ABORIGINAL EXPLOITATION OF PRONGHORN IN THE GREAT BASIN

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ABSTRACT.—Ethnographic, historic, and archaeological data concerning pronghom exploitation in the Great Basin are presented in a framework that allows for a revision of prevailing models concerning this activity. It is proposed that various ethnographic and historic accounts do not accurately reflect the prehistoric contexts of pronghom exploitation. Exception is taken with the Pendleton and Thomas (1983) model, which proposes that the use of permanent, labor-intensive drive structures diminishes through time in the Great Basin.

INTRODUCTION

The American pronghorn (Antilocapra americana), distinctive in both its evolution and behavior, was an important source of food and clothing for Indian peoples of central and western North America. Many ethnographic and historic sources mention both the ceremonial preparation for, and the actual hunting of pronghorn; and pronghorn remains are present in the faunal assemblages of numerous Great Basin sites. In spite of this, archaeological data concerning the exploitation of pronghorn by aboriginal groups in the Great Basin has not been synthesized with ethnographic data on the pronghorn. A revision of several prevailing concepts concerning pronghorn hunting that appear in the literature, and which have apparently been accepted by many North American anthropologists in lieu of a critical examination of the available data, is suggested. Various models concerning this important economic and social activity appear to be based largely on both post-contact- and negative data, and probably are not applicable to the pre-contact practice of pronghorn exploitation.

EVOLUTION AND ETHOLOGY

Based on the geological contexts of fossil specimens, it has been estimated that several genera of antilocaprids have existed in North America since the middle Eocene (ca. 17-70 million years B.P.), and apparently their ranges were restricted to west of the Mississippi River in post-mid Pliocene times (Einarsen 1948:1-2; Webb 1973:203). The pronghorn is the only living representative of the bovid subfamily Antilocapridae (Kitchen and O'Gara 1982:960), as pre-European pronghorn populations are estimated at 30-40 million individuals [Cahalane 1947:69; Yoakum 1978:103], and are believed to have occupied a large portion of western North America (Fig. 1). Fossil evidence suggests that many genera were present during the Pleistocene (Yoakum 1978:103, Kitchen and O'Gara 1982:960), and that the present population is the sole survivor of one genus.



FIG. 1—Geographic distribution of post mid-Pliocene Antilocapra americana. (Taken from S. D. Webb, 1973)

The behavior of pronghorns is a central issue here, as several predictable reactions were effectively utilized by aboriginal hunters in the capture strategies that were applied to this animal. In general, pronghorn do not follow any set pattern of migration, as do other animals such as the caribou (*Rangifer tarandus*). Einarsen (1948:11-12) stated that "... [pronghorn] may change feeding grounds several times within the year, but their drift from one range to another is not usually a long trek, lacks rhythm, and will often be northward as southward in winter". This means that they could not be hunted by planning where they would be at any point in time, but instead could be profitably hunted by opportunistic groups, usually during the fall and winter, when they come together in large herds. From southeastern Oregon, Einarsen (1948:41-42) reported that "On Drake's Flat in [the winter of] 1941, a band of nearly 1,000 animals was using only about 10 sections of land."

Gregarious by nature, pronghorn were ideal targets for large scale hunts, a hunting strategy possible, but not necessarily always practiced, throughout the Great Basin as well as portions of central and eastern California. Kroeber (1925:528) stated that Yokuts in the San Joaquin Valley of California hunted herds of pronghorn that numbered in the thousands. It has been reported that communal drives reduced local pronghorn populations to such an extent that at least several years were required to restore the herds to a sufficient size before a large drive could be held (Egan 1917; Steward 1938; Shimkin 1947). It seems that the concept of large scale hunts has been taken from one or two accounts of post-contact pronghorn drives among the Gosiute Shoshone (Egan 1917:240) and applied to the entire Great Basin. A principal objective of this paper is to present evidence supporting the view that pronghorn were plentiful in the Great Basin in precontact times and hunted in all seasons, in both individual and communal contexts (Murphy and Murphy 1960:308; Kelly 1964:50).

Another behavioral trait of pronghorns which helped hunters to more easily drive and corner them is that when confronted by fences and walls, instead of leaping over them, they prefer to either crawl under or through them, or to run along the barrier until it ends. This characteristic was an important factor in the success of Indian peoples when driving herds into wing traps and corrals, as they did not have to construct tall barriers or utilize exceptionally strong materials for such devices.

Although extremely fast, pronghorn have a habit of running at top speed until they are out of sight of whatever scared them, but then seem to forget about what they were fleeing from, and quickly settle down to graze. Consequently, a single hunter could successfully stalk them (Frison 1978:252).

ABORIGINAL HUNTING METHODS

Ethnographic literature indicates that all Numic-speaking groups of the Great Basin exploited the pronghorn often and in various ways. Kelly (1932:83) reported that the Surprise Valley Paiute held communal drives in fall as well as winter. Another season is added to this pattern by Lowie (1924:304), who stated that "Early in the spring, when the ground was muddy and someone had seen a big [pronghorn] herd, the Indians [Northern Paiute] would gather for the communal chase." Steward (1941:220) reported that various Nevada Shoshone peoples hunted pronghorn in both spring and fall. Furthermore, Murphy and Murphy (1960:308) stated that several Northern Shoshone groups, such as the Bannock and Lemhi, would pursue pronghorn whenever possible on an individual basis, in addition to large, formally planned drives in fall and winter. In her ethnography of the Southern Paiute, Kelly [1964:50] maintained that in the area occupied by the Kaibab, pronghorn could be hunted "any season of year".

In addition to occupying the plains and grasslands of the Great Basin, pronghorn also ranged throughout the eastern Sierran foothills, as they were hunted by the Washo (Curtis 1926:171-172), Mono Basin Paiute (Curtis 1926:167), Owens Valley Paiute (Steward 1933:253), Panamint Shoshone (Steward 1938:72, 233), Kitanemuk (Harrington 1942:6), and Kawaiisu (Vogelin 1938:13).

Shamanism.—Pronghorn hunting methods of historic Great Basin groups were considerably more elaborate than those employed for deer (Odocoileus spp.). The majority of Numic-speaking peoples relied on pronghorn shamans to charm the animals, capture their souls, and lure them into corrals made of wood (usually juniper) and sagebrush (Steward 1941). Pronghorn "charming" was widespread among the Northern Paiute (Lowie 1924:302-303; Stewart 1941:423; Riddell 1960a:40), Nevada Shoshone (Steward 1941:219), and some Northern Shoshone bands (Steward 1938:34).

Only a minority of Great Basin groups hunted pronghorn without the aid of a shaman. Some of the mounted Shoshone bands, such as the Bannock, Snake River, and Lemhi, did not practice charming, because they did not use corrals (Murphy and Murphy 1960:308). Instead, they secured pronghorn by surrounding herds on horseback and running them in circular relays until the animals dropped from exhaustion (Steward 1943:266). Kelly (1964:50) reported that most Southern Paiute groups did not rely on charming, as they also did not use corrals. The use of shamans seems to have occurred among groups that practiced large communal drives via corrals, and who did not use horses extensively. These ceremonial specialists acted as psychological aids for pronghorn drives, as they supposedly disoriented the animals, and caused them to enter the corrals. The charming of pronghorn required from three to five days, depending upon the particular group, and involved dancing, smoking, chanting, singing, and symbolic slaying of pronghorn (Hopkins 1883:55-57).

Individual hunting.—A lone hunter equipped with bow and arrow would often wear a pronghorn skin and head in order to approach a herd of pronghorn. The head would be that of a male, so the hunter could portray a lone buck approaching the herd. This practice occurred in all major areas of the Great Basin, being utilized by various Northern Paiute (Lowie 1924:197), Gosiute (Steward 1943:294; 1941:220), Ute (Kelly 1932:82-83; Stewart 1942:241), and Southern Paiute bands (Kelly 1964:50). In her 1932 ethnography of the Surprise Valley (northeastern California) Paiute, Kelly (1932:82-83) provided an excellent description of the way in which this animal was hunted individually.

The hunter wore an antelope head with horns attached, and also a hide body disguise. The latter was not necessary for deer stalking, but was required for the more alert antelope. The hunter carried white paint in a sack, and when he approached the animals he smeared it on his face and arms and on his body and legs below the hide covering. He carried a stick about the length of the antelope's leg as an aid in walking and gradually got within shooting range by imitating the movements of the animal, pawing the ground and simulating grazing in order to make the deception realistic.

Other techniques of individual pronghorn hunting involved hiding in ditches and behind shrubs next to springs and game trails, from where a marksman could effectively ambush these animals (Steward 1941:272; 1943:360).

Mounted hunting.—A method of taking pronghorn that is intermediate between individual and communal strategies in terms of the number of people required was to use horses in relays to run down and tire the animals. This method was mostly used by Northern Shoshone groups which had adopted the horse. This was obviously a late development, and usually required between six and twelve riders to encircle the pronghorn and run them. This actually was the least productive mode of pronghorn hunting, as numerous horsemen might work a small herd all day and catch only a few animals. In his ethnography on the Northern Shoshone, Lowie [1909:185] observed that "It would sometimes take forty or fifty hunters half a day to kill two or three antelopes by this method."

Although not the most effective technique, running down the speedy pronghorm on horseback was a popular activity for certain Great Basin-Plateau peoples, as the Bannock, Snake River, Wind River, and Lemhi Shoshone all practiced this technique in historic times (Shimkin 1947:268; Murphy and Murphy 1960:308-310).

Surround method.—Formal groups would sometimes gather to surround a large herd of pronghorn, and many could be caught by participants gradually closing the human circle in on the quarry (Vogelin 1938:13; Shimkin 1947:268). Dogs were also used to help drive pronghorn towards archers hidden among rock outcrops or shrubs (Lowie 1909:185; Steward 1941:367).

Drive fences and corrals.—Drive fences and V-wings seem to have been the constructions most often used to secure pronghorn. They may also represent forms that preceded the corral, as they are of a simpler design and allow some animals to escape. It is possible that the corral was incorporated into the V-wing and drive fence at a later time.

The most basic drive fences were either rock or sagebrush alignments with a gap in the center. Drivers on foot would herd the pronghorn in the general direction of the fence, where archers would be hiding in blinds along the passageway. The animals would usually head for the opening, and could be shot as they passed through (Kelly 1964:50).

Some Southern Paiute groups evidently constructed parallel rock alighments which formed a type of gauntlet, with rock blinds being staggered on both sides every 60 m or so [Kelly 1943:32]. The animals were driven through these channels and shot by hunters stationed in the blinds.

V-wings were implemented by practically all Numic-speaking peoples; even those with horses are reported to have built them. These traps could be erected by simply pulling up sagebrush in the appropriate formation, after which the quarry was driven between the arms, towards hunters concealed near the bottleneck (Chamberlin 1911:335-336). The arms of these V-wings were usually separated by a great distance at the mouth, as this ranged anywhere from one to ten km, and would gradually funnel down from there. Many bands held drives in early spring, when the ground was muddy and footing poor for the pronghorn (Lowie 1924:304). It was also common for the sagebrush wings to be set afire, presumably increasing confusion and preventing the animals from doubling back (Lowie 1924:304, Steward 1941:219; Stewart 1941:367).

Corrals are reported to have been widely used, and this may be because this method was a relatively late development, and therefore, still fresh in the minds of many informants. The corral was certainly a superior method in terms of maximizing results, for if everybody did his job correctly, an entire herd could be trapped.

Corral traps were usually constructed with long drive fences or V-wings leading to them (Fig. 2), and tended to be placed in areas where there was either a rolling and/or shrubby topography (Egan 1917:239), as this served to hide the corral from a distance.

The use of corral traps has been reported throughout the Great Basin. These structures were usually considered to be the property of the group or groups that built them, as they were often maintained and repaired from year to year (Steward 1938:175). This would seem to indicate that in the recent past, annual drives were held by various Great Basin groups. Corrals were often built by establishing a wide ring of juniper posts

and rocks, with sagebrush being incorporated to give the barrier a solid appearance (Fig. 3). Adequate corrals could also be constructed by joining together strands of sagebrush bark rope and arranging the rope in a circle, hanging it from sagebrush (Stewart 1941:422; Riddell 960a:40).



FIG. 2—Aerial view of historic V-wing trap (#3) in Mono Basin, California. Live juniper trees are incorporated into west wing (which runs for 600 meters) at top center, east wing is located at left foreground, and corral is situated in mouth of seasonal wash, at right middle. Photo: Eric J. Levy

Egan (1917) recorded an account of a pronghorn drive in which he participated in the late-1800s with a Deep Creek Gosiute band. This narrative is highly informative, and provides a vivid picture of what these drives were like.

For a few days before I came the squaws and bucks were busy repairing and extending the flanking arms of the old corral, or trap pen, which was located near the north end of antelope valley and about twenty miles northwest of Deep Creek ... After they had all come in from their work a great deal of talking and planning was on and each knew just what part and place he or she was to take ... They were to spread apart across the valley, travel in open order back to the north, being careful that not one of the antelope jumped would run, except in a northerly direction ... The arms or leads are started at the extreme ends by simply prying or pulling up a large sagebrush and standing its roots up on the top of another brush, thus making a tall, black object visible for miles ... There were many turns to the lane thus formed, but were getting narrower and stronger till finally, around a sharp turn through a large, thick bunch of cedars, the game were in the corral, which was about two hundred feet in diameter ... The pine and cedar trees had not been removed



FIG. 3—Aerial view of historic corral (trap #3). The corral entrance is located at top right, between two live juniper trees. Corral perimeter is 145 meters. Photo: Eric J. Levy

from the inside of the pen, and not many from the runway, for a mile back [1917:239-240].

ARCHAEOLOGICAL EVIDENCE OF PRONGHORN PROCUREMENT

A review of the literature concerning archaeological sites in the Great Basin and neighboring areas indicates that pronghorn have been exploited by aboriginal groups since early occupation of western North America; as this practice spans the Paleoindian period to historic times. In many areas, it appears that this animal provided a substantial portion of the meat consumed by inhabitants of seasonal camps and villages.

Terminal Pleistocene examples.—Although these data are derived primarily from the Plains, they are important to this discussion, as these late Pleistocene/early Holocene kill sites give some indication of the general time depth involved in pronghorn exploitation in western North America. Three sites in eastern Wyoming that are representative of Clovis, Folsom, and Agate Basin traditions have all yielded pronghorn remains.

The Agate Basin site was a seasonal camp at which bison (Bison bison antiquus) or (Bison bison occidentalis) procurement and utilization was emphasized (Frison and Stanford 1982:2). The site has a stratigraphic record which covers slightly over 10,000 years of occupation, based upon a sequence of eighteen radiocarbon dates which yielded early and terminal occupations of 11,840 ¹⁴C years B.P., and 1520 ¹⁴C years B.P., respectively, with at least six pronghorn represented in the Clovis, Folsom, and Agate Basin components (Frison and Stanford 1982:179). The investigators concluded that these particular animals probably were killed away from the site through individual efforts (Walker 1982:270, 273).

The Casper site, also a temporary camp thought to have been occupied during late fall, contained diagnostic pronghorn bone from a Hell Gap context [Frison 1974:108]. This material is seen as representing a terminal stage of the Agate Basin complex, with the most intensive use of the site occurring approximately 10,000 years ago [Frison 1974:108].

The Sister's Hill site is unique to the prehistory of the Plains, as bison remains were not recovered from this single component Hell Gap expression (Agogino and Galloway 1965:191-192). The charred bones of pronghorn, mule deer (Odocoileus hemionus), porcupine (Erethizon dorsatum), ground squirrel (Citellus spp.), and other small rodents comprised the faunal assemblage of the Sister's Hill site (Agogino and Galloway 1965:192). This site was occupied during early Holocene times, as a single radiocarbon determination of of 9650 ¹⁴C years B.P. was derived from a composite charcoal sample (Agogino and Galloway 1965:192).

Early Holocene record.—Many sites in the Great Basin have yielded pronghorn remains, indicating that this animal has been an integral part of human economies since the earliest clearly recognizable occupation of the region. Pronghorn bone was found in all cultural horizons at both Danger Cave and Juke Box Cave, with major occupations of these sites falling between 10,400 ¹⁴C years B.P. and 4000 ¹⁴C years B.P. (Jennings 1957:93). From the faunal assemblages of both sites, it was determined that the main game resource had been the pronghorn (Jennings 1957:224). Unfortunately, the minimum number of individuals (MNI) was not calculated, as only the total number of diagnostic ungulate bones (2337) appeared in text (Jennings 1957:224).

Dirty Shame Rockshelter, located in extreme southeastern Oregon, is another site the provides a lengthy occupational record. This rockshelter has been a focus of human activity for at least 9000 years, as early and late radiocarbon dates of 9500 ¹⁴C years B.P. and 365 ¹⁴C years B.P. have been obtained (Aikens, Cole, and Stuckenrath 1977:6-7). Of the six distinct cultural zones at Dirty Shame Rockshelter, five of them contained pronghorn remains, representing at least thirteen individuals (Grayson 1977:6, 11).

Middle and late Holocene period.—No less than eight sites dating from middle Holocene times, and distributed throughout the western Great Basin, have yielded varying amounts of pronghorn bone. These include Gatecliff Shelter (Thomas 1983b), Silent Snake Springs (Layton and Thomas 1979), Lovelock Cave (Loud and Harrington 1929), Southfork Shelter (Heizer, Baumhoff, and Clewlow 1968), Hidden Cave (Thomas 1985), the Karlo site (Riddell 1960b), and the Rose Spring site (Lanning 1963).

The occupations of all these sites occurred between 5800^{14} C years B.P. (Thomas 1983b:42-43) and 145 ¹⁴C years B.P. (Heizer and Napton 1970:3, 39). MNI calculations varied from site to site, but generally fell between three [Lanning 1963:287] and eleven animals [Thomas 1985:138-139]. It should be stressed that at all of these sites, much of the mammal bone was highly fragmented, possibly due to marrow extraction and tool production activities, and not identifiable at the genus and species level. Because of this, there is the distinct possibility that a large percentage of this material may have been that of pronghorn.

Various Fremont sites, located in the central Great Basin, contained butchered pronghom bone. These include Median Village (Marwitt 1970), Caldwell Village (Ambler 1966), Bear River No. 2 (Aikens 1967), and Bear River No. 3 (Shields and Dalley 1978). Occupation of these sites ranged from 1450 ¹⁴C years B.P. (Shields and Dalley 1978:63) to 995 ¹⁴C years B.P. (Aikens 1967:35). At both the Bear River No. 2 and Bear River No. 3 sites, bison *(Bison bison)* was the most plentiful game animal, with proghorn and mule deer being the next most important source of mammal meat (Aikens 1967:55, 57; Shields and Dalley 1978:94). At Caldwell Village, 125 pronghorn bones were

identified, as this mammal was by far the most important game animal, estimated to have supplied 65% of the meat consumed there (Ambler 1966:105). Cultigens were probably the primary food source for the inhabitants of Median Village (Dalley 1970:9), but at least four pronghorn were represented in the food remains recovered there (Dalley 1970:129).

Wooden traps and rock walls.—Game drive structures of the Great Basin have traditionally received little attention from archaeologists. However, recent work indicates that communal game drives were an important facet of Great Basin subsistence strategies, as the use of these features agrees with the general economic and demographic models presented in the ethnographic literature.

The Eden-Farson site is a proto-historic camp located in the Green River Basin of Wyoming. Remains of over 200 pronghorn were recovered from 12 house structures, indicating some sort of communal trapping operation (Frison 1971:258). Evidence suggests that this site was occupied only once, sometime during October and November, based upon the eruption of the premolars of pronghorn specimens (Frison 1971:258; Nimmo 1971:287-288). A single radiocarbon date of 230 ¹⁴C years B.P. further suggests a late prehistoric context (Frison 1971:258).

Although the remains of a drive structure were not found, a logical explanation for such a large number of animals being taken within such a short time is that some type of communal trap was used (Frison 1971:266).

The Little Whisky Flat site (NV-Mi-5) is located at the base of the Excelsior Mountains, near Walker Lake, in westcentral Nevada. The game trap there was first recorded by Edward Kern, a member of the 1845 Fremont expedition, which traveled across the Rocky Mountains and into California. In his diary entry of December 11, 1845, he mentions passing by "A large corral or pen made of sage and cedars for the purpose of ensnaring deer." (Kern 1876:481).

Kern was apparently incorrect in assigning to this corral the function of trapping deer, as a recent (1984) archaeological investigation of this site resulted in the recovery of a large amount of butchered bone from several house structures located on a hill overlooking the corral. Within the faunal assemblage, over 90% of all diagnostic specimens were those of pronghorn, with fish, jackrabbit (*Lepus californicus*), and rodents representing the other 10% [R. M. Yohe II, personal communication 1986].

Subsequent field surveys resulted in the discovery of a single-wing leading to the corral. Local juniper (Juniperus occidentalis) was used for much of the material, and two "modern" (<100¹⁴C years B.P.) radiocarbon dates (UCR-1639; UCR-1640) assayed on carbon samples collected from the outer rings of corral and wing posts indicate a late prehistoric/proto-historic use of the site, as it was probably occupied by a segment of Walker Lake Paiute (P. J. Wilke, personal communication 1985).

The Mono Basin Winter Village site (CA-Mno-2122) is located approximately 30 km southwest of the Little Whisky Flat site. This is an ethnographically known proto-historic Kuzedika Paiute village (Davis 1965) located in eastcentral California. The site was examined (and formally recorded) by the author during the summer of 1985. A complex of three V-wing corrals and at least ten house structures were recorded. All three traps were made of local juniper, with two having been burned to ground level (most likely by range fires), and one being fire scarred, but almost completely intact [Figs. 2 and 3].

The two burned traps are believed to have been constructed shortly before extensive contact with European populations (A.D. 1850), as the juniper posts were most likely felled by fire, and show no evidence of nails or wire having been used in construction or upkeep. Another indication of a relatively late construction date for traps #1 and #2 is the occurrence of Desert Side-notched and Cottonwood Triangular projectile points

within several activity loci directly associated with these drive structures. A map of corral #2 is presented to supply the reader with a general idea of the basic plan of a V-wing trap (Fig. 4). All three drive structures have been incorporated into consecutive washes, as these natural channels no doubt aided in funneling the quarry toward the corrals.



FIG. 4—Map of pre-contact pronghorn trap (#2) in Mono Basin, California. Dots represent live juniper trees, and triangles represent activity loci.

Two diagnostic pronghorn bones were found in surface association with the east and west wings of traps #1 and #2, respectively. Both specimens are astragali (R. M. Yohe, personal communication 1985); with one being fire-affected, and exhibiting what may be a butcher (cut) mark on the lateral anterior portion (J. D. Kent, personal communication 1986).

Two "modern" radiocarbon dates (<150 14 C years B.P.) (UCR-2096; UCR-2098) have been assayed on two carbon samples collected from the outer rings of the proximal portions of fence posts from both pre-contact corrals. These determinations indicate that the traps at this site, as well as the one at Little Whisky Flat, are younger than approximately 350 14 C years B.P., as no greater precision is possible because of short term variation over the last few hundred years in atmospheric 14 C activity.

From the available data, it appears that two of the drive structures probably were used for communal pronghorn drives. The function of the standing corral is more uncertain, as it was originally built sometime during the late 1800s. Over 90% of the posts of the standing wing trap were felled by axe and saw, and various sections were reinforced with square- and round-cut nails and bailing wire. There is a distinct possibility that trap #3 was used for capturing feral horses (P. J. Wilke, personal communication 1985), as the pronghorn population of the Mono Basin may have been drastically reduced by the influx of settlers in the mid-to-late 1800s, and it was no longer possible nor practical to attempt a drive. Surface faunal remains have not been found associated with the historic trap, and further investigation is needed to determine the function of this structure.

Two other examples of aboriginal corrals that have been recorded in recent years are located in Box Elder County, Utah [Raymond 1982:29]. Both elliptical enclosures are composed of juniper trunks and branches, with most of the fencing having tumbled over, but lying in a recognizable formation (Raymond 1982:26-27). Reconnaissance around both structures failed to yield evidence of aboriginal occupation within the immediate vicinity, but an open juniper grove 100 m east of one corral contains many old and weathered cut stumps that may have been the source of wood for trap construction (Raymond 1982:28). It has been determined that both structures were built in post-contact times, owing to the fact that various posts were felled with steel axes [Raymond 1982:28]. Based upon the data that have been obtained, it seems conceivable that these corrals were used by local Shoshone peoples for pronghorn drives, as the earliest government land survey maps for the area include both features, referring to each as an "Indian Corral" (Figzhugh 1884). However, the lack of diagnostic faunal materials presents a major problem in determining the exact activity that was carried out there.

There are various sites in the Great Basin where rock wall alignments are found. Invariably, these features are interpreted as having been used for game drives, with pronghorn, deer, and mountain sheep (*Ovis canadensis*) being the principal candidates. The following examples contain no diagnostic faunal materials which have been found in association with or near the rock walls, and therefore must be interpreted with caution.

The Fort Sage Drift Fence is located in northwestern Nevada, and consists of five separate rock alignments spanning nearly 1,800 m. The walls vary from 20 to 80 cm in height, and extend over three low hills [Pendleton and Thomas 1983:7]. Radiocarbon dates were not obtained although an occupational range of from 5000 to 1000 years B.P. was proposed, based on projectile points from the Gatecliff, Elko, Rosegate, and Cottonwood Traingular series which were found there [Pendleton and Thomas 1983:34]. Identifiable pronghorn bone was not recovered from either the midden deposit or the surface assemblage associated with the rock walls [Pendleton and Thomas 1983:23]. However, pronghorn bone was recovered from the backdirt of a vandalized rockshelter located 1,100 m north of the walls, pointing to the possibility that pronghorn may have been utilized there. A great deal more fieldwork must be done here before it can be conclusively demonstrated that pronghorn were communally hunted at the site.

The Bob Scott Summit rock alignment is found in central Nevada, and consists of two rock walls which range from 60 to 90 cm in height. The east wall extends for 100 m and the west wall runs for only 60 m [Thomas and McKee 1974:4]. The space between the two walls covers approximately 330 m. A relative age of from 1,500 to 400 years B.P. has been assigned to the walls, based upon locally accepted chronologies for the Humboldt and Rose Spring projectile points that were found in apparent association with the rock features [Thomas and McKee 1974:9-11]. Excavations were not carried out, and no pronghorn bone was recovered from the surface. Despite a lack of physical evidence, Thomas and McKee proposed that pronghorn may have been secured through the use of this rock alignment. This appears to be a tenuous conclusion, as the form of the rock feature alone would cause one to question such an assignment. The feature fails to exhibit many of the formal characteristics that are common to pronghorn drive structures as described ethnographically and archaeologically, including, but not limited to, the following: a relatively long drive wall or wing, the existence of hunting stations or blinds along the drive fence or near the bottleneck, and a narrow space near where the drive wall ends or where the wings meet.

In direct contrast to the Bob Scott Summit site is a series of rock walls in the Matlin Basin of southern Utah. These features consist of several parallel rock alignments, with blinds occurring in a staggered pattern along both sides, with the longest of these walls covering over 1.5 km [Kelly 1943:32]. There are also two V-wing configurations incorporated into the parallel alignments, and appear to post-date the original construction of the gauntlet-like rock walls [Kelly 1943:33]. Although no faunal remains were found which would suggest that pronghorn were being herded at this site, one could make a convincing case for such an activity based on the form of the rock features alone, as ethnographic data for this area indicates that the Kaibab Paiute used these types of rock alignments for communal pronghorn drives [Kelly 1964:50].

Explorers' accounts of game drive structures.—In addition to the accounts furnished by Egan (1917) and Kern (1876), several other early explorers of the Great Basin observed aboriginal game drive structures which most likely were used for exploiting pronghorn. A drive fence located north of Honey Lake, in northeastern California was noted by Joseph Bruff (1949), on September 25, 1849. Bruff was a draftsman for the Bureau of Topographic Engineers, and a member of the first organized party to explore the Honey Lake area. This structure was seen in the vicinity of the Mud Lake Basin.

From the elevated and rugged part of the hills to our right ¼ mile, and extending down, in a slight curve—crossing the road, and along the declivity of the hill in front, just beyond the western edge of the deep ravine, and running down, left to the cannon—a distance of 2 miles from the road, was a singular barrier, formed by the Indians, to pen in, probably, large hares when these hunt them [for there is no other game here]. This fence was close and regular, except where travel on the road has prostrated and scattered it—was composed of sage and greasewood bushes, torn up by the roots, and placed close together, roots up [Bruff 1949:160].

In all probability, this structure was used for pronghorn drives by the Honey Lake Paiute, and not for rabbit drives, as assumed by Bruff. The extensive length of the drift fence seems to indicate that pronghorn were driven there.

Another historic observance of a drive fence is found in the report and journal of Captain J. H. Simpson (1876). The Simpson expedition traveled across Utah and into Nevada in search of a direct wagon route between Camp Floyd, Utah, and Genoa, Nevada during the spring of 1859.

Just after crossing Round Valley we passed through a sort of cedar and sage-brush fence, which must have been about .75 of a mile long, and put up by the Indians. Its purpose, doubtless, was to catch rabbits by the suspension upon it of a net, in the mode explained before, and their attempting to run through it [Simpson 1876:60].

This drive trap was seen in the northern portion of Butte Valley, Nevada, and probably was used by local Gosiute Shoshone groups for hunting pronghorn. Steward's map of villages and subsistence areas of the upper Humboldt River region (1938:141) indicates that communal pronghorn drives were held in the area, and that

A village of perhaps 10 families was located in the northern end of Butte Valley in a canyon called Natsumbagwic (big water coming down), near the Taylor Ranch... The chief was Hugamuts, an antelope shaman who directed local hunts. These hunts were participated in by people from a wide area, including Ruby Valley, Cloverdale Valley, the Spruce Mountains, and elsewhere. BM also described an old woman who conducted antelope hunts in the Butte Valley, the only instance recorded of a woman antelope shaman [Steward 1938:145-146].

DISCUSSION

From the information presently available, it appears that there was a relatively large pronghorn population ranging throughout the Great Basin in prehistoric times. In many areas, this probably allowed for bi-annual, annual, and semi-annual communal hunts (Steward 1938:175; 1941:219; Frison 1971:267). These drives could have occurred in all seasons, but were most likely confined primarily to fall, winter, and spring; as pronghorn tend to disperse in summer, and this time would favor individual efforts.

Various authors have proposed that communal pronghorn drives often resulted in substantial reductions within local populations, and that many years were required before herds regained sufficient numbers, making it feasible to drive them once again (Egan 1917:240; Steward 1938:33; Shimkin 1947:268). It seems that this concept, for the most part, has been derived and generalized from a few post-contact accounts, such as the one which Egan provided, that refer to historic pronghorn populations which were no longer representative of prehistoric herds. Without a doubt, the influx of European explorers, miners, ranchers, and settlers during the mid-19th century exerted additional predatory and competitive pressures upon the pronghorn herds of the Great Basin. This development must have caused radical changes in aboriginal exploitative patterns, as much of the Shoshonean economy was upset during this period. In precontact times, the plains and grasslands of the Great Basin probably supported substantial populations, making annual drives possible for many groups. Much of the ethnographic literature previously mentioned indicates an annual pattern for communal hunts, and an account of the Grouse Creek Shoshone by Steward (1938:175) lends further credence to this theory: "A new antelope corral was built each year. Hunts were held when antelope went south in the fall, and in early spring . . ." Archaeological evidence is also available to support the proposal of an annual exploitative pattern: "... the Eden-Farson site ... represents a Shoshonean group in an area that supported enough antelope to allow an annual procurement pattern without decimation of the herd." (Frison 1971:283).

The potentially adverse effects of pronghorn drives may have been partially mitigated by the likelihood that during any one drive, an entire herd would not be captured (Kelly 1932:84). In addition to this, there is evidence that young animals were set free at the conclusion of the hunt by some groups (Stewart 1942:335; Steward 1943:267).

Another interpretive model of Great Basin pronghorn exploitation which falters in the light of this new archaeological data is that of Pendleton and Thomas (1983), in which they seem to rely heavily upon negative evidence in maintaining that the use of permanent, labor-intensive artiodactyl procurement facilities diminishes through time in the Great Basin (1983:30-31). Based upon recent investigations in the western Great Basin and southern Plains, this concept appears to be questionable, as three sites (CA-Mno-2122, NV-Mi-5; WY-Sw-304) where pronghorn appear to have been exploited via drive traps date from the terminal late prehistoric/proto-historic period, this being based on both artifactual assemblages as well as radiocarbon dates. In fact, the only irrefutable evidence presently available for labor-intensive, communal pronghorn procurement is that it occurred relatively late in time. Frison observed that "Antelope remains have appeared in archaeological sites since Paleo-Indian times but the only evidence we have for communal antelope hunting is quite recent (1978:252).

Pendleton and Thomas also stated that "We know of no accounts of Great Basin peoples constructing permanent rock wall facilities for communal antelope hunting. During the proto-historic period, it seems that corrals and wing walls were made of only temporary construction materials . . . " (1983:28). Data from western Nevada contradicts this position, as large portions of the pronghorn corral at Little Whisky Flat were built with rock.

Contrary to the views of Pendleton and Thomas (1983), it appears that permanent pronghorn traps were emphasized during the proto-historic period in the Great Basin. However, this does not mean that the tradition does not have a greater time depth. Many drive structures were built with perishable materials such as juniper and sagebrush, and early- to mid-Holocene period traps may not be preserved in the archaeological record. The lack of preservation of wood in open air sites is a major obstacle in tracing the antiquity of game traps in the Great Basin.

Another aspect of communal pronghorn exploitation which should be emphasized is the amount of planning which must have been invested in such endeavors. A wide channel of communication had to be operative in order for people to meet at the proper place and time, and to either strengthen an old trap with new materials, or else to build a new one. All this meant that a great deal of group effort was necessary before a communal drive could occur. This involved carrying and arranging rocks, felling timber with fire, and collecting and stacking sagebrush and other light materials, and probably took some time to accomplish. this view is at odds with that of Thomas, who insists that "The common Great Basin antelope drive employed walls constructed at the last minute . . . " (1983a:50). The point here is that it was impossible to build a trap in a capricious manner; it took time for people to be contacted and to travel to a designated area to accomplish this goal.

A great deal of information stands to be gained from the study of pronghorn drive sites, as our understanding of the antiquity and regularity of this activity is far from complete. There were most likely regional variations in emphasis and technique, due to factors of both human and pronghorn demography, availability of other resources, and extent of contact with other aboriginal and European populations. Pronghorn were most likely a readily available food source throughout much of the Great Basin in precontact times. However, their quickness and keen eyesight probably aided them in maintaining a relatively stable population in the face of human predation. Given the current data base, communal pronghorn exploitation appears to have been important for Great Basin groups in late prehistoric and proto-historic times.

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