10

Summary and Conclusions

WHO WERE THOSE GUYS?

> Where did they come from?
> Where did they go?
> That is the story we wish to know. (Watson 1959:1)

Sometimes it seems that the most controversial questions (or answers) in archaeology are those that address a prehistoric population's origin and demise. For instance, for many years we have asked, Were the Paleoindians the first people in the New World, or were there some "pre-Clovis" predecessors? Did the Paleoindians walk across the Bering Land Bridge, or did they evolve from some earlier migrants? Did migrants perhaps meet established populations during their passage? What became of the Paleoindians: did they change into the Archaic people? Did the Archaic people become the Formative? What became of the prehistoric farmers of this or that area? Did they move out? Were they assimilated by some other group? These are the questions asked by archaeologists who are attempting to reconstruct continuity in the flow of culture history.

Other archaeologists are intrigued by the similarities and differences in cultural inventories in various places during a single prehistoric period. These inventory differences are thought to reflect cultural boundaries between different emicly defined groups of people. This work searches for geographical continuity and sunder in order that, when coupled with the temporal information, boundaries (or banks) of cultural flow can be established.

Thirty years ago Binford (1968) criticized these approaches as inadequate for secure inference. Agreement as to which traits are culturally related has not developed, but this has not slowed the use of this traditional methodology.

The result is an increase in our detailed knowledge of some cultural inventories for an increasing number of areas and time periods. This detailed knowledge has allowed archaeologists to delineate more and more differences among time periods and areas. To traditional archaeologists, these differences, then, indicate more cultural discontinuities in time and space, which has resulted in a proliferation of cultural-tradition constructs based on these finer-scale temporal and geographical cultural breaks. Hence, traditions and phases become more constricted (for example, Black 1991), as do regional boundaries (Reed 1997).

I began this book with a history of research on lithic-scatter sites in western Colorado. I pointed out that many researchers preferred rockshelter sites, although some would excavate open lithic scatters. The resulting interpretations usually describe the region's hunter-gatherers as local expressions of the Desert culture. As described by Jennings (1964:166), the Desert culture is an unchanging adaptation in a poor country: "The Desert Culture concept, though only recently expressed, is an old one. Many authors concerned with the ethnology of the West have postulated an ancient cultural substratum or base from which the later cultures have evolved. Archaeology eventually caught up when a long radiocarbon dated record of a stable lifeway adapted to a land of sparse resources was discovered and reported."

Jennings and other researchers believed it significant that the Desert Archaic spread over a region much larger than the Great Basin. However, an important fact comes from my analysis—the prehistoric adaptation in the Upper Gunnison Basin changes through time. Further—although I may be seeing the proverbial glass as half full—I don't believe that the Basin was a land of sparse resources for most of the prehistoric past. The "long radio-carbon dated record" of the lifeway in the Gunnison Basin and the Colorado high country, as described in this book, does not fit Jennings's definition of the Desert culture.

THE NATURE OF SURFACE SITES AND THEIR VALUE TO ARCHAEOLOGICAL RESEARCH

As a field archaeologist, one of my first impressions of a site comes from the modern ground surface. In the Gunnison Basin, surface information is critical to any interpretation because most sites are shallow lithic scatters. I judge a site's research potential by its surface, or perhaps I search for patterns that will enable me to interpret how old the site is or how it functioned within a past cultural system.

I have shown that the surface archaeology of the Tenderfoot Site has not been static during the time we have monitored it. The surface does reflect the subsurface remains, but this reflection is not a random sample; it is biased. Interpretations of the surface archaeology that do not take this into account are likely to be skewed, and interpretations that equate 4-x-4-m or 10-x-10-m clusters with "occupations" are especially likely to be inaccurate.

Surface archaeology is interpretable, but possibly not in ways we might like at the moment. We must adopt research methods that are appropriate for the data (Ebert 1992).

Multiple Occupations

The Tenderfoot Site was a popular place throughout prehistory. Many periods of multiple occupations have been revealed in our excavation area, even though the area is small. Furthermore, the way the site was used changed through time. Multiple occupations appear to be the rule on lithic scatters; every site that we have excavated in blocks has shown multiple occupations. Multiple occupations negate easy interpretation of surface clusters as occupations, even if the surface were a simple random sample of the subsurface remains—and I have demonstrated that it isn't. This means that in order to accurately interpret the surface material, and to use the material in determining its occupational history, we must excavate the site. Fortunately, the shallow nature of such sites facilitates excavation.

THE SIZE OF THE PREHISTORIC SYSTEM AS SHOWN BY OBSIDIAN DISTRIBUTIONS

Archaeologists working in Colorado occasionally recover obsidian artifacts from prehistoric sites. Usually, obsidian is relatively infrequent compared to other raw materials, such as quartzite or chert. In spite of the rarity of these obsidian artifacts, they are important because analysis can determine the geological source of the obsidian. We know the location on which the archaeologist found the artifact (the site), and we can determine the location from which the material originally came (the obsidian source); a number of processes may account for how the artifact was moved between these two spots.

Because the amount of obsidian recovered is so small, few have ventured to suggest that a well-organized obsidian trade network moved these tiny quantities across the landscape. Instead, the two most common interpretations of how the obsidian got from source to site are that someone carried a few pieces across the span or that an occasional down-the-line trade moved quantities over the stretch. Either of these two explanations might account for the distribution of western Colorado obsidian artifacts.

In an attempt to shed light on the processes of obsidian movement, I mapped the sources of all recorded, analyzed, and reported obsidian found in sites in Colorado. The sources are given in Appendix C, which lists the site (sometimes just a county location), the quantity analyzed, the source, and the report reference. These data are mapped by county in Figures 10.1 and 10.2. As can be seen in Figure 10.1, most of the analyzed obsidian was found in western Colorado; a large portion in five or six counties.

The majority of obsidian pieces come from New Mexico sources, especially Polvadera and Cerro del Medio. Some pieces come from Arizona, Utah, Idaho, Wyoming, and Colorado sources. Figure 10.2 shows the locations where these non–New Mexico source obsidian pieces were found. It is obvious that whereas New Mexico obsidian is found across the state, obsidian from other sources is found along the north and west boundaries of the state, in counties that are nearest the sources. The Idaho and Wyoming obsidian is found as far south as the Colorado River. Arizona obsidian is found in the southwest corner of the state.

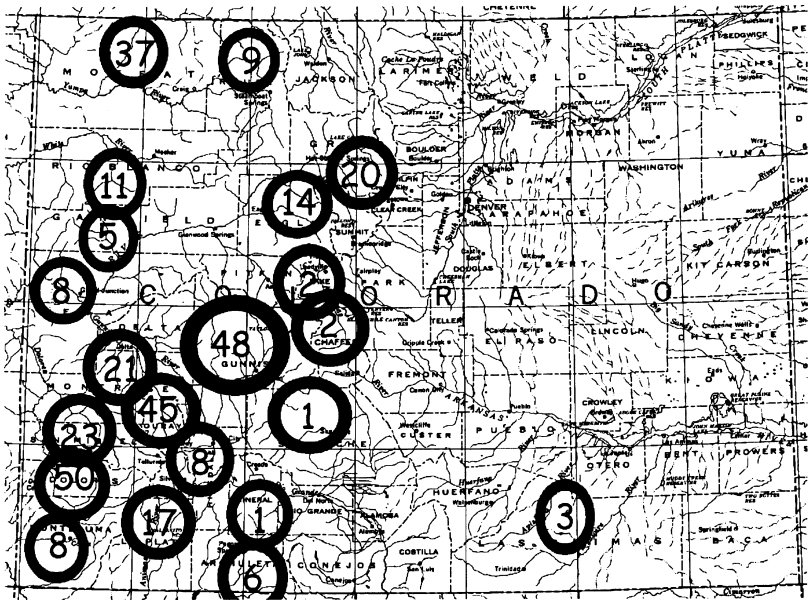

Fig. 10.1. Numbers of obsidian pieces found in Colorado for which source analysis has been run. Map courtesy Perry-Casteñada Library Map Collection, University of Texas, Austin.

Utah obsidian is found along the western edge of Colorado. Valuable information could be obtained by conducting research into the sources of obsidian found in more counties and, particularly, into their respective mixes of obsidian sources.

A single Colorado obsidian source is reported here. The Cochetopa (Saguache County) source produces obsidian pellets mostly smaller than two centimeters in diameter. Cochetopa obsidian has been recovered from Gunnison, Chaffee, and Saguache Counties. Also reported in Appendix C are two flakes of Cochetopa obsidian recovered from Chaco Canyon ruins.

Regardless of whether the obsidian was moved as a commodity in down-the-line trade or as material carried by individuals from the source, the obsidian data show that contact and interaction took place between the southern half of western Colorado and northern New Mexico. Although I have not examined the temporal distribution of obsidian, I believe there is considerable time depth to this pattern extending into Paleoindian periods. For example, Winter (1983:96) reports that artifacts from the Lindenmeier Site near Fort Collins, Colorado, are made of Jemez obsidian. Obsidian from the Tenderfoot Site dates at least back to 6000 B.P. and perhaps to 7650 B.P. These data show contact between Colorado and New Mexico populations and indicate that the prehistoric culture in the Upper Gunnison Basin was not a closed system. Further, the Archaic of northern New Mexico is relevant to that culture.

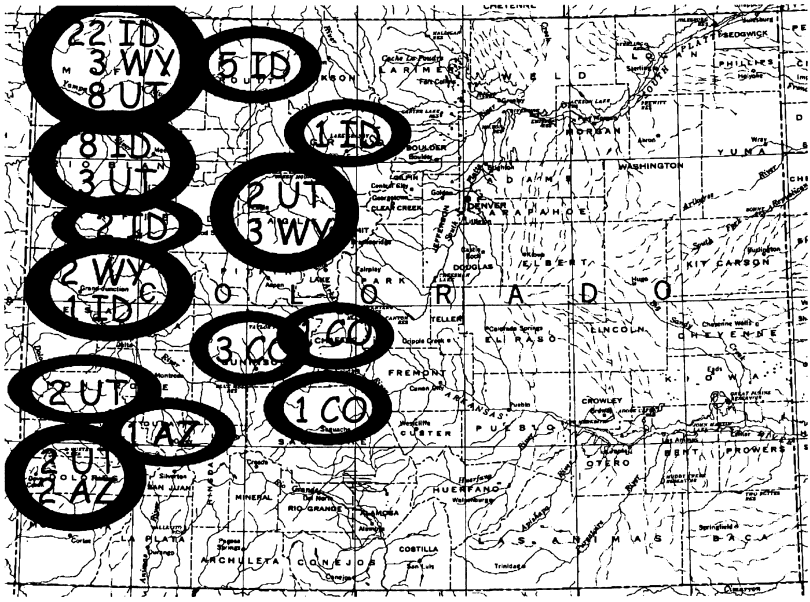

Fig. 10.2. Numbers of obsidian pieces found in Colorado that do not come from New Mexico. Map courtesy Perry-Casteñada Library Map Collection, University of Texas, Austin.

The presence of New Mexico obsidian in central Colorado probably indicates that the prehistoric scale of movement extended from the Gunnison area to the Santa Fe area. This area may seem large, but historic indications of large hunter-gatherer territories are common. For example, in 1776, Escalante encountered youths from Utah Lake in a Ute camp near Paonia, Colorado; although the introduction of the horse had certainly changed the Ute people's lifestyle by 1776, the youths did not have horses and were on foot (Bolton 1972:160–161).

PROJECTILE-POINT STYLES

Many Colorado archaeologists believe that "projectile points are the principle artifact for ordering archaeological assemblages temporally and spatially for culture-historical reconstructions in many areas of Colorado" (Rayne 1998:38). The idea is that points with similar styles were made during restricted time periods or in restricted geographical areas. Point styles were learned. Hence, the closer in time or social proximity that one person or group was to another person or group, and consequently the more that learning was passed on, the more that projectile points will be similar.

This idea does not hold up to scrutiny. Projectile-point styles vary within caches (Cressman 1977:154); projectile-point styles vary within burial assemblages (Lindsay et al. 1968:47). Corner-notched projectile points are found in a range of time periods, as, for example, near rock-lined hearths and near a rock feature

in the north end of the Tenderfoot Site, features whose dates span a wide period. Additionally, Archaic-style fragments are associated with the 7650 B.P. house on the Tenderfoot Site; nearby in an associated windbreak, Archaic- and Paleoindian-style points were found. The windbreak also had associated bison bones.

Similar to the Tenderfoot Site, the Zephyr Site (Indeck and Kihm 1982) contained an early structure (dated to over 8000 B.P.), Paleoindian point fragments, bison bone, and Archaic points. The Gorto Site (Buckmaster and Paquette 1988) produced late Paleoindian points, notched points, a large charcoal stain, and post molds. Mason and Irwin (1960) report a Paleoindian cremation with associated burial goods: Eden and Scottsbluff projectile points, a side-notched point, bifaces, and scrapers. "We believe the evidence is sufficient to warrant considering the side-notched point and the Eden-Scottsbluff quartzite points as contemporaneous and definitely associated in the burial activity recorded at the site" (Mason and Irwin 1960:47–48).

Several sites in the Midwest and East have produced Late Paleoindian– and Archaic-style points in association. Among these sites are the well-reported—Deadman Slough Site in Wisconsin (Meinholz and Kuehn 1996)—and the famous—Hardaway Site, on the Carolina Piedmont (reanalyzed by Daniel 1998). These two open sites were excavated in blocks. Found in single deposits were varied projectile-point styles, including those of different "traditions": Paleoindian and Archaic.

Binford (1979:262–263) also reports that Nunamiut hunters traditionally used at least two different points, one of stone and one of antler. These points might have been used for different prey, but, more important, they were used in different seasons for different kinds of hunting.

Sinopoli reported an ethnoarchaeological study of projectile-point styles in ethnographic collections made in the 1800s in the western United States. She concludes, "this analysis indicates that, rather than leading to an increased similarity, proximity may in fact have contributed to increasing differentiation in certain attributes or artifact categories" and "this finding contradicts the view of stylistic variability in which proximity between groups is assumed to imply similarity between artifacts and vice versa" (Sinopoli 1991:73).

Museum studies of ethnographically collected harpoon projectile weapons likewise concluded that stylistic similarities may not come from social similarities but from adaptations to similar environments. Minor differences within regions may be individual preferences. Mason's comment about application of ethnographic material patterns to archaeological patterns must be seen in the context of his era's view of shallow time depth in the archaeological sequence of North America.

> When it is remembered that every part of this complex apparatus must be most efficacious for its region and quarry, and not bulky, one is not astonished to find a great variety of patterns in the structure and in the knots on the lines. The Eskimo themselves were not agreed on these points. Hence, for example, Murdoch discusses

> the question whether the blade of the toggle head should be in the plane of the line hole or across it. Again, the length of the shaft and other characteristics were, in certain limits, fitted to the hunter. One has only to look through Nelson's plates to be convinced that there was a range of individual choice in many parts. While, therefore, it is correct to say that all harpoons of the different types resemble one another in the same area, it is equally proper to add that no two harpoons are alike.
>
> Besides the lesson in the history of invention which this study affords, other questions arise. What help do these technical specimens offer to the ethnologist and archaeologist in deciding race, language, migrations, and antiquity? Can it be said of a harpoon, or some of its parts, found without label in a collection, that it was made by this or that tribe, or that it came from a certain area? Or, if in a shell heap or village site or grave certain harpoon parts are found, will a comparison with the drawings or descriptions in this paper tell who the makers of these relics might have been? In the first place, if the technical products of peoples now living are to throw light upon ethnic and archaeologic investigations, these products must be collected in large numbers and the identity of those who made and used them must be settled beyond controversy. With reference to precious material gathered after the discovery and scattered in private and public collections, it is safe to label them as to tribe and locality by the help of specimens lately acquired by scientific collectors. In this way the mouths of these dumb witnesses will be opened. It must not be forgotten, however, that unity of race is a matter of blood, of kinship; that unity of speech is a matter of lip and ear, and requires some close contact; while unity of industry is a matter of eye and hand and may be easily communicated from afar. (Mason 1900:303–304)

STONE TOOLS

After analysis of stone tools found in the Upper Gunnison Basin and after review of hafted knives and burial goods in the ethnographic records, I see several categories of artifacts related to the way tools were organized within technology.

Personal Gear

Based on the analysis of burial goods, I argue that knives and projectile points were personal gear. These items are often hafted into a wooden handle or foreshaft; hafting is a further indication of complex technology and curated or maintained tools. Personal gear is curated, and discard of broken or worn pieces often occurs at residences where repairs or maintenance take place. Archaic residences described earlier all had high frequencies of broken bifaces and projectile points.

The repair of broken or worn personal gear may be done prior to and in anticipation of the use of the gear (Binford 1979:269–270). Several tools might

be repaired at once, or repair may occur in stages—steps with intervening periods in which the tools are laid aside and the repairer waits for the right time or materials. The knife blades in the house at Tenderfoot may be indicative of a number of broken tools in staged repair. Likewise, my review of hafted knives showed that many knife handles were found in groups or caches, often without blades, as if the tools were stashed until an opportunity for repair presented itself.

Site Furniture

I believe that ground stone tools, chopper/hammerstones, and cores were site furniture. These tools are often found beside hearths, where they had been abandoned after use. These items are often large and heavy, and some were not broken when abandoned. Most of these tools are not highly shaped or modified; however, they may show heavy use.

Expedient Gear

Many tools were reported as "flake tools." These are flakes that show little evidence of shaping, no evidence of hafting, and some retouch or use along an edge or projection. These tools appear to have been quickly manufactured, used, then discarded.

SEQUENCE OF TECHNOLOGICAL ORGANIZATION

There is a general trend through time of gear found in house structures: decreasing frequencies of bifacial knives and increasing frequencies of flake tools, cores, and perhaps ground stone tools and choppers/hammerstones. This decrease in personal gear and increase in site furniture and expedient technology may also be represented in smaller campsites. Often on multiple-occupation sites, small-camp components show recycling of bifacial knives from earlier occupations. This reorientation of technology seems to be linear; however, I think our sample size is too small to see some changes. Probably important periods of technological changes are 6000 B.P. and 5000 B.P. For instance, at about 6000 B.P., several structural sites' assemblages seem to have high frequencies of site furniture and expedient gear. These sites were not included in this study because their data are not directly comparable to the data I presented here. Future work should remedy this deficiency.

RAW MATERIAL USE

Although quartzite sources are found across the Gunnison Basin, chert sources are restricted in distribution mainly to the edges of the Basin. The use of chert is represented through all time periods, with residential sites showing relatively high frequencies of chert artifacts. I believe that the chert found on residential sites was introduced by work groups returning from camps at the Basin's edges.

Most post-3000 B.P. sites also show relatively high frequencies of chert tools. For instance, at Marion, a late site on which bison bones were found, twenty-two chert tools and thirty-four quartzite tools were recovered. At Pioneer Point, a second late site on which bison bones were found, thirty-four chert tools and 112 quartzite tools were recovered. The frequency of chert tools is very high on these

two sites. The post-3000 B.P. sites were occupied by people coming into the Basin and bringing tools made with raw material from outside areas.

FEATURES

I presented evidence that firepits of different constructions had different burning characteristics. For example, rock-lined firepits give more control over fuel use and heat than do unlined firepits. Such control was probably more important during longer occupations. The debris from stone tool manufacture confirms that more reduction took place near rock-lined hearths than near unlined hearths. The one rock-lined hearth with adjacent low quantities of debitage, found on the south end of Tenderfoot, appeared to be a highly maintained work area; debris had been removed from the area and dumped nearby.

The sequence of features in the Basin shows several important changes through time. Boiling pits have been found on only one site (so far), which is dated between 8800 B.P. and 5800 B.P. Use of big-deep fire-cracked-rock features began about 5800 B.P. and continued until about 3000 B.P. Small fire-cracked-rock-outside features were used for a few hundred years around 3000 B.P. Finally, small-shallow fire-cracked-rock features were used after 3000 B.P. Houses and rock-lined firepits are restricted to between 8000 B.P. and 3000 B.P., and amorphous stains and game drives appear only in the last 3,000 years.

GAME DRIVES IN THE HIGH COUNTRY

To show an approach to interpretation of prehistoric remains that differs from the traditional approach of reconstructing social relationships, I will explore the way in which one set of features—game drives—was integrated into the subsistence organization of past peoples in the Colorado region.

Game-drive systems have been found in various locations in Colorado. Benedict and Olson (1978) and Benedict (1985a) report the famous drives near Rocky Mountain National Park. Hutchinson (1990) describes a game drive near Monarch Pass. Additionally, several structures termed "fortified sites" (Lyons and Johnson 1993) and "eagle traps" are most likely trap or drive systems.

Although game drives are reported, explanations of how the drives were incorporated into prehistoric subsistence systems are scarce. Some ethnographic comparisons are made (Hutchinson 1990:22–25); the Colorado drives are compared mainly to drives in Canada.

Benedict (1985a:84–85) believes that the Canadian Arctic caribou drives are better analogs to Colorado drives than are Plains bison drives. Aspects that he compares include the physical construction of the features and the nature of kill method: "Animals were *drifted* to the kill area—aware of danger, but not seriously alarmed. There was no pell-mell stampede to death in the tradition of the Northwestern Plains bison jump" (Benedict 1985a:85). Benedict states that in Colorado these drive events occurred all summer long, apparently year after year. "Summers in the mountains were spent hunting and gathering wild plant foods, wandering in a general north-south direction along the crest of the Front Range, from drive system to drive system" (Benedict and Olson 1978:136). As

mentioned earlier, the drive systems were interpreted as perhaps being evidence of social relationships between the inhabitants of what is now Colorado and those of the Arctic (Benedict and Olson 1978:172).

These researchers use the traditional approach and assume that the remains of similar structures found on the Continental Divide, the Arctic, the Plains, and the Great Basin represent similar adaptations. I propose that they may not.

To support my proposal, I used ethnographic literature to fit the systems of mass kills and game drives into a picture of annual hunting and multiyear activities. In the process, I learned that ethnographers' inferences had to be carefully considered in the light of their methods, or problems with interpretation would occur. The most obvious problem is that drives and trapping can be staged several times a year, once a year, once every ten years, or only in times of stress, but some ethnographers observed only one segment of seasonal activities, thereby probably missing game drives staged during other segments. More difficult to discern, but certainly more misleading, is an ethnographer's observation of a game drive during short-term fieldwork resulting in the assumption that drives were long-term annual behavior. So, although accounts of game drives are plentiful in the ethnographic record, only the most reliable are described here.

Binford (1978b) describes caribou-drive hunting by the Nunamiut of Alaska, and numerous examples of Arctic drives and pounds are provided by Damas (1984). The important aspect of caribou drives is that they are designed to procure bulk resources for food storage. Because caribou usually migrate into and out of the drive operators' territories and are not available year-round, the caribou meat is dried or frozen for consumption at a later time, thereby allowing people to consume meat even when animals are not available to hunt. Because of the importance of the stored meat, drives are staged until stores are deemed sufficient. (See Spencer 1984:281 for an illustration of a caribou drive.)

Within the Arctic region, caribou drives varied in how they fit into the subsistence system. For instance, Binford (1978b:136) reports an unusual year in which the caribou did not migrate far from the winter residential area of the Nunamiut, and he describes how this conditioned subsistence. Stefánsson (1919:47–59) described caribou game drives as relatively unimportant except as used to acquire food eaten within a short span of time.

A second ethnographic example of drive hunting is a Paiute antelope drive cited by Steward (1938). In this case, men and women met for several days in advance, assigning roles and otherwise organizing the effort. Then, an entire valley was swept for antelope, which were driven into a pound. The killing was done methodically over a period of several days to allow time for proper processing. Although the account did not specify exactly when the kill took place, the observer noted that it was before the snowfall. In all, twenty-four antelope were taken. Steward gives no indication of how many people participated. I submit that the number of people was higher than the number of antelope, because the wing walls of the trap were twenty miles long and people were stationed along them. The Paiutes indicated that the take was a good one; however, they said that

the previous drive had been twelve years earlier, and it would now take several years for the antelope population to recover.

In this situation, it is doubtful that a group of hunters destroyed the major herd of ungulates for an extended period of time unless the group was not dependent upon the animal for subsistence or unless the hunting group had a territory that included minimally twelve such antelope ranges to be used over a period of time. I propose that because of the long recovery times for antelope populations, the Great Basin antelope-procurement system does not indicate dependence on antelope as an overwintering resource.

Why, then, would the antelope drive be staged? I suggest that bulk procurement, such as the antelope drive, provided a way of funding large, temporary human gatherings held for the purpose of exchanging information about overwintering resources. In the vast Great Basin, where extensive territories were exploited by native groups, resources were spottily abundant. By pooling information in the autumn, groups that had been dispersed all summer could have informed each other of conditions everywhere.

One of the more interesting statements Steward makes with regard to drive systems is that communal drives are more common in the drier valleys where the poorer horseless natives live. Although one might expect that it was the relatively low mobility of the horseless hunter-gatherers that necessitated the pooling of information about a large territory, not having the horse apparently was not the important factor in prompting information sharing. Petersen (1977) describes some of the early historical accounts of the multiple-band get-togethers of the Ute, who were horse mounted. The Ute meetings evidently took place slightly earlier than the drive recounted by Steward—in other words, in the late summer or early fall. These multiband get-togethers seem to have been directly related to information pooling. People came together from all points of the compass, and gossiping was one of the main activities.

The bison-pounding systems of the Great Plains, although very similar in physical form and operation to the Great Basin antelope system, certainly had a different role within the cultural system. Some of Kehoe's (1973) comments on the documented historical observations are of particular interest, as are those by Arthur (1978) and Schaefer (1978). Specifically, the amount of planning that preceded the hunting season was staggering. For weeks before the communal hunt took place, prohibitions against individual hunting were enforced. The actual killing of bison within a pound was accomplished (in direct contrast to the Paiute antelope pound) with a fervor. Arrows were shot into the mass of bison in a shotgun fashion.

Kehoe (1973:175–176) suggests that bison pounding is analogous to the operation of a modern whaling factory ship. He described the pounding group as a total functional unit moving across the Plains and processing the bison as they killed them. The whaling-ship analogy also describes, I think accurately, the bison as an unearned resource. As Kehoe points out, bison pounding became a commercial venture early in Plains history, with the meat being sold to the military. The major difference between commercial and subsistence pounding was

solely the number of times the pounding was done in a year. This ability to intensify the pounding effort is similar to that of the Arctic game-drive examples.

Procurement of bulk resources is usually associated either with attempting to extend time utility of a resource or with feeding a large group of people for a short time. Examples of the former are the practices of middle- to high-latitude groups of the New World. The latter type of mass kill is represented by the tropical Birhor monkey drives (Sinha 1988:376–377) and the Australian fire drives (Hart and Pilling 1961:41–42), although facilities are not built for either. It appears that the Paiute example already discussed and the various rabbit drives and fire drives of California and the western U.S. desert are New World examples of the latter type.

These differing drive systems reflect two differing environmental situations and two differing exploitation systems. The Plains bison pounds and the northern caribou migration exploitation are utilization of unearned resources not unlike marine or anadromous fish exploitation. On the other hand, the Great Basin antelope system is the exploitation of patchy resources, requiring extensive territories. This system, to follow the aquatic analogy, is like harvesting fish from a series of small ponds—when one pond is emptied, the next pond is exploited.

Some interpretations of Western archaeological sites might change if viewed from the ethnographic perspective presented here. For example, the Eden-Farson Site, in the Green River Basin, is a late prehistoric or protohistoric camp site that was probably associated with a game-drive system. Twelve lodges were present along with the remains of at least 212 antelope. This site probably represents a single episode of occupation (Frison 1971). Frison draws on ethnographic accounts of Great Basin antelope hunts and concludes that the activities at the site resembled "a Great Basin oriented pattern rather than that of the Plains farther to the east" (Frison 1971:258). However, the Green River Basin is a huge contiguous area, unlike the smaller valleys described in the Great Basin accounts. This environmental situation, as well as the number of antelope per lodge and the fact that the hunt took place in the fall, indicates that Eden-Farson represents a hunt for overwintering supplies. Thus, in an area the size of the Green River Basin, it is expected that game drives functioned within the cultural system more as the Plains bison hunts did, rather than as the Great Basin antelope hunts did.

Another example of an interpretation benefiting from an ethnographic perspective is the view of adaptation to population packing. Whether packing occurred in the Great Plains because of population increase or environmental degradation, it appears that the bison hunters responded to the situation by intensification of bison exploitation. As Kehoe (1973) mentioned, intensification (for market hunting) was done at European contact by increasing the number of hunts per year. However, it is obvious that in the Great Basin situation, increasing the number or frequency of drives would have been futile. In this respect, the Plains system, again, resembles one based on marine resources. The prospect of intensification gives new perspective on the nearly contemporaneous initiation of Basketmaker and Besant "cultures"—two intensified subsistence systems, one based on agriculture, the other on intense, efficient bison pounding.

The game-drive sites of Benedict and Hutchinson appear to better follow the pattern of Great Basin hunting than the patterns of the Arctic or Plains. The catchments for these systems are similar to those of the Paiute antelope example. Many of the drive systems described by Benedict and Hutchinson are located on passes among the headwaters areas of major rivers or drainage systems—this is no coincidence if such drive systems funded gatherings and served as corroboree locations where information about different territories was exchanged. I surmise that game-drive systems, whose purpose was to fund gatherings of bands of hunters and gatherers, were more common during periods of environmental degradation.

I am not arguing that the Arapaho, Hungry Whistler, and Monarch game drives represent peoples or cultures derived from a Great Basin source, and I am not suggesting that the early drives in the Colorado mountains indicate the diffusion of ideas or migration of peoples from the Colorado mountains to the Great Basin or elsewhere. I do believe that understanding peoples' adaptations to environment constitutes a valid anthropological goal, one that would give us more useful information than establishing diffusions or migrations.

Many different kinds of game-drive systems are described in the ethnographic record. Pointing to just one or two ethnographic accounts and assuming that they are reflected in an archaeological record fails to fully employ the value of ethnography. Many variables condition how a drive might fit into subsistence, such as the prey's seasonal availability (and nonavailability) and the impact of bulk procurement on it. Other variables have to do with the territoriality and other behaviors of the prey species; in comparing caribou, elk, and mountain sheep as prey species, one will detect some important differences. For example, the migratory caribou herds of the Brooks Range (Binford 1978:172) move rapidly through mountain passes. The herds range in numbers "from around 100 up to 1000 animals. Intervals between herds vary. Sometimes 20 minute[s] elapses between herds; sometimes as much as a day goes by before another herd is sighted." This migration lasts for about twenty days through the mountain passes. The migration patterns of the elk or bighorn of Colorado are vastly different; elk and mountain sheep winter at lower elevations.

These low-elevation winter ranges are near Benedict's hypothetical winter base camps on the Front Range. One can only wonder why winter bulk procurement was not done using these winter camps as bases. Also, why did the prehistoric folks on the Front Range bother to go to the Continental Divide for winter meat supplies when bison were available to the east? Benedict (1996:xiii) describes the settings in which high-elevation game drives are found in Colorado, as well as similar settings in which they are absent. We must conduct research to determine which factors are conditioning the presence and absence of drives in high-elevation Colorado.

FLORA AND FAUNA

Plant and animal remains indicate that prehistoric people used a broad range of species, including some not found in the Basin today. Perhaps most important was the piñon pine, which has been reestablishing its population in the Basin in

Table 10.1—The Yarmony model of site types.

Site Type	*Architecture*	*Flaked Lithic Items*	*Tools*	*Ground Stone*
Summer base camp	Absent	Dense	Diverse	Plenty
Short-term camp	Sometimes	Low density	Varied	Some
Winter base camp	Present	Dense	Diverse	Plenty
Specialized	—	—	—	—

the last fifty years. Several species show restricted periods during which they were used. Some of the temporal patterning of the rarer species may be due to the limited nature of the sample.

Large mammal scapulae and pelvises in the Basin are limited in distribution to late sites and one unique early processing site. These axial faunal elements might have been brought to the sites to feed the hunters seeking other prey.

EXPLANATION OF THE CULTURAL SEQUENCE

A common problem with archaeological models is that they don't tell us anything except how the constructor accounts for variability in the record. Some models can account for all data, but they don't allow testing of their accuracy.

For instance, the Metcalf and Black (1991:201–221) Yarmony-centered model of Archaic settlement and subsistence at first appears to be informative, but upon dissection, the interpretive conventions used to account for all archaeological sites are shown to be simplistic. This model divides sites into several types based on artifacts and features found. Table 10.1 is my description of these site types and their recognition criteria.

These criteria are architecture (presence/absence and type), density of artifacts, diversity of tool kit, and presence of ground stone tools. According to the model, the density of lithic items on a site gives an indication of how long a site was occupied. The tool types found indicate activities—hunting tools indicate hunting, ground stone indicates plant processing, many varied tools indicate many varied activities. Short-term camps may be hunting camps or plant processing sites. Specialized sites include quarries and game drives.

The location of a site gives clues to the season of use. High-elevation sites were used during warm seasons; low-elevation sites were used during cold seasons. Also, Metcalf and Black's (1991:218) judgement of how substantial or complex a structure was can inform them during which season and for how long a site was occupied.

The Yarmony model accommodates all sites; therefore, it tells us little. No archaeological site that we could investigate would contradict the model. If we use the model to explain a prehistoric site, the site will automatically fit the explanation. However, if the Yarmony model were used to explain an ethnographic mountain group, would it help us understand the past? If, for instance, we examine the Owens Valley Paiute, we find that small winter villages were located in higher elevations when the nut harvest was good (Steward 1933:239); in bad years larger, more substantial houses were built in the valleys (Stewart 1933:264).

Here are some facts that would not fit the interpretations of the model, yet without the ethnographic knowledge, we would not know that the Yarmony model floundered. Models must be testable.

With this criticism of modeling expressed, I now propose the following regional model or sketch. I attempt to accommodate the facts, but I also provide testable generalizations and interpretations. I can guarantee that there are errors of fact and interpretation in my reconstruction. However, I think it is more important to attempt an understanding of these data through various speculative ideas than to wait for all the data to be described.

The Early Paleoindian

I have not yet discussed it, but fluted points have been found in the region; some are in private collections. A few Early Paleoindian sites have been cursorily examined by archaeologists. It is probable that a number of these sites are unrecognized as such, because no projectile points were left behind after abandonment. Early Paleoindian sites are mainly located on high points and near springs. With so few data, I can guess only that Early Paleoindian hunters might have moved their residences from kill to kill. There does not seem to be a lot of variation in the Early Paleoindian sites, but with no excavations, this is speculation, and data are needed.

The Late Paleoindian

Our information about the Late Paleoindian period is decidedly better. Sites such as Tenderfoot, Kezar Basin, and Zephyr afford us a look into activities. House structures are present. These residential structures were probably occupied in winter. Activities in the house included food processing and consumption (evidenced by ground stone and bone fragments), tool maintenance (broken stone tools), and clothing or basket making or repair (bone awl). Subsistence included bulk-resource procurement and food storage. Bison were taken, as well as other large game animals.

Technological organization emphasized maintained bifacial tools. Projectile points included Late Paleoindian point styles and Archaic styles. Flake tools are relatively uncommon. Projectile points might have been used for a number of purposes other than as weapon tips. Use-wear analysis may be employed to examine whether bifacial tools were used for a variety of tasks or whether Late Paleoindian assemblages are innately depauperate in varied stone tools.

Nonresidential sites include a processing site with stone-boiling pits—Kezar Basin. This site was used and reused over several thousand years. Because this site is presently unique, it is important to fund and study other redundantly used sites. We don't know if this reuse is characteristic of the adaptation because of topography, environmental conditions, or technology.

Environmental shifts toward increasing seasonality probably were occurring at this time. It is expected that an increase in reliance on stored foods would have occurred, under certain conditions, during change from an equable to a seasonal environment. By at least 8000 B.P., the Upper Gunnison Basin had a piñon-

juniper ecosystem. Although we do not know that piñon nuts were being collected and consumed this early, the ground stone tools and storage pits suggest the bulk procurement and processing of some plant food. I suspect that bulk-procured plant food was replacing bulk-procured animal food in importance in subsistence.

The Archaic

The Altithermal, a climatic period of relative warmth and dryness or perhaps high seasonality, begins toward the end of the Paleoindian period and reaches a height around 6000 B.P. Several schemes and environmental sequences for the Altithermal have been proposed; these proposals vary in details, and they have yet to be agreed upon by all researchers. The supposed environmental changes of the Altithermal are theoretically important.

It is a simple geographical fact that land area decreases as elevation increases. When climatic conditions drive a life zone higher in elevation, that life zone will occupy a smaller area. A species or culture dependent on that life zone must get by with a smaller territory—adaptational pressure will occur during warm, dry periods.

A response to adaptational pressures appears in the Basin's archaeological record at about 6000 B.P. Stone boiling ceased at Kezar Basin Site. Slab-lined hearths of various types (often in pairs) appear across the Basin, representing activities of increasing variety. Assemblages begin to differ in frequencies and to increase in variety; these assemblages include faunal remains, stone tools, and some ground stone. Big-deep fire-cracked-rock features appear. Diversity in faunal and floral remains increases.

Residential sites do occur during this period, but there is a preponderance of nonresidential sites; this may reflect more use of specialized-function sites. There is an increase in the number of flake tools and the amount of site furniture. The best information on residential sites of this time period comes from the Yarmony Site, outside the Basin proper. If Yarmony can be taken as indicative of residential sites in the entire region during this period, such sites will show evidence of substantial architecture.

I believe that the height of the Altithermal is marked by increased length of occupancy in winter residential sites, increased dependence on stored foods, and increased variability in short-term camps. During this time, the lithic technology becomes more oriented toward expedient flake tools and site furniture.

A notable environmental event occurred about 5000 B.P. We don't know exactly what happened, but a brief period of cooler, wetter, or less seasonal climate might have transpired. This period is sparely represented in the archaeological record in the Upper Gunnison Basin. Only a few features, with few associated artifacts, are dated to this time. Within the larger region, however, the period is represented. The house at Site LA47940, near Abiquiu, New Mexico, is dated to about 5000 B.P., and is described as odd in content and arrangement as compared to other structures. We do not know whether or not the Abiquiu site is reflective of the whole region; however, we do know that the site indicates a period of high mobility and, thus, of ephemeral remains.

The environmental event appears to have ended by about 4500 B.P., with conditions returning almost to those of Altithermal conditions. In the Basin, many sites appear that indicate the resultant cultural adaptation. Although some features and artifacts seem to be similar to materials that date to before 5000 B.P., there are important differences. Highly diverse residential sites appear after 4500 B.P. Substantial houses are found, some with cribbed construction. Deep trash deposits indicate long residential use of some locations. Posthole patterns and trash dumps indicate an increase in more-ephemeral houses, but site maintenance continues. Some sites with structural remains have sparse artifact assemblages. A few fire-cracked-rock features are found, and a change in their size and rock-dispersal pattern occurs. There is a high frequency of flake tools and site furniture in the recovered artifact assemblages. Some of the faunal assemblages include a number of small animals.

That this period was one of stress or change is evidenced in the larger region. In the Grand Canyon, Emslie and others (1995) found split-twig figurines with radiocarbon dates ranging from 4390 B.P. to 3100 B.P. These had been placed under cairns in caves, some of which were accessible only at great risk of personal injury or death. The authors suggest that rituals account for their placement.

Regional environmental conditions change again about 3000 B.P. In the Basin, piñon pine becomes extirpated. Lodgepole pine expands its range within the Basin at this time, according to pollen and macrofossil evidence. With this environmental change, a drastic shift in the use of the Basin occurs.

Post-3000 B.P.

After 3000 B.P., prehistoric use of the Basin is made by people whose residential bases are outside the Basin. Hunters come into the Basin and take bison. Small, temporary structures are constructed at some camps. At some ephemeral camps, small-shallow fire-cracked-rock features are built and used, but no artifacts are deposited. At a few other ephemeral camps, some artifacts are used, but rarely is a large number of artifacts made and deposited.

The use of the Gunnison Basin during this time is not representative of cultural adaptation in the larger region. The last 3,000 years of environmental history is different in the Basin than in the region as a whole, because of the Basin's unique topography. Outside the Basin, evidence shows an increase in residential sites after about 3000 B.P. Substantial houses dating to this time are found at the Abiquiu sites, Casa de Nada, and Kewclaw. These sites are all at lower elevations and are farther away from the mountains than are sites in the Upper Gunnison Basin. All continue the earlier trend of frequent use of flake tools and site furniture.

In southern Arizona, San Pedro farming villages appear about this time (Huckell 1995). The beginning of farming far to the south coincident with the adaptational changes in the Upper Gunnison Basin suggests that large-scale environmental changes were occurring. It took about 700 to 800 years for corn farming to move from southern Arizona into western Colorado. Corn farming was taking place 150 kilometers west of the Gunnison Basin, on the Uncompahgre

Table 10.2—Radiocarbon dates on corn from Uncompahgre Plateau sites—dates corrected for isotopic fractionation.

Site	*Age*	*Lab Number*
Cottonwood Cave	2220±80 B.P.	Beta-36438
Tabeguache Cave	2060±60 B.P.	Beta-76546
Tabeguache Cave II	1430±60 B.P.	Beta-76547
Dolores Cave	360±60 B.P.	Beta-76548

Plateau, about 2200 B.P. Tabeguache Cave and Cottonwood Cave (Tables 10.2 and 10.3) show early corn farming in the area at least a few hundred years B.C.E. The earliest Basketmaker houses bear a remarkable likeness to the earlier Archaic structures. That farming remained part of the regional adaptation after the Fremont and Pueblo abandonment of the Four Corners region is evidenced by dated corn. Whether the technology and other aspects resembled those of the Archaic is not known.

Limited evidence found at the edges of the Gunnison Basin shows that game-drive systems begin to be used here about 1400 B.P. Benedict (1996:59) notes periods of intense use of high-elevation game drives farther north in Rocky Mountain National Park, as follows: "Frequency maxima are centered at 4860 cal B.P. (Middle Archaic), 2750 cal B.P. (Late Archaic), 1480 cal B.P. (Late Archaic), 1140 cal B.P. (Late Prehistoric), 830 cal B.P. (Late Prehistoric), and 290 cal B.P. (Protohistoric)."

Decalibrated, these maxima fall at about 4310 B.P., 2620 B.P., 1575 B.P., 1230 B.P., 880 B.P., and 220 B.P. The last four maxima fall during or after the time period that the Anasazi were farming in the southwest corner of Colorado and the Uncompahgre area. In the first chapter, I suggested that high-elevation game drives were indications of hunter-gatherers under stress. The last 1,400 to 1,500 years in the region from Rocky Mountain National Park to the southwest corner of the state show hunter-gatherers stressed and turning to farming or corroboree hunting. Benedict's data suggest that other periods of stress are found at about 4300 B.P. and 2600 B.P. These are times when substantial structures were constructed at Site 5GN205, and at Dolores, Abiquiu, and Battlement Mesa. Habitations were constructed at Tenderfoot at 7650 B.P. and at Yarmony and other Upper Gunnison Basin sites at about 6200 B.P. to 6000 B.P. Benedict's data, again, reflect that these were stressful periods for prehistoric hunter-gatherers.

> Until the evidence from this site can be proven to be of cultural origin, the strongest evidence for Paleoindian game-drive hunting in the region is a date of 7650±190 B.P. (I–3266) for charcoal from a basin hearth at site 5BL70, on the east flank of Mount Albion (Benedict and Olson, 1978). The site . . . is interpreted as a butchering station where animals killed by game-drive hunters were taken for processing. . . . The oldest unequivocal evidence for use of a drive structure in the Indian Peaks is a date of 6175±65 B.P. (Benedict 1996:6)

Table 10.3—Dendrochronological dates from Tabeguache Cave. Dates from unpublished research by John Gooding, notes on file at the C. T. Hurst Museum.

Hurst Specimen #	*Tree Ring Lab #*	*Inside-Outside Dating*	*Species*
CT Hurst 3991	TAB-15	(–)0269 p –(–)0101v	juniper
CT Hurst 3983	TAB-12	(–)0255 p –(–)0048v	juniper
CT Hurst 3993	TAB-2	(–)0215 p –(–)0028vv	juniper
CT Hurst 3995	TAB-3	(–)0200 –(–)0012vv	juniper
CT Hurst 3989	TAB-1	(–)0135 p –(–)0004rLG	juniper
CT Hurst 3985	TAB-14	(–)0226 p –(–)0002+v	piñon
CT Hurst 3992	TAB-16	(–)0261 p –(–)0000+v	juniper
CT Hurst 4418, 4694	TAB-17	(–)0212 p –(–)0000+v	juniper

From the Late Paleoindian period on, the hunter-gatherers in the mountains lived through environmental fluctuations that altered the carrying capacity of the region. During periods of reduced carrying capacity, residential mobility was reduced and more substantial structures were constructed. Perhaps in response to this restricted mobility, alternative strategies were used to increase a given subsistence payoff. Game-drive systems and farming both involve a harvest of bulk resources during which processing is necessary in order to increase either the length of time the resource will last or the number of people it will feed. We do not yet know whether such harvests were used for survival or to fund corroborees for information sharing. Perhaps farming began as a low-elevation analog of high-mountain game drives and later became a necessary subsistence technique.

When mobility was reduced, technology was oriented more and more toward expedient flake tools and special-use sites. It remains to be seen whether these expedient flake tools were, in fact, embedded in more curated, more highly organized technologies. That is, the simple flake tools may have been haftable, and, if hafted, would have been specific-function tools. Tools and sites become more specialized in function as the need for increased production—efficiency—rises. This efficiency may be attained at the expense of security and flexibility.

The sequence I have sketched here places importance on past environmental changes. This scheme of cultural development does not suppose the social relationships of past people, and it does not suggest that movements of a group with newly invented technology caused changes in the archaeological record. It does posit that culture is a system of adaptation to environment.

Environmental changes, especially in regions like western Colorado, create pressures and vacuums. Culture changes across a large area occurred in response to these environmental changes. Although this study has focused on the Upper Gunnison Basin, similar cultural responses appeared close to the same time in New Mexico and northern Colorado. Patterns of cultural change that occur in such a large geographical area are important.

In fact, the cultural and ecological changes of the last 10,000 years in the Gunnison Basin are related to larger-scale evolutionary trends. Data from Larson (1997), Stiger (1986), and this volume are plotted in Figure 10.3, and illustrate residential sites in a larger region—southern Wyoming, Idaho, western Colorado,

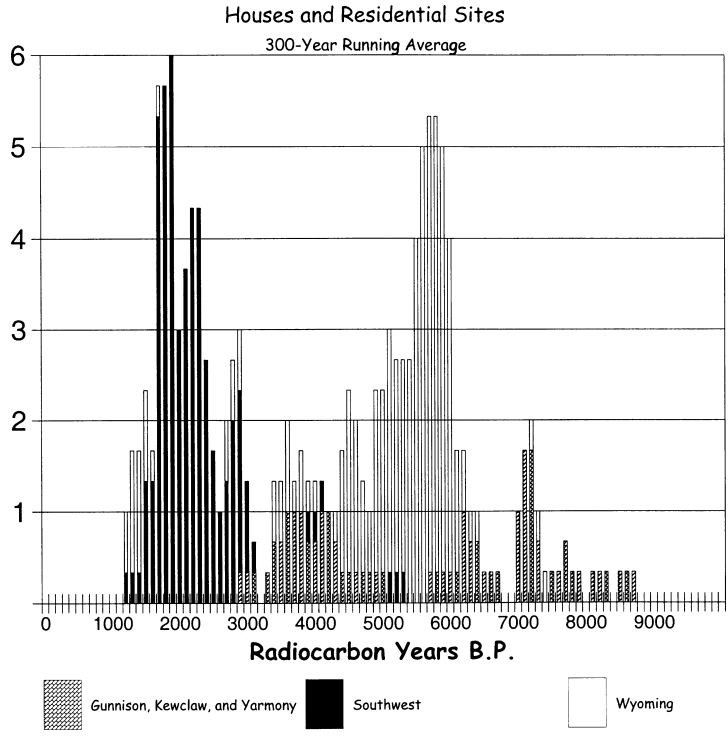

Fig 10.3. Temporal distribution of prehistoric houses in southern Wyoming, Colorado, and northern New Mexico. Data from Larson (1997) and Stiger (1986).

New Mexico, Utah, and Arizona. Given that the Gunnison Basin is an area smaller than the Southwest or southern Wyoming (hence less represented in numbers), there is, in the geographical distribution of houses in the region, a north to south trend from 7000 B.P. to the Formative period.

Notable periods of few houses include those immediately after 7000 B.P. and 3000 B.P. These two periods precede changes in "traditions" in the sequences of the western United States. These changes mark the end of the Paleoindian and the end of the Archaic.

It is important to note that none of the areas in the region is totally unrepresented in any major time period. It would be a mistake to interpret Figure 10.3 as indicating abandonment of any one area. Although it might be tempting to interpret Figure 10.3 as evidence of migration, I think these data show changing patterns of land use in a large-scale region. The information on technological change in these widespread sites is waiting to be used in comparisons. Also awaiting is the explanation of the southward movement of relative sedentism and its collision with the northward movement of food production.

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