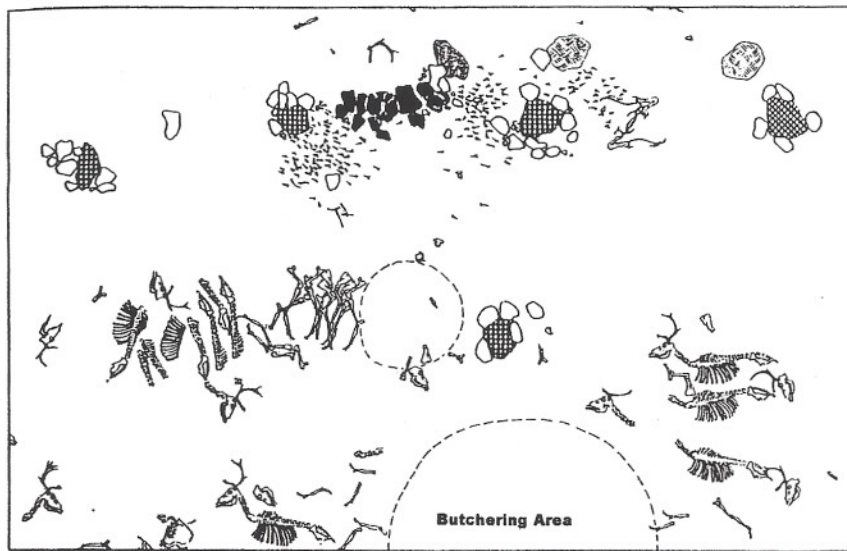


Figure 9-15. Butchering areas at Anavik kill site (after Binford 2002:Figure 60. Copyright © 2002, The Regents of the University of California).

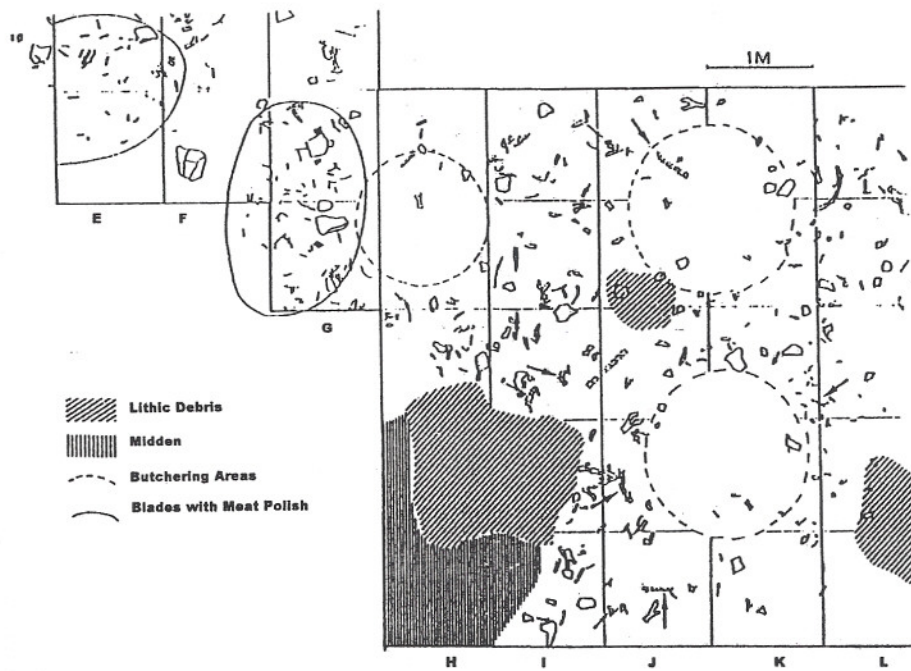


Figure 9-16. Butchering areas inferred at Verberie (after Audouze 1988:Figure 5).

similar to the proportions of refitted elements found at Pincevent. The almost exhaustive accounting for individuals within the MNI argues strongly for contemporaneity within the sample. The nearly exhaustive accounting for potential individuals also lends credence to interpretations of spatial distributions in terms of meaningful economic or social interactions inferred from the distributions. It would appear that Marshall's (1993) observations among the Okiek do not pose such a large problem in this case. From this point, one can proceed to consideration of the locations of the dispersed carcass portions within the spatial framework of the archaeological occupation surface.

Identified elements of the refitted forelimb portions of the 12 most complete reindeer carcasses were primarily concentrated in a single large midden between the two major hearths (Figure 9-17). The contrasting results from carcass refitting at Verberie appear to indicate quite another pattern of carcass distribution, with the implication of another pattern of carcass partitioning. This implies that a different scheme of food sharing was being practiced at the site. It must be taken into consideration that a much smaller surface area of the site has been exposed than is the case at Pincevent (ca. 200 vs. 4,000 m²). O'Connell and colleagues (1992) have observed that modern Hadza butchering at kill sites results in rather large-scale dispersions of bone and artifactual material, and they suggest that typically restricted archaeological excavation areas might inadequately reflect activities related to carcass processing. Nonetheless, substantial portions of the forelimbs of a considerable number of individuals have been refitted. Within the MNI of 29 for the upper forelimbs, substantial carcass portions could be refitted for 12 individuals. A rough calculation of the maximum dispersion of the more-complete individual carcass portions yields a mean maximum distance of just over 4 m between the farthest-separated elements of any of the 12 most completely refitted carcass portions. This can be compared with a mean distance between similar refits at Pincevent on the order of 20 m. The great distance between the two sites is not merely a function of the area excavated at each. While the faunal assemblage at Pincevent includes a postcranial MNI of some 43 individuals, they are spread over an area 20 times larger than the currently excavated area of Verberie, which has more than half as many individuals. The dispersion of individuals at Verberie is much more concentrated, irrespective of area excavated or total number of individuals. The much-shorter distance between fragments of refitted individuals reflects this same concentration.

Sharing and Identification of Site Role in the Subsistence System

This translates into a very different scheme of distribution at Verberie for the upper-forelimb elements that were the most widely dispersed or shared portions of carcasses at Pincevent. At Verberie, the most securely refitted carcasses are principally clustered in a single large midden, located between the two major hearths. This common dump for the two hearths seems to suggest meals taken communally, that sharing was taking place at the level

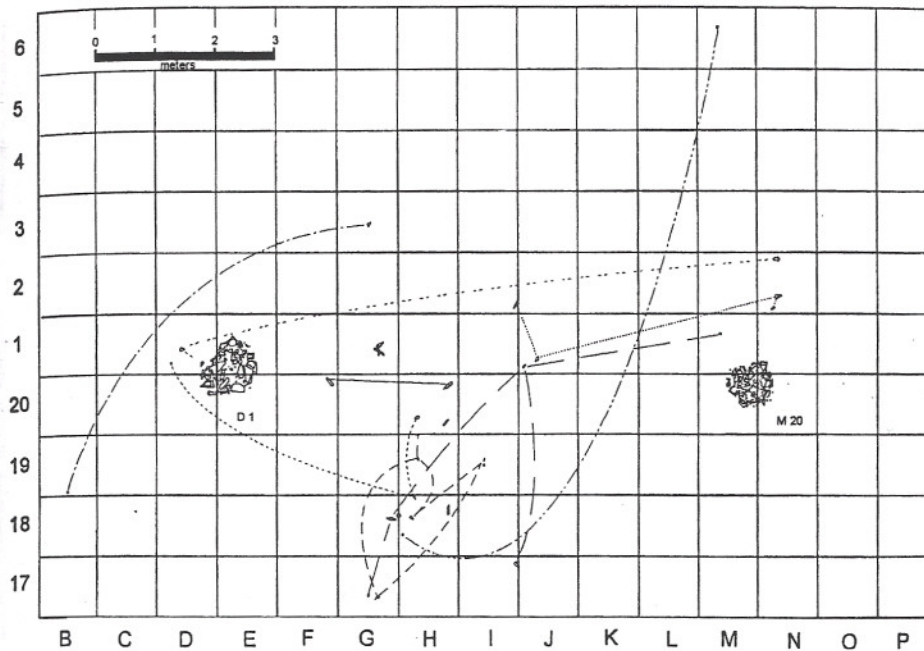


Figure 9-17. Spatial distribution of humerus and radiocubitus refits at Verberie.

of consumption rather than at the level of distribution of portions of carcasses to different consumer groups. If that is the case, then the hearths at Verberie do not represent the same kind of domestic units that they do at Pincevent. The major hearths may be related to different functions rather than to different residence groups; they may not play the same roles as hearths do in residential base camps. This possibility is very important for understanding differences in the overall spatial organization of the prehistoric occupation, with significant implications for identification of the functional role of the entire site as well as for the social organization of its inhabitants.

This faunal and spatial analysis indicates a different spatial organization of the exchange of food products within the site of Verberie. Carcasses were not systematically portioned out between different consumption locations. The kinds of reciprocal or donor-recipient relationships seen at Pincevent are not evident in the spatial distribution of reindeer carcasses at Verberie. Such a difference suggests that the demography of the occupants at Verberie did not correspond to that which would be expected of a residential camp like Pincevent, which would include adult men and women with juveniles and infants—in short, all members of the society assembled at one place. The occupation at Verberie may have been composed of a limited subset of the society, a specific task group such as a hunting party occupying a short-term camp away from the residential base in order to procure a crucial food resource to

be subsequently transported for consumption at the longer-term residential camp. Determination of this difference may help more securely indicate the role of Verberie as a hunting camp in a more complex regional subsistence system. The nature of social relationships at such a camp is less clearly defined than that of the relationships inferred for Pincevent. Mostly we have seen what it is not. Before we can begin to understand the nature of food-sharing relationships at Verberie, a methodologically developed approach to the site must be undertaken.

Conclusion

What have these two archaeological cases taught us about the exploration of food-sharing practices in prehistoric cultural systems? First, under certain depositional regimes, if correctly excavated and adequately recorded, issues of this kind of social and economic integration and organization can be examined. Functional differences in site roles within subsistence systems can be identified. Moreover, aspects of the social and labor organization inherent in the subsistence system can be differentiated, informing us about the overall complexity of behaviors in relation to the utilization of the landscape. Neither site structure nor the behaviors responsible for the formation of patterned deposition or artifactual material in the archaeological record are uniform within a given archaeological culture. Conversely, similar kinds of behaviors can be recognized between different archaeological cultures. This latter fact may be the most important facet of this research. If the origin or appearance of food-sharing behavior carries great adaptational significance for the origins of hominization or for the evolutionary success of anatomically modern humans, this research provides the starting point for comparative studies among our premodern and recent ancestors.

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