Archaeological Investigations at Chimney Rock Mesa: 1970-1972

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APPENDIX A

FAUNAL REMAINS FROM CHIMNEY ROCK MESA

by

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Some 34 vertebrate taxa have been identified from the Chimney Rock archaeological bones (Table 30). Many of the remains are from occupational levels, but a large proportion is from deposits post-dating occupation. An early problem concerned treatment of the post-occupational-level material. A variety of reasons have led me to include most of this material with that from the occupied levels. Many of the bones, for example, show evidences of association with man (burns, cuts, shaping) and thus definitely are derived from the aboriginal habitation. The sheer numbers of bones also imply this, for the chances of such an accumulation by agencies other than man are nil under the conditions at the sites (absence of archaeological evidence of other prehistoric groups leaves only historic man to worry about). It also is obvious by inspection of frequencies that there is no statistically significant difference between the occupational and post-occupational faunal remains.

All faunal remains, then, have received preliminary interpretation as being man-related with the following exceptions: surface bones; bone specifically noted as intrusive or likely intrusive by the excavators; and the few human remains, which have been excluded from frequency calculations on the basis that such were not utilized in the sense that other faunal elements were and that the sample is highly biased by deliberate removal of most human elements by the excavators.

The minimum possible number of individuals has been calculated by using the feature (excavation unit) as a basic unit. Thus a right and a left humerus from the same feature would be taken as indicative of one individual; however, a right humerus from one feature and a left from a different feature would count as two individuals. The implicit assumption that there is scattering within a feature but not between features obviously is not always correct, but seems to introduce as little bias as any practical interpretation and less than many (for further comments, see Harris, 1963b).

In calculating minimum possible individuals, queried identifications have not been included, but identifications considered probable—but not certain—have.

A minimum of 217 individuals was identified from 5AA86, 36 from 5AA83, 30 from 5AA88, and 21 from 5AA92. As may be seen from Table 30, definite differences occur between 5AA83 and 5AA86. The samples from 5AA88 and 5AA92 are too small to allow much certainty in comparisons, but appear to be most similar to 5AA83.

Major differences between 5AA86 and the remaining sites lie in the frequencies with which the rabbits (*Sylvilagus* and *Lepus*), porcupine (*Erethizon dorsatum*) and artiodactyls (*Cervus canadensis, Odocoileus hemionus,* and *Ovis canadensis*) appear. Other differences seemingly could be explained by differences in sample size and sampling error. The likelihood of bias makes the use of statistical tests somewhat shaky (Harris 1963b), but does give a somewhat more objective basis than opinion along. χ^2 tests between the two groups of sites on the rabbit, porcupine, and artiodactyl data give low probabilities ($p = 0.005$) that identical groups are being sampled. Smaller differences, such as seen between the *Neotoma* samples, are not significant (in the *Neotoma* case, $p => 0.90$).

Several possibilities to account for the differences exist. Possibly the degenerating houses served as denning areas for porcupines and rabbits after abandonment. Although this cannot be entirely ruled out, it does seem improbable since porcupine remains from at least seven features show evidence of association with man by having been burned or by displaying cut marks. Likewise, although cottontail rabbits frequently utilize burrows, jackrabbits seldom do.

Climatic conditions being different at the two sites is ruled out by the sympatry in both time and space. More difficult to rule out is differential preservation and/or recovery. Since artiodactyl bones are relatively large and heavy, they tend to preserve well and are easy to recover. Thus differential loss of smaller bones would artifically inflate the apparent frequency of artiodactyl bones. However, differential preservation is not noticeable in the laboratory; some extremely fragile material has been preserved, and the rather heavy-boned porcupine shows no tendency toward increased numbers in 5AA83.

The most likely cause of most of the displayed differences lies in the cultural attributes. It would appear likely that people of the two contemporaneous sites were utilizing different meat gathering strategies. Nearly 80 percent of the faunal material from 5AA86 is non-artiodactyl and thus represents relatively small animals; less than 45 percent from 5AA83, 5AA88 and 5AA92 falls into this category. It appears that the 5AA86 inhabitants were more opportunistic or that there was some deliberate attempt to gather the (likely) more easily harvested smaller animals.

Both groups utilized areas away from the immediate vicinity to some extent. Since fish, beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and otter (*Lutra canadensis*) are expected only in river and stream valleys, they represent forays to the Piedra, Stollsteimer, or Devils Creek Valleys. Assuming little or no climatic change, *Lepus* remains likely represent hunting along sagebrush terraces bordering the Piedra Valley to the south of Chimney Rock. It is not impossible, however, that black-tailed jackrabbit (*Lepus californicus*) occurred in sparse numbers in the pinyon-juniper woodland on Chimney Rock Mesa or along the flats bordering Stollsteimer Creek to the east of the mesa (there is a recent sight report of its presence in the latter area).

Grouse, red squirrel (*Tamiasciurus hudsonicus*), golden-mantled ground squirrel (*Spermophilus lateralis*), and yellow-bellied marmot (*Marmota flaviventris*) were noted in this study only somewhat farther north. However, the marmot occurs farther south in the drainage, in New Mexico (Harris 1963a), and the ground squirrel would have to shift its range only slightly to reach the Chimney Rock area. Red squirrels in the Southwest are pretty much limited to spruce-fir forest areas; the habitat in the most mesic areas adjacent to the sites seems somewhat too xeric. Past presence of more firs in the area (William Robinson, letter to F. W. Eddy) may indicate conditions sufficiently mesic to entice red squirrels into the area; otherwise, a several-mile trip to the north is indicated.

Data directly bearing on climate are few. As mentioned above, a slightly more mesic habitat may be represented by presence of several animals in the recovered fauna; however,

TABLE 30
Minimum Numbers of Individuals Identified From the Four Chimney Rock Sites and Percentages of the Site Fauna by Taxon

Scientific Name (Common Name)	5AA83	5AA86	5AA88	5AA92	Total
Fish	1 (2.8)	7 (3.2)	-	-	8 (2.6)
Lizard	-	1 (0.5)	-	-	1 (0.3)
Snake	-	3 (1.4)	-	-	3 (1.0)
?Meleagris (Turkey)	1 (2.8)	-	-	-	1 (0.3)
Grouse	-	1 (0.5)	-	-	1 (0.3)
Other Bird	1 (2.8)	5 (2.3)	1 (3.3)	-	7 (2.3)
Sylvilagus (Cottontail)	1 (2.8)	25 (11.5)	-	2 (9.5)	28 (9.2)
Sylvilagus nuttalli (Nuttall's Cottontail)	-	4 (1.8)	-	-	4 (1.3)
Lepus (Jackrabbit)	-	13 (6.0)	-	-	13 (4.3)
Sciurid (Squirrel)	1 (2.8)	1 (0.5)	-	-	2 (0.7)
Tamiasciurus hudsonicus (Red Squirrel)	-	1 (0.5)	-	-	1 (0.3)
Spermophilus cf. lateralis (Golden-Mantled Ground Squirrel)	1 (2.8)	5 (2.3)	-	-	6 (2.0)
Spermophilus variegatus (Rock Squirrel)	2 (5.6)	7 (3.2)	-	-	9 (3.0)
Marmota flaviventris (Yellow-Bellied Marmot)	1 (2.8)	2 (0.9)	-	-	3 (1.0)
Thomomys (Pocket Gopher)	1 (2.8)	6 (2.8)	1 (3.3)	1 (4.8)	9 (3.0)
Thomomys bottae (Southern Pocket Gopher)	-	3 (1.4)	1 (3.3)	-	3 (1.3)
Dipodomys Ordi Ord's Kangaroo Rat	-	6 (2.8)	-	-	6 (2.0)
Castor canadensis (Beaver)	-	2 (0.9)	-	-	2 (0.7)
Peromyscus (White-Footed Mouse)	1 (2.8)	6 (2.8)	-	-	7 (2.3)
Neotoma (Wood Rat)	3 (8.3)	10 (4.6)	-	-	13 (4.3)
Neotoma cf. mexicana	-	-	1 (3.3)	-	1 (0.3)
Microtus (Vole)	-	6 (2.8)	-	1 (4.8)	7 (2.3)
Microtus longicaudus (Long-Tailed Vole)	-	2 (0.9)	1 (3.3)	-	3 (1.0)
Cricetid	1 (2.8)	3 (1.4)	-	-	4 (1.3)
Ondatra zibethicus (Muskrat)	-	1 (0.5)	-	-	1 (0.3)
Erethizon dorsatum (Porcupine)	1 (2.8)	35 (16.1)	-	1 (4.8)	37 (12.2)
Rodent	-	1 (0.5)	-	-	1 (0.3)
Canis cf. familiaris (Domestic Dog)	-	1 (0.5)	-	1 (4.8)	2 (0.7)
Cf. Canis (ca. size of C. latrans)	-	-	2 (6.7)	-	2 (0.7)
Canis cf. latrans (Coyote)	-	2 (0.9)	-	-	2 (0.7)
Canis cf. lupus (Gray Wolf)	-	2 (0.9)	-	-	2 (0.7)
Cf. Vulpes vulpes (Fox)	-	-	1 (3.3)	-	1 (0.3)
Ursus cf. americanus (Black Bear)	-	1 (0.5)	-	-	1 (0.3)
Mustelid (Weasel)	-	1 (0.5)	-	-	1 (0.3)
Mustela frenata (Long-Tailed Weasel)	1 (2.8)	-	-	-	1 (0.3)
Taxidea taxus (Badger)	-	1 (0.5)	-	-	1 (0.3)
Martes americana (Marten)	-	1 (0.5)	-	-	1 (0.3)
Lutra canadensis (River Otter)	-	1 (0.5)	-	-	1 (0.3)
Lynx rufus (Bobcat)	-	1 (0.5)	-	1 (4.8)	2 (0.7)
Felis concolor (Mountain Lion)	-	-	1 (3.3)	-	1 (0.3)
Carnivore	-	1 (0.5)	-	-	1 (0.3)
Cervus canadensis (Wapiti, American Elk)	2 (5.6)	7 (3.2)	4 (13.3)	2 (9.5)	15 (4.9)
Odocoileus hemionus (Mule Deer)	9 (25.0)	29 (13.4)	12 (40.0)	5 (23.8)	55 (18.1)
Ovis canadensis (Mountain Sheep)	-	2 (0.9)	-	-	2 (0.7)
Unidentified Artiodactyl	8 (22.2)	8 (3.7)	3 (10.0)	5 (23.8)	24 (7.9)
All Artiodactyls (Sub-Total)	19 (52.8)	46 (21.2)	19 (63.3)	12 (57.1)	96 (31.6)
Medium or Small Mammals	-	2 (0.9)	1 (3.3)	1 (4.8)	4 (1.3)
Large Mammals	-	1 (0.5)	1 (3.3)	1 (4.8)	3 (1.0)
TOTAL INDIVIDUALS	36 (100.3)	217 (100.5)	30 (99.7)	21 (100.2)	304 (100.0)

short hunting trips (ca. 10 miles) could easily account for their presence. On the other hand, presence of *Lepus* in fair numbers could indicate a slightly drier habitat, decreasing the thickness of pinyon-juniper growth on the southern slopes of Chimney Rock Mesa. Another possibility, fitting both sets of animals, is a precipitation regime favoring slightly more winter precipitation and thus promoting the favorable sagebrush country seemingly preferred by jackrabbits in the Piedra drainage. Such a regime likely would favor presence of true fir on the northwestern face of Chimney Rock Mesa and also allow presence of somewhat more mesic habitat animals (see discussion of precipitation regimes in Harris 1963b, 1970). In any event, the faunal evidence is weak, and appreciable climatic differences seem unlikely.

Presence of Ord's kangaroo rat (*Dipodomys ordi*) does seem to throw some light upon the vegetation at the time of habitation. At least six individuals are represented, and one skull element of this rodent was burned, indicating its presence was contemporaneous with habitation of the site. Presence at the same time as presence of mesic indicators is

indicated by recovery of a vole (*Microtus* sp.) from the same feature. Although this particular vole specimen may be intrusive, an individual from another feature is burned, again indicative of contemporaneity with man.

The nearest known approach of kangaroo rats to the area today is some 30 airline miles to the south, at two miles northwest of Blanco, New Mexico (Harris 1963a). The distance involved, the relatively small food value, and the lack of other surely southern forms makes it likely that the presence is natural rather than man-related.

The archaeological record from the Navajo Reservoir District sheds some light on the matter—*Dipodomys ordi* remains were recorded from sites as far north as southern Colorado (Piedra Section) as late as the Arboles Phase, A.D. 950-1050 (Harris 1963b, Eddy 1963). Harris (*op. cit.*) suggested much better development of grass and/or forbs than at present and that possibly introduction of domestic animals in historic times had eradicated *Dipodomys ordi* by destruction of this habitat; an alternative suggestion is eradication by drought damage sometime after A.D. 1050. These possibilities seem as viable today as 10 years ago, with damage from sheep most likely the main cause.

The same factors allowing presence of *Dipodomys ordi* may also have favored presence of *Spermophilus lateralis* at lower elevations than at present.

Assuming better low-growing plant cover, we can expect non-arboreal pollen counts to be relatively higher than at present. There also is the possibility that some arboreal species of plants, particularly of the pinyon-juniper woodland, have increased their density to a degree as competition from grasses decreased; increased sheet erosion following cover reduction may have further reduced the density of forms competitive to tree growth.

An unknown proportion of the recovered fauna may be intrusive. Rock squirrels (*Spermophilus variegatus*), wood rats (*Neotoma* spp.), and pocket gophers (*Thomomys* spp.) frequently utilize rocky areas for protection or are fossorial. Definite evidence of utilization is absent in the area, though all are edible. One gopher element and one *?Neotoma* bone have been burned—the sole suggestion of possible use by man. On the other hand, only 2 of the 13 jackrabbits and 4 or 5 of the 32 cottontails show evidence (cuts or burning) of utilization, though they certainly were used. The evidence indicates smaller animals likely were boiled with a minimum of dismemberment and thus leave little evidence of their utilization.

Other small animals (snakes, *Peromyscus* spp., and *Microtus longicaudus*) live now in ruins on top of Chimney Rock Mesa. Burned *Microtus* and small cricetine elements prove contemporaneity for some, but whether they were utilized for food or died in the burning of the dwellings is conjectural.

The rather long list of carnivores probably indicates use of fur and possibly other parts; use as a food resource is possible.

Animals likely used primarily for food and/or fur or hides include fish, birds, cottontails, jackrabbits, red squirrel, marmot, beaver, muskrat, porcupine, American elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), and mountain sheep (*Ovis canadensis*).

Fish preserve poorly, but the scarcity of even fragmentary remains indicates relative unimportance as a staple; birds also make up a minute portion of the fauna. This would seem to be a matter of cultural selection since birds undoubtedly were plentiful at the time of occupation just as they are today.

Estimated weights and frequencies of usable mammal meat are shown in Table 31. As is obvious from the figures in this table, the vast bulk of meat is from the large, hooved mammals. The misleading effect of considering frequencies of individuals rather than usable meat con be dramatically demonstrated. For example, non-artiodactyl sources considered in Table 31 make up 67.6 percent of the individuals of

TABLE 31

Estimated Poundage of Usable Meat and Percentage of the Total Represented by Several Categories in Each Site*

Scientific Name	5AA83	5AA86	5AA88	5AA92
Sylvilagus	2 (0.08)	51 (0.74)	-	4 (0.23)
Lepus	-	39 (0.57)	-	-
Scivrid	1 (0.04)	1 (0.01)	-	-
Tamiasciurus hudsonicus	-	1 (0.01)	-	-
Spermophilus lateralis	1 (0.04)	5 (0.07)	-	-
Spermophilus variegatus	2 (0.08)	7 (0.10)	-	-
Marmota flaviventris	8 (0.33)	16 (0.23)	-	-
Castor canadensis	-	77 (1.12)	-	-
Ondatra zibethicus	-	2 (0.03)	-	-
Erethizon dorsatum	10 (0.41)	350 (5.07)	-	10 (0.58)
Cervus canadensis	700 (28.88)	2,540 (35.51)	1,400 (48.28)	700 (40.84)
Odocoileus hemionus	900 (37.13)	2,900 (42.04)	1,200 (41.38)	500 (29.17)
Ovis canadensis	-	200 (2.90)	-	-
Unidentified Artiodactyl (calculated on basis of mule deer or mountain sheep)	800 (33.00)	800 (11.60)	300 (10.35)	500 (29.17)
Total Artiodactyl	2,400 (99.01)	6,350 (92.04)	2,900 (100)	1,700 (99.18)
TOTAL USABLE MEAT	2,424	6,899	1,714	2,900

*Average weights of usable meat per animals are based on data of White (1953); mammals smaller than squirrel size are ignored. Figures are rounded to the nearest pound.

5AA86, but only 7.94 percent of the usable meat for that site.

In large part, the differences seen earlier between 5AA83 and 5AA86 maintain themselves when viewed on the basis of meat poundage. At first thought, the non-artiodactyl resources may seem inconsequential. However, smaller animals have several advantages over larger, including the fact that it is an amount of meat that can be consumed before spoilage, that they are easy enough to capture that women and children may take such animals, and, frequently, that they are more available.

Seasonal fluctuations in availability of animal food resources occurred. Ground squirrels and marmots hibernate, and their presence indicates spring and summer hunting. More serious, elk and mountain sheep tend to move into higher country in summer, leaving mule deer as the single dependable large mammal in summer. Remains of fawns indicate spring hunting of deer. Antler remains are usually so fragmented as to allow identification only as cervid. In the case of one elk antler, the base has the appearance of having been shed rather than having been removed from a kill. Since no antlers were found attached to skull parts, no implication of fall-winter hunting is present.

Among mammals absent from the recovered fauna are chipmunks (*Eutamias* spp.), Gunnisons prairie dog (*Cynomys gunnisoni*), and the Abert squirrel (*Sciurus aberti*). The latter may be present but confused with rock squirrel elements. I think this unlikely, however, since most skull elements can be identified. There seems no obvious reason for the absence of these forms even assuming some climatic change, thus we may presume either sampling error or cultural reasons for their absence.

In summary, bird resources were almost entirely neglected. 5AA92 has too small a sample for much confidence in interpretation; perhaps greater similarity to 5AA83 is shown. Differences between 5AA83 and 5AA86 are pronounced and apparently significant; 5AA88 and 5AA92 appear most similar to 5AA83. The differences likely are due to cultural features. Climatic differences between the period of occupation and the present are not shown clearly; if present, the likely form would be in slightly greater winter precipitation.

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