
Lorna Marshall's book, *The Ik of Nyae Nyae*, is a first rate description of the life and social organization of Bushmen who lived in South West Africa's portion of the Kalahari Desert, during the 1930's and early 1960's. During this time Mrs. Marshall and other members of her family made multiple expeditions to the Kalahari. Subsequently Mrs. Marshall has published articles dealing with the material collected over this period. The present book contains four chapters which originally appeared as papers in Africa, the journal of the International African Institute. These papers appear in their entirety with minor changes. The original titles were "'Ik Bushman Band," "The Kin Terminology System of the *Ik* Bushmen," "Marriage among *Ik* Bushmen," "Sharing, Talking and Giving: Relief of Social Tensions among *Ik* Bushmen." These papers are now "classics" according to Bushmanologists and are widely regarded as being of very high quality. The remaining seven chapters, to which this review addresses itself, represent previously unpublished material on other aspects of *Ik* life. They include a discussion of the Nyae Nyae environment, the techniques and objects of gathering and hunting, codes of interaction among categories of people, games played by adults and children, and music.

The introductory chapter, "Orientation and Perspective," provides an overview of Bushman classifications which have been made by linguists, physical anthropologists and archeologists. Much recent literature is compactly surveyed here. Also included in this chapter and not widely available in English language publications is an account of the inception by non-Bushman peoples into the Kalahari over the last one hundred years.

"Environment and Settlement" (Chapter Two) contains geological and climatological information about the region along with rich anecdotal description of some of the consequences of these environmental features for every day life. In fact, a particular talent of the author, apparent throughout the book, is her ability to present essential information about *Ik* customs while simultaneously reendering that information in ways which give the reader another order of insight. For example, in a discussion of residence choices by individuals, she writes (p. 84):

"... it is a delightful insistence on precision to say that Lame Gao lived... with his sister Li, not with his eldest sister, Dila, although the two sisters were accustomed to settle not more than two arrow's lengths apart, because they liked to be able to hand things across from one household to the other without getting up. Yet the *Ik* do have residence, and it does become clear precisely who lives with whom. One way this can be observed is to see whom the women feeds with the plant food she gathers: it was Li, not Dila, who fed Gao."

Chapter 7, "Reserved Behavior," contains material on what might be termed non-verbal communication among the *Ik*. This reviewer found the chapter especially interesting for such matters as are not treated by other *Ik* ethnographers. *Ik* customs of modesty, forms of respectful address, and sitting avoindences and speaking avoindences are described.

Lorna Marshall's book is a rich description of the cultural order occupied by Nyae Nyae *Ik* ethnographers in the 1930's. As such it is engagingly written. Mrs. Marshall does not, in this book, address larger issues of theoretical interest to students of hunter-gatherers world-wide. Similarly, the author does not deal systematically with the ways in which her findings for the *Ik* of South West Africa contrast with data collected ten and fifteen years later by researchers working with Botswana *Ik* and other non-*Ik* Bushman groups also living in Botswana.

The appearance of this book is most pleasing. Numerous black and white photographs illustrate the text. The diagrams showing the kin and band connections among people discussed in the text are unusually clear. They show not only existing connections between the principals, but also their past ties, for example through dissolved marriages.

The book is an important work in the growing collection of materials on hunter-gatherers of southern Africa. It will have wide appeal to a lay audience and to academics of various persuasions.

Patricia Draper

IN PREVIOUS ARTICLES I have addressed various organizational properties of Nunamiut Eskimo technology. In one case (Binford 1977a) I explored the problem of site formation processes when gear was highly curated, illustrating the way in which the Nunamiut conceived different types of gear as appropriate to carry on trips of differing purpose, distance and duration. Later (Binford 1978a) I examined factors which conditioned the execution of tasks at a single location, the Mask site. I studied the gear being used or passing through, and that which was finally abandoned on the site. The perspective in that analysis was not person centered, as it had been in the "Forty-Seven Trips" article, but location centered.

In this paper I shift perspective again and view the organization of technology from the perspective of a settlement system. I am here concerned with the organizational characteristics within a technology viewed from a situational perspective. I am concerned with the organizational alternatives within a technology which may be manipulated differently to effect acceptable adaptations to differing situations. What are the technological options for planning and executing tasks in different places? What can we learn about archaeological site formation processes by studying sites which have played different roles in a subsistence-settlement system? Is the case with faunal remains (see Binford 1978b), the content of tool assemblages at different sites studied along logistic, storage, or strategic dimensions must be understandable in terms of strategies that are responsive to concrete situational variables. This paper, therefore, is a discussion of the different modes of procurement, manufacture, use, and discard of tools as these modes are clues to, or correlations with, site functions within a settlement system. I am using my ethnographic experience among the Nunamiut as a basis for this discussion.

It should be pointed out that, in all probability, the Nunamiut are an "extreme" case in both their logistic and storage characteristics, as well as in the seasonal variability of their access to different resources. This is a desirable situation, perhaps, since it is not empirical generalization which I seek (see Binford 1977b and 1978a for a discussion of this problem). An "extreme" case often facilitates comparison with other "extreme" conditions, and promotes appreciation of variability "between the extremes" better than does an understanding of a "modal" case.
The Nunamiat, for example, obtain more than 70 percent of their yearly food during approximately thirty days: fifteen days during spring caribou migration and fifteen days during fall caribou migration. As can be imagined, they consume food out of storage during much of the year and are faced, therefore, with interesting logistical problems, since it is unusual for the bulk of their food to be obtained in a place where conditions for residential occupation are otherwise optimal. They continually transport either fresh or stored food from one place to another. Because of the bulk involved in stores, there are many logistic locations and special purpose sites where fresh, supplementary foods and other resources can be obtained (see Binford 1978b for a description of the Nunamiat system). Contrast such conditions with those confronted by foragers such as the !Kung and G/wi, or the central desert Australians, or many of the hunters and gatherers of India and of the American Southwest, and the Baja sector of California. Such foragers range out into the environment each day, searching for resources, and return to a residential camp each night. Their food is generally procured on a daily basis for more or less immediate consumption. Storage for them plays only a minor and situational role. Since their foods are generally procured in "small packages," their logistic problem is rarely significant (see Binford 1980 for a discussion of Subsistence-Settlement Patterning).

Given very different types of settlement-subistence systems we might expect different types of "sites" to result from their different technological organizations. Assuming this, some understanding of the factors conditioning different modes of procurement, manufacture, and use of tools should permit the positive functional identification of different sites, and hence their roles as components of specific systems; this in turn should allow us to differentiate and characterize various subsistence-settlement systems. This paper, therefore, is a search for an understanding, in organizational terms, of a technology and how it is internally differentiated with regard to the production, use, and maintenance of tools.

**ACTIVE VERSUS PASSIVE GEAR**

One important aspect of Nunamiat technology is the change-of-state dynamics certain items undergo. Nunamiat technology is characterized by a well-developed storage and caching strategy for gear, such that at any one time some of the gear organized within the technology is in storage and not being used: it is passive gear. Active gear is that which is current, or being used regularly, and this generally means that it is distributed differentially within sites and in different patterns of association. The Eskimo make a conceptual distinction between passive gear, which is seasonal, and insurance gear.

The sled and the kayak, considered together, are a good example of complementarily organized seasonal gear. Kayaks are used on lakes, for both fishing and hunting, between approximately June 25 and October 25. In addition, they may be used for stream transport during the same period, although this is rare and very hazardous. Sleds are used between approximately October 10 and June 1. It is clear that sleds are in use when kayaks are not, and that kayaks are in use when sleds are not. The normal pattern is to cache the sled at an early spring settlement when the site is abandoned for the summer. Normally the Nunamiat try to abandon their late winter sites prior to melt so that sleds can be used to transport persons and gear to the early spring settlements, the ones occupied during spring caribou migration; there they are also used to hunt and process animals during the migration. The breakup and following melt of the tundra normally occur immediately afterward, between May 25 and June 10. Any move away from the spring residential site is almost always preceded by the preparation of a cache at the site for items such as sleds, which will not be used again until the following fall: snow shoes and goggles, ice-diggers and ice-fishing gear, axes used for butchering frozen meat, winter clothes and sleeping skins, and other winter gear may all be cached at the spring site, entering into a passive state. Similarly, at the end of summer, the kayak, leister, snare elements, fish nets, and summer clothing may be cached at the late summer sites for recovery following the following spring. These reciprocal shifts between winter and summer gear, and the transitions from active to passive states for different elements of the gear which they require, determine but one of the ways in which gear may be divided into active and passive states.

Insurance gear is distributed differently from seasonal gear, which is essentially always associated with a seasonally occupied residential location. Insurance gear is cached throughout the region, not in terms of specifically anticipated seasonal needs, but in terms of what might generally be needed at the location at some time in the future. Considerations involved are similar to those evaluated in choosing gear for transport on trips (see Binford 1977a:31). Insurance gear is generally distributed throughout the region as site furniture at locations not in use (see Binford 1978a:329 for a discussion of site furniture), as discrete caches at stream crossings, in well-known caves and rock crevices, in caches adjacent to known archaeological sites, or in deliberately constructed rock cairn caching facilities (see Binford 1978b:241).

As Simon Panaek explained:

Every time men go out for something they have space in the pack or on the sled on the way out. Good men always say 'what can I carry that may help someone in the future.' Maybe they decide that where they are going there is no firewood, so maybe they take out some extra. Maybe there is no good stone for making with an adze, so maybe they take out some extra to leave out there in case somebody needs it later. In the old days, in my father's time and before, fellows always carried out shiny stones for making tools and left them all over the place so if you needed them they would be around. Today men carry out axes, cooking cans, cups, knives, matches, bandages and medicine, and always in winter good food bones for burning, and sometimes stones for sleeping ones feet. I know where there are little secret places all the way from here to the Kobuk, to Barrow, to Fort Yukon, and to Barter Island. I could get everything almost a man might need along the way by knowing what people in the past have left as insurance.

Caches are continually being made by the Nunamiat, and in turn stories are continually being told, so that a kind of running inventory of what is in the passive state and where it is located is maintained by most men and boys in the group. I once had the opportunity to accompany a late summer hunting party on the northern tundra some eighty miles north of Anaktuvuk village. Nine caribou were killed, and after butchering the hunters took the metatarsals and attached feet of the butchered caribou, made a small slit in the stomachs of the butchered animals and shoved in the feet. The hunters explained to me that the mild stomach acids actually pickled the feet, when left to stand for some time, and commented, "You never know when you may come along here and be real hungry."
The importance of caching strategies is perhaps best summed up in the words of Jessie Aghook:

Catch things when you can, if pass good stone for tools, pick 'em up, if pass good wood for sled runner, catch 'em then. Good man never think back and say, "If I had just pick 'em up last summer!" or something like that. If too much trouble pack 'em, put 'em some place where you catch 'em later. Every dead Eskimo can remember something he not pick up when it was around. My great uncle broke ankle in winter up around pass at Kogmavuk. He can't walk to catch firewood, he can't walk to get rocks for making soup, but he remember where man tell him that during summer when sheep hunting, and nothing to do, fellow put willows and cooking rocks, and some extra skin rope in little cave at top of pass. Uncle, he get there and make nice fire, fix food, and pretty soon another fellow see smoke and come to see, find uncle, and take him home on sled. Good Eskimo always say, "What might happen to me here during winter or some other time?" then he leave things so later OK.

In order to obtain some appreciation for the magnitude of the inventory of passive gear, exclusive of seasonal caches, Table 1 reports the result of interviewing twenty-one men, who were identified as heads of households in the 1969 census, concerning the disposition of their gear during the first two weeks of June, 1971. The method used to establish the list of gear to be studied was simple: I entered the first house where interviewing was to be conducted and made a list of all items hanging on the walls, exclusive of clothing, or sitting in containers on the table before me. I then interviewed all heads of households regarding that list, making no attempt to enlarge or modify it in terms of subsequent observations in other houses. My goal was not to obtain a complete inventory of all items in use in the village, but rather a sense of the differential distribution of the gear within and outside of the village. Table 1 illustrates the situation nicely: 51 percent of all items inventoried were within the houses of Anaktuvuk. The remaining 49 percent were identified as cached: 9 percent within the village, and 40 percent outside the village as distributed caches or as site furniture at locations used in hunting sheep and caribou.

At the time of this interview I was unaware of the distinction which the Eskimo make between active and passive gear. I made no attempt to determine what gear inside the houses or out was considered active or passive. Therefore, relative to this distinction the data of Table 1 are ambiguous. I have no measured estimate of the part of the technology which might at any one time be considered active or passive. It is my guess, however, that during summer active gear would constitute less than 30 percent, while during winter active gear would be slightly over 40 percent of the total. Stated another way, I estimate that at any one time between 60 and 70 percent of all the gear considered part of the technology might be considered passive. Passive gear would be distributed as site furniture at locations not then in use, in seasonal caches, and in insurance caches. Through this planned activity, the Nunamit modify their effective environment by distributing resources in terms of anticipated future needs. This is accomplished at very little cost, since the dispersion is made as part of other activities: items are transported when one is moving for other reasons. By these means the Eskimo gain utility in both time and space for their resources, at very little direct cost in mobility or transport (see Binford 1978b:91).

This brings us to the major characteristic of Nunamit technological organization.

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### Table 1

**Disposition of Selected Gear, June 20-30, 1971**

<table>
<thead>
<tr>
<th>Artifact type</th>
<th>Total</th>
<th>In houses within village</th>
<th>In caches within village</th>
<th>Site furniture in various sites</th>
<th>Caches within normal exploitation zones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish net</td>
<td>5</td>
<td>1 (20%)</td>
<td>0</td>
<td>0</td>
<td>4 (80%)</td>
</tr>
<tr>
<td>Net float</td>
<td>57</td>
<td>9 (16%)</td>
<td>17 (30%)</td>
<td>0</td>
<td>31 (94%)</td>
</tr>
<tr>
<td>Plers</td>
<td>108</td>
<td>34 (31%)</td>
<td>19 (18%)</td>
<td>0</td>
<td>55 (51%)</td>
</tr>
<tr>
<td>Net weights</td>
<td>37</td>
<td>6 (16%)</td>
<td>14 (38%)</td>
<td>0</td>
<td>17 (46%)</td>
</tr>
<tr>
<td>Fish Lures</td>
<td>150</td>
<td>71 (47%)</td>
<td>19 (13%)</td>
<td>0</td>
<td>50 (40%)</td>
</tr>
<tr>
<td>Fishing poles</td>
<td>89</td>
<td>12 (13%)</td>
<td>2 (02%)</td>
<td>44 (49%)</td>
<td>31 (35%)</td>
</tr>
<tr>
<td>Bowling cans</td>
<td>47</td>
<td>36 (66%)</td>
<td>0</td>
<td>0</td>
<td>16 (34%)</td>
</tr>
<tr>
<td>Cups</td>
<td>159</td>
<td>69 (50%)</td>
<td>3 (02%)</td>
<td>32 (23%)</td>
<td>38 (25%)</td>
</tr>
<tr>
<td>Axe</td>
<td>51</td>
<td>27 (53%)</td>
<td>0</td>
<td>13 (25%)</td>
<td>11 (22%)</td>
</tr>
<tr>
<td>Big knife</td>
<td>52</td>
<td>34 (65%)</td>
<td>6 (12%)</td>
<td>3 (06%)</td>
<td>9 (17%)</td>
</tr>
<tr>
<td>Reat pan</td>
<td>21</td>
<td>16 (76%)</td>
<td>2 (10%)</td>
<td>0</td>
<td>3 (14%)</td>
</tr>
<tr>
<td>Spoons</td>
<td>267</td>
<td>138 (51%)</td>
<td>22 (08%)</td>
<td>51 (19%)</td>
<td>36 (13%)</td>
</tr>
<tr>
<td>Small knife</td>
<td>24</td>
<td>20 (83%)</td>
<td>1 (04%)</td>
<td>3 (13%)</td>
<td>0</td>
</tr>
<tr>
<td>Kettle</td>
<td>34</td>
<td>36 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rifle</td>
<td>14</td>
<td>14 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>.22 Pistol</td>
<td>14</td>
<td>14 (100%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Credits and Acknowledgements**

- EMBEDDED VERSUS DIRECT PROCUREMENT STRATEGIES

If everything goes well there are few or no direct costs accountable for the procurement of raw materials used in the manufacture of implements, and only low costs for materials used in the manufacture and repair of facilities.

Raw materials used in the manufacture of implements are normally obtained incidentally to the execution of basic subsistence tasks. Put another way, procurement of raw materials is embedded in basic subsistence schedules. Very rarely, and then only when things have gone wrong, does one go out into the environment for the express and exclusive purpose of obtaining raw material for tools. For example: a fishing party moves in to camp at Natvatruk Lake. The days are very warm and fishing is slow, so some of the men may leave the others at the lake fishing while they visit a quarry on Nassaruk Mountain, 3.75 miles to the southeast. They gather some material there and take it up on top of the mountain to reduce it to transportable cores. While making the cores they watch over a vast area of the Anaktuvuk valley for game. If no game is sighted, they return to the fishing camp with the cores. If fishing remains poor, they return to the residential camp from which the party originated, carrying the cores. Regardless of the distance of Nassaruk Mountain from the residential camp, what was the procurement cost of the cores? Essentially nothing, since the party carried home the lithics in lieu of the fish which they did not catch. They had transport potential, so they made the best use of it; the Eskimo say that only a fool comes home empty handed!
Another example of lithic procurement strategy relative to a primary strategy was related to me during the course of a discussion concerning a particular site at the mouth of Konumuvuk valley, where flakes of pure quartz crystal were the only lithics to be found. My informants, on observing the lithics, launched into an interpretive story about how men must have camped there during the late phases of fall caribou migration while setting deadfall traps for fur bearers in the high mountain passes of Konumuvuk! My curiosity was aroused. How they could tell so much from a few flakes? When questioned, they rather condescendingly replied:

This quartz only comes from little nodules found on the top of the limestone exposures in the highest parts of the mountains. One only goes up there to set deadfall traps for the fur bearers which cross these high upland passes in winter, in going from one valley to the next. The only situation in which one would be up there to pick up this quartz would be while building deadfall traps. One only does this in fall after one has put up winter storages of caribou meat, but before substantial snows have fallen in the passes. Nobody would go up there just to get quartz unless a shaman mixed quarts up in his business, but if a shaman messed around with the quartz he would not use it to cut up caribou here (in the site in question, Kakinma No. 2).

This situation reflects nicely an assumption which Eskimo informants always make: that lithic materials obtained in the late 19th century from the Killik or Kohuk rivers were introduced through social mechanisms, primarily as gifts between trading partners, or, at least, that lithic materials from those areas were brought back by persons who had made the trip for some other purpose. The procurement strategy was embedded within some other strategy and, therefore, the cost of procurement was not referable to the distance between the source location and the location of use, since this distance would have been traveled anyway.

My experience with the Eskimo, and a limited but enlightening experience with the Alyawara of the central desert of Australia, has convinced me that variability in the proportions of raw materials found at a given site is primarily a function of the scale of the habitat which was exploited from the site location, possibly coupled with a founder effect resulting from discard on the site of items which had been manufactured previously at some other location (see Yellen, 1977:73 for an apparently similar observation). This viewpoint yields a very different perspective on relations between locations of discard, archaeological remains, and source locations for raw materials, from that which is commonly assumed. Most analysts of lithic remains assume a direct set of procurement strategies for lithic materials; that is, parties going out for the expressed and exclusive purpose of obtaining lithic raw materials. Under such an assumption it is reasoned that a minimal “costs” strategy should obtain. The greater the distance between source and anticipated locations of use the greater the attempt to reduce the bulk of materials transported. The greater the distance “traveled” to obtain a material, the greater must be its value to the users! This view is well illustrated by Gould's (1978:288) discussion of lithic source variability at his Puntutjarpa rock shelter:

Exotic cherts, however, were not only the most efficient raw material for adze tasks, and they were by far the most difficult to obtain. Was the efficiency of exotic cherts great enough to lead the Aborigines to make the extraordinary efforts needed to obtain them for adze making? I very much doubt that it was, especially in light of the more than adequate supplies

From my perspective, the presence of exotic cherts may simply be a fair measure of the mobility scale of the adaptation appearing as a consequence of the normal functioning of the system, with no extra effort expended in their procurement.

**ORGANIZATION OF GEAR**

Much of the following discussion must be viewed as an ethnoarchaeological reconstruction, since the mail-order technology of the Nunamiat at the time of my field work offered little opportunity for studying the organizational consequences of stone tool assemblages.

My interviews regarding traditional strategies and use of gear were basically with four men: Jessie Ahgook, Simon Panteek, Elyahak Kakinma and Arctic John. All of these men learned from their fathers the principles of production and use of the traditional gear of the Nunamiat. All men have made essentially all the bone and wooden tools of the traditional Nunamiat; however, only Jessie Ahgook actually used a “traditional” technology as a young man. Only Simon Panteek and Jessie Ahgook have attempted as adults to use stone tools, and only Jessie was considered “knowledgeable” in this area. All old men basically agreed on the organizational aspects of traditional technology, and most provided situational or anecdotal accounts of the conditions under which various strategies and “mixes” in gear usage might occur.

I approach the problem of technological organization from the perspective of the Nunamiat themselves, that is, how they conceive of their gear with regard to the planned execution of their adaptive strategies. I emphasize the phrase *planned execution*, since my experiences with the Eskimo has convinced me that subsistence-oriented decisions are goal oriented, and are made with definite expectations as to the nature of future conditions. This element of planning in their subsistence behavior is so exacting that anticipating unforeseen events is always present; there is always a “backup strategy” in case the “first priority” does not work. This is perhaps best illustrated by the fact that one old man reports carrying flint cores (we would call this a preform) in a specially made pouch as part of his regular field gear up until about 1930, in spite of the fact that he had never had to use stone tools in his life. The core was carried just in case something happened to his metal gear! Three old men in Anaktuvuk village still make and carry flint and steel sets as part of their regular winter personal gear, just in case something happens to the matches. One might view these examples as cases of “conservatism,” and in one respect they are. Nevertheless, “back up” strategies and gear are a regular part of young men’s field planning.

All the Nunamiat elders agreed that viewed from an organizational perspective, there were three basic types of field gear: personal gear, site furniture, and situational gear. Both personal gear and site furniture were viewed as anticipatory in character, while situational gear was responsive in character.
Personal gear

Personal gear was carried by individuals in anticipation of future conditions or activities. In an earlier article (Binford 1977a), I discussed personal gear as it was observed among the Nunamut during the spring of 1971. They recognize three basic categories of personal gear: gear selected for 1) what I will have to do in terms of the goals of the expedition; 2) how I may feel in terms of hunger and warmth; and 3) what may happen to me in terms of mishaps (see Binford 1977a:31).

My primary concern here was with lithics, so informants were questioned about stone tools which were considered by their fathers to be essential parts of their personal gear. All informants mentioned "bone cutters" (kinnuasuk) which were worked (dowel-shaped) pieces of antler with inset side blades, a large one for heavy cutting, and a smaller one for more delicate work. These were used for slotting antler sections from which deer arrows were made, making the barbed sleeves for stone projectiles, and many other antler tools. Informants identified the item illustrated in Murdoch (1892:160, fig. 117) as being similar but not identical to "bone cutters" they had seen as young men. A "crooked knife" was also regularly mentioned, which during the lifetime of the informants had always been set with a metal blade. A very fine example was still in the possession of Elijah Kakinya in 1972. This is the same one illustrated in Ingsted (1951:112a), and is very similar to the one obtained by Murdoch (1892:158, fig. 114) from an inland Eakimo during his visit to Point Barrow from 1881 to 1883. These knives were worn tied parallel to the belt, which was generally worn over the parka.

Informants always spoke of carrying "cores" into the field; as they put it, you carry a piece that has been worked enough so that all the waste is removed, but that has not been worked so much that you cannot do different things with it. These cores were described as shaped like discs of different sizes; the only item pictured in the books which I had at Anaktuvuk for comparative purposes that were identified as like the "cores" their father carried were the "discoids" pictured by Giddings (1964:56). That the items being described by the informants were in fact cores, was made clear by many references to the removal of flakes radially around the disc for use in butchering animals, the manufacture of scrapers from flakes struck from the "long side" of the oval, and the fact that once you had reduced the core down to a very small size you had a "round scraper."

In winter, the "old timers" were described as always carrying an "ax" and an ice chisel. The latter was generally mounted on the end of a a leister, or an ice dipper used in cleaning ice from fishing holes.

Men always carried flint and steel sets, together with charcoal-rubbed willow cotton for tinder. Before flint and steel, men carried a caribou bone (astragalus) and a strip of hide which could be mounted on almost anything, a caribou rib for instance, to make a fire drill for starting fires. One could always use the men's cutting board, which was generally carried by men into the field, as a hearth for fire making.

Inevitable components of field gear were the bow, arrows of several types, and a quiver and bow case. The bow was the sinew-backed bow so frequently described from the Arctic. The arrows were of three basic types: deer arrows with antler points, bird arrows with rather large blunt points, and bear arrows with stone points. Some extra shafts and points were generally carried. The old men explained that

the difference between "deer" and "bear" arrows was not so much that each was exclusively used for the two types of game but that the antler points were used more commonly during the months of freezing weather, and stone when it was warm. Stone points were very easy to break and were unreliable to carry, because they cracked sometimes from just being rubbed together in the quiver" when it was very cold. Stone points were believed to be better for penetration, and hence better for larger animals; since the bear is a "warm weather animal" they are "bear arrows."

Other items mentioned as components of personal gear for men were extra sinew for sewing and making splints for small animals, needles, extra skin patches in the event clothing repair was needed, a "man's flaker" or pressure flaker used in making stone tools, together with a scraper on the opposite end of the handle used in softening skins. These items, together with flake knives, simple flakes from relatively large cores used in butchering, were carried in a small pouch worn in much the same manner as an ammo pouch is worn today (see photo of Kakinya in Ingsted 1951:96b).

Informants recognized that personal gear was variable, depending upon the purpose of the expedition and the season. For instance, during late spring, summer, and early fall, men always carried a leister as a walking stick. These were used to spear fish in small streams and along lake margins, to support the men while in the field. The poles could be put together to make an emergency drying rack (see Binford 1977b:229). In winter, this item was replaced by an ice dipper with an ice chisel on the opposite end. If men were going hunting at lakes or in well-known ambush areas, a lance would be carried instead of the leister (see the lance in Murdoch 1892:243). Men in winter invariably carried a snow knife, the equivalent of the "big knife" in my 1971 data (see Binford 1977a:28).

Women were said to have had certain distinctive personal gear items; however, I could never get the old men to identify any except the ulu, woman's cutting board, berry bucket, needle, and case for needles.

Men recognized that the gear varied with the mode of transport, as in the 1971 data (see Binford 1977a:31). If the sled was being used, there was always a drill, extra drill bits, preworked wooden and antler pegs, rawhide lashing, extra elements of dog harness, and more "carving tools," including a hafted stone tool used much as a draw knife, with a small stone blade (typologically similar to the raclette of the French typologies).

Personal gear was heavily curated (Binford 1977a:33). Recyling, reuse, and heavy maintenance investments were made in these items. One never went into the field with personal gear that was not in good condition and relatively new; informants agreed that personal gear was inspected before going into the field so that worn items or items in need of repair were either repaired first or replaced before leaving for the field. This means that the discard of personal gear related to the normal wearing out of an item was generally done inside a residential camp, not in the field where the activity in which the item was used occurred.

Site Furniture

In my discussion of the Mask Site, I noted that there were basically three types of gear introduced to, used at, or carried through the Mask Site. One type was designed site furniture, or items which "went with the place" (Binford 1978a:399):
... all the items with low ‘use ratios’ were most commonly considered to be ‘site specific’ artifacts that were generally available for use by any occupants of the site. They were considered part of the site in much the same way that facilities such as hearths were considered. These items were generally introduced during the early phases of use, or they were removed from caches at the site, having remained there from a previous period of use. They were thought of as appropriate ‘artifact’ furnishings of the site, the site-specific ‘hardware.’ The best analogy to the way the Eskimo conceived of these items is similar to the way we think of furnishings in a room. They are items that go with the place, not necessarily the persons occupying the place.

The most common items or features of site furniture are hearth stones, hearths, anvils used in pounding bones for broth (see Binford 1978b:163-165 for a discussion of bone juice), and kaotah, used as long tabular hammers and as rather massive “scrapers” for removing the periosteum along long bone shafts before breaking them. Figure 1 illustrates several examples of kaotah recovered from Nunamiut sites of the 1940’s. Weights for tents and other anchoring functions are very common items of site furniture. Various sticks used in supporting containers over a fire, or antler racks used for the same purpose (see Binford 1978b:183, fig. 5.8) are common elements of site furniture. Today containers, most commonly a Hill’s Brothers coffee can with a small wire handle, are found on most sites. In the past, worn wooden “meat dishes” (see Murdoch 1892-99:100, figs. 33, 34), and old “cooking buckets” (see Murdoch 1892:86-89) were frequently “recycled” to temporary sites as site furniture to be used with a portable skin liner for stone boiling on such locations as hunting stands. Wooden drinking ladles, lithic raw material, repair and emergency parts such as sled runners, usable spruce wood, and many other items such as anvils, kaotah, and tent weights enter the archaeological record only as a function of discontinued site use or natural processes which cover up or otherwise modify the site itself. One process which I have observed with regard to site furniture has been discussed as the “site effect” (House and Schiffer 1975:174; Baker 1978:288-93). Upon arrival at a known site, one generally searches for the “furniture” and pulls it “up” out of its matrix for reuse. This means that large items of site furniture get continuously translated “upward” if a deposit is forming.

One of the characteristics of many items appearing as components of site furniture, for instance kettles, is that they are items which were previously used in a different context, but for the same purpose, e.g., boiling water. This situation has some of the same characteristics as the “lateral recyclying” discussed by Schiffer (1978). In this example an item is transferred from the context of “household gear,” used primarily by women, to “site furniture” on, for instance, a hunting stand where men are the primary users of the item. On the Mask Site, essentially all of the items shown distributed in the central area among the four hearths (Binford 1978a: fig. 17) were items “laterally recycled” from household gear at residential locations. I suspect that this is not unique to the Nunamiut, and that pots introduced into hunting camps, gathering locations, etc., are likely to be well worn but still usable elements of household gear which has been replaced at the household location. Situational Gear

Situational gear is that which is gathered, produced, or “drafted into use” for purposes of carrying out a specific activity. This is a tool kit, “put together” in

Figure 1. Kaotah from Nunamiut sites.
order to accomplish a specific task. As the Eskimo describe it, situational gear is always in response to conditions, rather than put together in anticipation of events or situations. Typical examples of situational gear are illustrated by the following statements by informants:

“You know, something like firewood in a hunting camp, when you decide to cook then you look around for wood. I remember one time when I was out on August Landers with my uncle, maybe I was maybe 19. We looked for firewood, we camped upon hunting wolves, they had run a small herd of muskrats and young into a little lake. We ran off the wolves and shot many muskrats and then uncle find out he had his good knife somewhere. No good, all that caribou and nothing to cut ‘em up with! My uncle he not like me always have good knife from tacos (Caucasians) he grew up when they cut ‘em up with stone knife. We go around lake looking for shiny stones, and uncle fix little hammer of willow wood and part of old dog harness spreader we find around the lake. Right there he make many good little knives, we cut ‘em up good, no sweat. All those little knives he make like what I mean.”

Situational gear is expediently designed in terms of the raw material “options” available. One may seek raw material from caches, one may modify elements of personal gear for reuse, one may seek direct sources in the immediate environment as in the above example, or one may scavenge sites for lost or abandoned gear. The form that such situational designed and produced gear may take will vary, depending upon the tool demand and the nature of the expediently drafted sources of raw material. Some of the best examples of situational gear have been described by George Frison (1968), from kill-butcher contexts on the plains of North America (see also Frison 1970;1974 and Brian Hayden 1977 and 1978 for the Australians).

LOOKING AT PROCUREMENT STRATEGIES IN TERMS OF THE ORGANIZATION OF GEAR

Should we expect the procurement of raw material for site furniture, personal gear, and situational gear to have the same characteristics and therefore to have similar archaeological consequences? In my experience the answer must be an emphatic NO. Let us take the situation of the manufacture or replacement of an element of personal gear; where does a hunter go to find the raw material? Regardless of where he is, he attempts to find a piece of suitable material within the camp—regardless of the fact that he may know that the ultimate source of the material is far away. Stated another way, among mobile hunters and gatherers raw materials are generally procured as elements of an embedded strategy, and are obtained in anticipation of future needs. Consequently, when one needs raw material one looks around to determine what is on hand. Since the repair and maintenance of gear is also generally embedded in other work schedules (that is, performed in anticipation of future needs) and executed during “off time” relative to other work schedules, if it is concluded that appropriate raw material is not on hand, the word is let out, and it is generally not long before someone introduces the needed materials.

Another aspect of lithic procurement strategies is that, as in most situations I witnessed the amount processed and transported does not vary in terms of “estimated needs.” That is, if it is agreed that raw material is needed, then when the opportunity arises, the party with access to it would bring back all it could reasonably carry. This situation is likely to obtain where the availability of raw material in a camp is viewed as a corporate phenomenon, i.e., generally shared throughout the group.

Gear produced for inclusion as “personal gear” or even “household gear” is much more likely to be manufactured according to quality considerations unaffected by constraints on time or immediate availability of appropriate material, since this activity is intended to meet anticipated needs rather than immediate needs. I do not mean to imply that procurement is apt to shift to direct strategies, such as making long trips specifically to obtain a given raw material; I am only suggesting that within the range of materials available from normal forays into the hinterland, some will be differentially used because of quality considerations. This situation is apparently well illustrated in the data collected by James O’Connell (1977:277-81).

In direct contrast to procurement strategies for personal or household gear are those for situational gear. In meeting situational contingencies the needs for tools are immediate, so that immediately available materials must be used if the “situation” is to be coped with adequately. As has been pointed out, these materials may be naturally occurring, cached, scavenged, or recycled personal gear. In general there is little investment in the tool-production aspects of “situational gear”: edges are used if appropriate, minimal investment is made in modification, and replacement rates are very high if material is readily available. Under situational conditions practically the only factors conditioning relative investment in maintenance, reuse, and recycling is the quantity of the immediately available material; if it is low, considerable investments may be made in “economizing” so as to ensure the accomplishment of the task immediately before the worker. Quantity is almost invariably “low” if personal gear is being recycled to situationally appropriate forms, so that recycling, reuse, resharpening, and multiple usages for any given form are apt to be most common under situational use conditions. This is, other things being equal, basically a property of “field” conditions, or special-purpose sites.

Likewise basic “reduction strategies” for naturally occurring materials may be highly variable in “situational” contexts. If only very small pebble materials are immediately available for instance, “bipolar” techniques may be used, whereas given larger materials, hand-held percussion techniques may be used. In contrast, one would expect that with “residential locations,” where personal and household gear was frequently manufactured and maintained, only larger, higher quality materials would be commonly used, and reduction strategies would be less variable from one site to the next.

TOOL DESIGN, FORM FUNCTION RELATIONS AND TOOL USE IN TERMS OF ORGANIZATIONAL CHARACTERISTICS

Do I expect the patterns of tool design and use to be the same for site furniture, personal gear, and situational gear when similar tasks are to be performed? As in the previous discussion the answer must be an emphatic NO. I would expect elements of personal and household gear to exhibit both maximum design comparability relative to function, and maximum fit between the appropriate “quality” of the raw material and tool design. In addition there should be more design features related to hafting among items manufactured as household and personal gear, while in situation contexts items used for identical functions may exhibit at most only minimal, and perhaps technically different, hafting features.
I would expect that the manufacture of tools for personal and household gear would be executed in a staged manner for many items; that is, the manufacturing process would take place in episodes—certain modifications would be made and then the items would be stored for some time before the next "stage" of manufacture occurred. I would also expect that stage planning, particularly in the production of lithic items, would be manifested both in the logistics of procurement and the context of use. Staging in production may well correspond to transport junctures that is, items would be partially processed, transported, further processed, and transported again. This expectation derives from the observation that just as the procurement of raw materials is generally embedded in other activity schedules, so is the manufacture of personal and household gear. Staging is at least a partial accommodation to the on-and-off work schedule used in making most tools; in addition, the embedded character of the tool making schedule insures that various "phases" of the manufacturing process will be conducted in different places. A good example of this is the craft activity described on the Mask Site (Binford 1978a); I think one can readily imagine that hunters might take lithic items in various "stages of production" to a hunting stand for further modification while watching for game. In fact, this was commonly reported by the older Eskimo as a common activity on "prey" hunting stands. "Gearing up" locations may well inform us about the intended context of items produced; in one of the earliest detailed studies of lithic production strategies, for instance, Ruthann Knudson (1973:145) describes her understanding of the production sequences indicated at the MacHaffie Site:

Apparently at least 2 general kinds of chert or chaledony cores were produced—(1) biface or bifacial cores, where the reduced core was the production trajectory goal subsystem B and (2) polyhedral to irregular cores where the flakes or blades were the focus for implement utilization (system C). Blade production is indicated in this assemblage but is not common. Subsystem B dominates the technology. This dominance is undoubtedly a function of the fact that MacHaffie appears to have been occupied specifically for lithic provisioning.

By implication the target items of "subsystem B" were removed from the site to be further processed and used in other contexts, resulting in differential debris from staged processing occurring on different sites of the subsistence settlement system.

In the same work Knudson (1973:138) notes that, "As far as is currently known, none of the northern Plains Cody—assigned assemblages includes evidence of significant coreblade production while all the late Paleo-Indian assemblages studied from the southern Plains are characterized by cores with specialized flake production and direct manufacture of bifaces from relatively thin flake blanks."

In light of the arguments presented here the reader should be able to appreciate that these differences probably reflect the proportion of situational gear, produced from local materials, as opposed to personal gear, transported for use at a site.

Turning now to consideration of tool design under different forms of intended usage and different organizations of gear, I think it should be clear that the manufacture of situational gear is carried out with a full knowledge of tool needs and replacement potential which is characteristic of the situation. Under such conditions one need only be concerned with design characteristics which facilitate a specific, known and immediate task; therefore, the tool design may be quite specific or limited, in response to 'short term' considerations. Planning or designing a tool to be incorporated in personal or household gear is very different, since it will be seen in the context of long-term usage and the requirement that it meet many different types of tool needs. A good example of this is the contrast between spear making by Australian Aborigines as experienced by Brian Hayden and Richard Gould. Hayden asked Aborigines to perform different manufacturing tasks for his enlightenment; since these men were not equipped with traditional gear and were expected to make the tools needed to accomplish a specific task, it should come as no surprise that what Hayden witnessed was almost exclusively the production of situational gear. By way of contrast Gould observed Aborigines who were equipped with traditional gear; when they manufactured many of the same items which Hayden had witnessed, they used different tools! Compare for instance "spear making" reported by Gould (1969:99) with that reported by Hayden (1977:184). In Gould's description a hafted adz (an item of personal gear) was used in working the spear shaft, while in Hayden's what appears to be a hand-held denticulate was used for accomplishing the same task. We can expect many such tool-design parallels, that is tools of very different design being used for identical tasks; but this is not to say that they are functionally isomorphic, since they are clearly designed for very different intended roles within the technology. This context variability is probably illustrated as well by many of the expediently manufactured butchering tools described by Frison (1968, 1970). It is likely that identical butchering tools would be performed by the same people with tools of pesian in a base camp of other less situational contexts.

LOOKING AT DISPOSITION AND ABANDONMENT IN TERMS OF ORGANIZATIONAL CHARACTERISTICS FOR GEAR

Within this context we face quite directly sources of variability among archaeological sites. In a previous discussion (Binford 1977a) I have addressed the issue of expected differences between curated and expediently organized technologies. In that paper I was interested in contrasting site formation processes when the differences were between complete technologies which were expediently produced, and curated technologies where at least some items were produced and then maintained within the technology in anticipation of future usage; I had in mind contrasts between the Mousterian (which I believe to be largely noncurated) and the Upper Paleolithic of Western Europe (which I believe to be curatorially organized). In this paper I have addressed intersite variability which might arise from organization variability within a basically curated technology. What is clear is that as far as actual tool use and production are concerned, the relative roles of household and personal gear (heavily curated) and situational gear (largely noncurated) are variable, and we can expect (assemblages) which are "curated" in the broad sense to exhibit patterns of interassemblage variability depending upon the organization of the technology as seen in the proportion of situational to more curated types of gear. In seeking such an appreciation we must consider some of the probable consequences of associations between tools of different form, evidence of use, and debris, under different systems conditions within an organized technology. For instance,

1) Items of personal and household gear are apt to be both produced and maintained within residential sites, resulting in an association at such locations of debris from manufacture, repair, and final discard of worn-out items.

2) Items that have relatively long use lives are not likely to be "worn out" on special purpose
that it seeks to gain spatial utility (see Binford 1978b) from resources. If one adopts systemic expectations for properties of the archaeological record, there are certain methodological challenges which inevitably follow. If we anticipate that past behavior was differentially organized to accomplish different types of tasks, it follows that the "reasons for occupation" as well as the "tasks accomplished" would be variable among sites generated by persons participating in a single system (Binford and Binford 1966); that "functional" differences can be expected is now a demonstrated condition (see Binford 1978b). Given such an empirical warrant for expecting such conditions among at least among some prehistoric systems, it becomes necessary to develop a means of identifying generic types of functional differentiation when they are encountered in the archaeological record. It is toward just this end that this paper was prepared. I have been concerned with the differential organization of gear and how this may result in differences in assemblage content, as a clue to the logistical function of sites. I have also suggested that some variability among special purpose locations will be directly attributable to immediate system-state conditions, such as the degree to which tasks were adequately anticipated and the party was "properly" equipped for them. This type of variability can be expected as a major contributor to frequency variations among assemblages derived from curated technologies; for instance, such conditions may well be responsible for the sometimes high frequency of "Mousterian" tools in upper paleolithic assemblages, i.e., they were "caught short" (see Straus 1978 for a discussion of this problem).

This paper has sought to introduce the idea that technologies may be differentially designed, manufactured, used, and discarded, in response to their intended roles in the technology. I have made no attempt to develop actual techniques for the unambiguous analysis of archæological assemblages in these terms; I hope rather that a sufficiently convincing argument has been presented to warrant a "rethinking" of current approaches to the study of lithic assemblage variability. Such "rethinking" is especially needed with regard to "cost/benefit" analysis of lithic source locations and differential relationships between reduction strategies, raw materials, tool design, recycling, re-use, and the relative contributions of each to "assemblage variability." We should expect different designs and reduction strategies for functionally similar tools, depending upon their intended technological roles, given variable situations of tool demand and adequacy of gear provisions. Normative ideas of technically and morphologically "homogeneous" industries should be abandoned as a general set of expectations; rather we should expect that developing situationally responsive alternative ways of doing things has adaptive significance within most cultural systems.

Whereas the older and largely implicit model of tool design and production was that of a maker producing a tool to perform a task, I have suggested that tool production may be "future oriented," and the manufacturer takes into consideration the selection of raw material, design, and fabrication of the tool to its intended role in the technology. This is a very different set of considerations from that of "simple function," in a task-specific sense. In the case of a hide-scarifying tool, to what degree will similar materials, design features, and fabrication methods be used when it is intended for immediate use and discard and when it is intended for incorporation in a portable tool kit for use in a variety of situations in which some
scraping of hides may be required. Given that a knapper may well bring his skill to bear in both types of situation, to what degree are the recognizable differences in the products "stylistic" rather than "functional"? Since only one maker is involved, I must conclude that all observed variability would be "functional." This would be true even where use wear would indicate an "identical" task-related "function" for the tool! In this situation researchers might attempt to hold function "constant" by means of use-wear information; observing morphological differences, they would therefore feel justified in asserting that the variation was "stylistic," and so attributable to differences in the identity of the makers—and they would be wrong. One cannot "give meaning" to the archaeological record in terms of "conventions," as has been done routinely in the past. The assignment of meaning to properties of the archaeological record must rest on a solid understanding of the processes which operated in the past to generate the patterns remaining for us to observe today.

NOTES

1) This reference is to stones for warming to put in the foot of one's sleeping skin.
2) approximately 175 air miles.
3) approximately 225 air miles.
4) approximately 230 air miles.
5) approximately 175 air miles.
6) These references are to places which form a rough circle around Anaktuvuk Pass, encompassing approximately 150 square miles, an area greater than any U.S. state except Montana, California, Texas, or Alaska.

and greater than the entire area of the United Kingdom or any countries of Europe except Russia, Spain, Sweden and France. It is an area approximately 70 percent of the size of France. This is the area which the old men of the Nunamiut discuss with ease when remembering the locations of former sites, caches, and resources. By our standards they have a detailed and comprehensive knowledge of an enormous terrain.

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