North Table Mountain:
A Grouping of Cairns, Stone Circles and Activity Areas

by

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Abstract

North Table Mountain in Jefferson County, Colorado, is the location of a grouping of activity areas and stone circles closely surrounding a system of cairn lines along the perimeters of two short but prominent intermittent drainages, encompassing an area of approximately 120 acres. Six sites (5JF962, 963, 964, 965, 966 and 989) have been identified, based on surface artifacts, groupings of cairns and stone circles, and spatial/topographical relationships between these factors. Preliminary analysis of the diagnostic artifacts in the sparse surface collection indicated a possible temporal span from the Middle Archaic through the Late Prehistoric. The content of the total assemblage of artifacts and their distribution among the various component sites suggests several possibilities regarding the significance of the association of the stone circles, cairn lines, and activity areas. Partial excavation of two of the stone circles produced no cultural material, but indicated a probable contemporaneity of the stone circles and the cairn lines. The composition/spatial relationship of these sites, their location on the mountaintop, and their close proximity to hogback valley sites like Magic Mountain and Van Bibber Creek add a new dimension to the known prehistoric activities for the area, and raise numerous questions that can perhaps be answered by future research.

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Chapter One

Introduction

North Table Mountain, located in the hogback valley just west of Denver, is part of a Plains-Mountain transition zone. A systematic survey of a parcel of land owned by Western Paving Construction Company revealed a concentration of stone circles and cairn lines centered around two drainage systems. Along the periphery of this concentration are open lithic scatters, fabricated tools, and domestic equipment. The purpose of the survey was to reexamine data collected by a previous project undertaken by graduate students from the University of Colorado at Boulder, C.K. Robinson and B. Benz under the direction of Dr. David Breternitz in an attempt to better understand prehistoric land use patterns and their integration into other prehistoric cultural patterns observed elsewhere in Jefferson County.

Chapter Two

Environmental Data

Modern Environment

Physiography/Geology

North Table Mountain comprises the ecotonal area between the foothills/mountains and the central high plains, and is located in the Colorado Piedmont section at the far western border of the Great Plains physiographic province (Fenneman 1931). The Colorado Piedmont section is characterized by a hogback and shallow valley at the base of the foothills and broadly rolling topography with areas of local scarping. North Table Mountain, and its sister, South Table Mountain, are scarped, basalt-capped mesas, remnants of the Tertiary landscape as it was formed by lava flows interbedded with the sedimentary deposits of the Denver/Arapahoe Formation in the late cretaceous and early Tertiary Eras (Tweto 1976). Uplift of the region and downcutting by Clear Creek and other greater (e.g. South Platte River) and lesser drainages, from mid-tertiary times to the present, created among other things, the hogback valley along the Front Range of the Rocky Mountains (Taylor 1992) and left the two Table Mountains standing some 700 to 1000 feet (308 M) above the surrounding countryside, at an altitude averaging about 6450 feet (1966 M). The porphorytic basalt that forms the 900 to 1000 acre cap of North Table Mountain is extrusive mafic latite, a feldspar-pyroxene-rich igneous rock. It is nearly homogeneous, very hard, and weathers light red to light to dark gray where exposed (Van Horn 1972). Zeolite crystals are found in amygdloidal cavities,

especially in the upper portion of the second of three lava flows, and the contact between the second the third flows (Johnson and Waldenschmidt 1925, Wilson 1917).

The soil that covers most of the basalt that composes the entire bedrock surface of the mountain and particularly the area of the sites included in this report, is of two types. The first is found on the more level, lower elevation areas. Called Denver clay loam (USGS 1980), it is a dark gray to black, mildly alkaline clayey sand colluvium, characterized by weathered latite fragments of angular, flat, boulder-size, well graded through rounded pebble to sand- and silt- sized grains (Van Horn 1972). This soil is found in deposits, which range from less than one meter to four meters or more in thickness. It is suitable for agriculture with the application of fertilizers and proper tillage methods (USGS 1980).

The second is actually two soils called the Baller Variant-Lavina-Rock complex. The Baller Variant is formed in noncalcareous, gravelly, loamy material derived from weathering latite. It is found on ridges and hill slopes (USGS 1980). This is the soil found sites 5JF963 and 966 in conjunction with Lavina. It is seen wherever the bedrock is exposed, forming a thin border around these areas and becoming gradually deeper as slope increases. Maximum thickness for this soil, however, is seldom more than about 30 cm.

Lavinia, though also a shallow soil, is different. It is formed in calcareous, clayey alluvium and loess over the underlying basalt bedrock (USGS 1980). Brown to dark brown in color, it accumulates to depths of some 70 cm. Site 5JF962 is on (and in) a bench or terrace of this soil. Like the Baller Variant, Lavinia is subject to severe erosion.

Soil movement, generally, appears to be prodigious. When wet, rather than becoming sticky, the soils flow easily with any runoff. Because of this relative contour changes can be seen when examining geologic survey maps published between 1913 and 1965/photo revised 1980.

Flora

The top of North Table Mountain gently inclines to the southeast and resembles the surrounding, lower, countryside in its undulating topography. The plant community, too, reflects the Great Plains physiographic province, composed as it is of short and mixed grasses, forbs, shrubs, with riparian vegetation around a perennial spring, and pine/juniper in the three main drainage canyons which cut the rim of the mesa on the south, southeast and east, respectively.

(*Achillea lanulosa*) wild onion

(*Agropyron cristatam*) crested wheat grass

(Agropyron *smithii*) wheat grass

(Ambrosia *artemisiifolia*) Roman wormwood

(Andropogon *gerardi*) big bluestem

(Andropogon *scoparius*) little bluestem

(Artemisia *filifolia*) silver wormwood

(Artemisia *frigida*) pasture sage

(Bouteloua *curtipendula*) side oats grama

(Bouteloua *gracilis*) blue grama

(Bromus *tectorum*) cheatgrass

(Buchloe *dectyloides*) buffalo grass

(Calamovilfa *longifolia*) prairie sandreed

(Cercocarpus *montanus*) mountain mahogany

(Chrysothamnus *nauseosus*) rabbitbrush

(Crisium *sp.*) thistle

(Coryphantha *missouriensis*) nipple cactus

(Digitaria *ischaemum*) smooth crabgrass

(Eriogonum *compressa*) sulfur flower

(Grindelia *squarrosa*) gumweed

(Gutierrezia *sarothrae*) snakeweed

(Juniperius *commonis*) common juniper

(Lepidium *campestre*) peppergrass

(Liatris *punctata*) blazing star

(Optunia *rafinesquei*) prickly pear

(Pinus *ponderosa*) ponderosa pine

(Populus *angustifolia*) narrow leaf cottonwood

(Runex *sp.*) dock

(Salosa *sp.*) thistle

(Selaginella *densa*) club moss

(Sporobulus *cryptandrus*) sand dropweed

(Stipa *comata*) needle grass

(Symophoricarpos *occidentalis*) snowberry

(Tragapongon *dubius*) goatsbeard

(Yucca *glauca*) Spanish bayonet

The composition of the floral community in any given area is primarily the result of altitude, soil depth, and available water, although in some locales overgrazing is also a factor (Marr 1964). Areas of shallower soil depth on North Table Mountain, especially on steeper slopes where runoff, both surface and at bedrock, is quicker, support blue grama (Bouteloua *gracilis*), buffalo grass (Buchole *dactyloides*), big and little bluestem (Andropogon *gerardi* and A. *scoparius*), needle grass (Stipa *comata*). On ridge spines and other areas of very shallow soil and, therefore, quickest runoff, sparse grasses are joined by prickly pear cactus (Optunia *rafinesquei*), yucca (Yucca *glauca*), and mountain mahogany (Cercocarpus *montanus*). At the heads of the three drainage canyons are flat areas of deep, black soil that support concentrations of side-oats grama (Bouteloua *curtipendula*), cheat grass (Bromus *tectorum*), wheatgrass (Agropyron *smithii*), and crested wheatgrass (A. *cristatum*).

Mountain mahogany (Cercocarpus *montanus*) is also found in a band some 10 to 20 m. in width around the entire rim of the mountain, and covering the north-facing slope of the ridge that comprises the southernmost extremity of the rim. Except for one, lone ponderosa pine (Pinus *ponderosa*) in the west-central portion, and a few deciduous trees planted near an old radio facility tower; there are no trees on the mountaintop. Although the altitude is suitable, the situation is the same as on the plains below regarding soil depth and moisture, and pine (Pinus *sp.*) and juniper (Juniperus *communis*) are found only on the steep slopes of three drainage canyons. A small stand of narrow leaf

cottonwood (Populus *angustifolia*) lines a short section of the drainage above a spring at the head of the canyon on the south side of the mountain.

Fauna

North Table Mountain supports a limited, but diverse, faunal population. Species observed during the project include two herds of mule deer (Odocoileus *hemionus*) which range in size from 10 to 30 individuals, jackrabbit (Lepus sp.), prairie dog (Cynomys *ludovicianus*), coyote (Canis *latrans*), and deer mouse (Peromyscus *maniculatur*). The tracks of a mountain lion (Felis *concolor*) were also seen. Species likely to inhabit the area, though not observed include ground squirrel (Spermophilus *sp.*), pocket gopher (Geomys *bursarius*), cottontail rabbit (Sylviligus *sp.*), badger (Taxidea *taxus*), and fox (Vulpes *sp.*). Prior to modern development, it is possible that other species utilized the mountaintop, such as pronghorn (Antilocapra *americana*), elk (Cervus *canadensis*), bison (Bison *sp.*), bobcat (Lynx *rufus*), wolverine (Gulo *luscus*), lynx (Lynx) and, perhaps, big horn sheep (Ovis *canadensis*) (Quick 1964). Waterfowl are also present, utilizing both natural and manmade seasonal ponds, and consist mainly of mallards and lesser scaup.

(Antilocapra *americanus*) pronghorn

(Bison, *sp.*) buffalo

(Canis *latrans*) coyote

(Canis *lupus*) grey wolf

(Cervus *canadensis*) elk

(Cynomys *ludovicianus*) prairie dog

(Felis *concolor*) pocket gopher

(Gulo *luscus*) wolverine

(Lepus, *sp.*) jackrabbit

(Lynx) lynx

(Lynx *rufus*) wildcat

(Peromyscus *manticulatus*) deer mouse

(Ovis *canadensis*) mountain sheep

(Spermophilus, *sp.*) ground squirrel

(Sylviligus, *sp.*) cottontail

(Taxidea *taxus*) badger

(Vulpes, *sp.*) fox

(Ursus *americanus*) black bear

Modern Climate

The plant and animal communities of North Table Mountain are what they are due to a complex of factors, of which, climate is the most important. The climate is Continental Type, typified by a number of general attributes which encompass the following: high sunlight potential, low relative humidity, relatively low precipitation, coming mainly in the spring and summer, prevailing westerly winds of moderately high velocity, wide daily temperature range, and warm to hot summers and cold winters (Paddock 1964). The proximity of the Front Range, however, causes certain ameliorating modifications (Paddock 1964; Tate 1986).

First, summer temperatures are somewhat higher, but the daily range is not as great as farther out on the plains or in the mountains. Second, there is somewhat more relative humidity, more precipitation more evenly distributed throughout the year than on the plains and, therefore, more cloudiness and less

potential sunlight. Most of the precipitation comes as monsoon thunderstorms during the spring and summer, with late spring and early fall snowstorms providing the bulk of the rest. Precipitation averages 15 to 18 inches annually, compared to 12 or less further out on the plains and 30 or more in the foothills and mountains to the west (Tate 1986). Blizzards or snowstorms with strong north winds, however, are infrequent. Third, the winds in the foothills and adjacent plains tend to be noticeably higher, especially in winter, with gusts over 100 m.p.h. having been recorded. "Chinook" winds also occur in winter, and these warm, downslope, west winds often raise the temperature of the Hogback Valley several degrees above the surrounding foothills and plains, quickly melting the snow off west facing surfaces (Tate 1986). The prevailing wind on North Table Mountain in the spring and summer, until mid-afternoon, is from the east or southeast.

Paleoenvironment

That the last great "Ice Age" of the Pleistocene, with its massive continental and mountain glaciers, ended about 10,000 years ago is generally agreed upon. What went on after that is subject, at present, to a good deal of controversy. The hypothesized Altithermal (Antevs 1955), particularly, has been under scrutiny and attack from a number different quarters, ranging from researchers in the mountains (Baker 1983; Benedict 1979; Fall 1985,1988; Madole 1991), to others on the high plains (Cummings 1990; Frison 1978; Levish 1990; Tucker 1990). Findings in most areas support the concept of localized conditions. Though the warmer, more arid conditions of Antevs's altithermal did occur in some areas (Benedict 1979; Frison 1978), in others they did not (Baker

1983; Fall 1985, 1988; Frison 1978; Madole 1990), or their temporal span was interrupted (Benedict 1979) or truncated (Tucker 1990). No specific data on climate from sites in the hogback region near Golden have been located. Therefore, it is suggested that the environment and climatic conditions were probably similar to what exist today, with warmer, drier periods of varying depth and duration possible in the period from 7000 B.P. to 400 B.P. More data is needed in this research domain and geographic area.

Chapter Three

Existing Data and Literature Review

Prior to the survey and testing done on North Table Mountain, a file search was conducted at the Office of Archaeology and Historic Preservation. This search revealed that undergraduates from the University of Colorado at Boulder had previously surveyed the project area. The following is a description of the prehistoric cultural history of the Colorado Front Range and a description of the recorded prehistoric archaeological sites in and near the project.

Cultural History

Prehistoric archaeological investigations in Jefferson County suggest that various prehistoric groups have inhabited the area for at least twelve thousand years. The following synopsis of prehistoric archaeological sites summarizes regional cultural histories along the Front Range of the Colorado Rocky Mountains spanning this time period.

Pre-Projectile Point Stage

Although there is evidence suggesting habitation of the area during this time, this evidence is tenuous at best. Examples of this site type are evidenced at the Dutton and Selby sites in northeastern Colorado and, closer to the project area, the Lamb Spring site in Douglas County (Stanford 1978). This period is characterized by bone and pebble tools, core and flake tools in association with

the remains of extinct megafauna. At the Selby site, excavations exposed mammoth, which appeared to have been butchered and intentionally piled at the edge of a Pleistocene lake. Other extinct fauna, (horse, camel and bison) were found in association with bone tools. At the Dutton site numerous types of bone tools were found along with other extinct fauna not found at Selby. Dates for the Dutton and Selby sites range from 16,130 to 13,600 B.P. (Cassels 1990).

At the Lamb Spring Site two distinct archaeological layers were encountered (Stanford 1978). The earliest level contained extinct mammoth (at least 23 individuals), camel, horse and bison bones. Like the above mentioned sites, flaked bone tools and bone cores (Stanford *et al.* 1981a) were found in association with the remains. No diagnostic lithic artifacts were recovered in the earliest level of the excavation. Dates for Lamb Spring extend from13,140 to 11,735 B.P. (Cassels 1990).

Paleo-Indian Stage

The Paleo-Indian Period in Colorado has been divided into three categories: Clovis, Folsom and Plano. Each of these periods are recognized by characteristic differences in projectile point styles. Subsistence strategies of the early Paleo-Indian period are acknowledged as primarily being associated with hunting extinct magegauna such as mammoth, bison, camel, and smaller mammals such as elk, deer, and bear (Jepson and Hand 1994) using dart points in association with atlatls.

Clovis (11,500 B.P.-11,000 B.P.): The tool types most often associated with archaeological sites during this time period are large partially fluted lanceolet projectile points. These points have been found along the Front Range in Colorado in association with extinct Pleistocene megafauna. At the Dent site northeast of Denver, two Clovis projectile points were found *in situ* with mammoth bones. It was postulated that this was a mammoth kill site based on the number of animals found, twelve, and the location of the points. However, more recent investigations have questioned this finding and suggest that the points were washed into the site and may not be associated with the mammoth. Examination of the remaining bone disclosed no apparent butchering marks that might indicate the animals were brought down and subsequently butchered by humans.

The Dutton site has a component dating to the Clovis Period. At this site scrapers and flakes have been found in association with the bone fragments of mammoth, horse, antelope and peccary (Stanford 1978).

Folsom (10,800 B.P.-10,20 B.P.): Fluted projectile points found in association with extinct Bison *antiquus* remains characterize sites of this time period. There are more Folsom sites in Colorado than in the preceding periods. This may be a result of an influx of people to the area or a general increase in the extant population. Sites dating to this time east of the Front Range include Linger, Jones-Miller, Frazier, Cattle Gaurd, Zapata, Fowler-Parish, Powers, Johnson and Lindenmeier.

One of the best known of these sites, the Lindenmeier site (Wilmsen and Roberts 1978), yielded the remains of camel and at least nine extinct bison in association with Folsom points, scrapers, blades, knives and gravers. Indication of a prolonged stay was by abroiginal peoples found at the kill site. Excavations revealed fire pits containing butchered bison bones, some of them charred, as well as other tools near the kill site. Radiocarbon analysis of material from this site dates it to 10,780 B.P.

Plano (10,200 B.P.-7,000 B.P.: During this time period (Jepson and Hand 1994) fluted projectile points are replaced by long slender lanceolet points which have been collaterally flaked (Midland, Agate Basin, Hell Gap, Alberta and Cody). Later in this same period, parallel oblique-flaked points are found (Frederick and Lusk). General subsistence patterns became more complex with an increase in the frequency of vegetal processing and a greater variety in tool kits. Evidence recovered from archaeological sites suggests that social organization may have changed also, with more direct archaeological evidence of communal hunting practices, as well as ritual activities. At one such site, Jones-Miller, at least three episodes of communal bison kills took place over a period of several seasons (Stanford 1974,1975). This site is unique in that it also contains the remains of a posthole near the center of the site. Artifacts found immediately adjacent to the hole include a miniature Hell Gap projectile point and antler flute and butchered canid remains. It seems unlikely that these artifacts were part of the butchering process but may instead be associated with a ritual activity that preceded the kill.

Archaic Stage

With the onset of the Archaic Period the shift in subsistence strategies began. With the extinction of megafauna, prehistoric groups began hunting modern species of large mammals such as bison, elk, deer, antelope and along the eastern foothills, mountain sheep. Additionally, there is evidence that smaller mammals and birds were becoming part of the diet. Vegetal material began to be utilized more often. This is evidenced by the greater occurrence of groundstone is found at archaeological sites. Generally, during the Archaic, there was a decrease in the size of projectile points and a decrease in the diversity of point types (Jepson and Hand 1994). Points were usually stemmed and/or notched for a more stable attachment to the hafting element and lack the fine flaking patterns of the Paleo-Indian period. This period also marks the advent of architectural structures such as rock walls, cairns, stone circles and game blinds used in communal hunting practices (Benedict 1996; Jepson and Hand 1994), the use of rock shelters (Stone and Mendoza 1994) and pit houses for shelter (Tucker *et al.* 1994).

Early Archaic (7,000 B.P.-5,000 B.P.): During this time the altithermal, a hotter dryer climatic period, effected subsistence activities on the plains of eastern Colorado. It has been postulated (Benedict 1979) that during this dryer time both animals and people retreated, to some extent, into the foothills and mountains along the eastern slope of Colorado.

Projectile points from this time period found in the foothills and Hogback Valley just west of Denver, tend to be fairly large and are side or corner notched. Excavations at the Magic Mountain site (Irwin-Williams and Irwin 1966) in the late 1950s and 1960s produced a point typology still in use today. Many of the projectile points found at that site are, because of the nature of this stratified site, definitive of point types found along the Front Range relating to the Archaic Period. Other Early Archaic sites along the Front Range include LoDaisKa (Irwin and Irwin 1959), Cherry Gulch (Nelson 1981), Willowbrook (Leach 1966), Massey Draw (Anderson *et al.* 1994), and Dutch Creek (Jepson and Hand 1994).

Middle Archaic (5,000 B.P.-3,000 B.P.): This time period is characterized by a wetter climate than the previous period. It is perhaps because of this that the number of sites dating to this time increases. This may be the result of both people and animals returning to the area as the abundance of food increased for grazing animals. Along with the increase in the number of sites, is the repeated use, over time, of individual sites (Anderson *et al.* 1994). This pattern may be the result of changes in social structure involving a more territorial existence. That is, people were participating in a seasonal movement through a territory exploiting seasonally available resources rather than the highly mobile short-term occupation, which characterized the Paleo-Indian period.

Artifacts from the Middle Archaic are varied. They include projectile points such as those from the McKean Complex, Duncan and Hanna. Also included are an increased number of bifaces, scrapers, drills, spokeshaves, more formalized grinding tools, bone awls and hammerstones (Jepson and Hand 1994).

Late Archaic Period (3,000 B.P.-1,800 B.P.): The Late Archaic is characterized by an increase in the number of corner-notched and side-notched projectile points. These points remained fairly large with expanding stems (Gunnerson 1987) and straight to slightly convex blade edges. Subsistence strategies include a greater reliance on plants and small mammals, rodents, fish and birds. There is an increase in energy expenditure on the part of prehistoric peoples when compared with earlier time periods. Also present are a larger number of pit house structures, and in southern Colorado, jacal structures (Shields 1980). Sites dating to this time period along the Front Range include Magic mountain, Complex B (Irwin-Williams and Irwin 1966), Van Bibber Creek (Nelson 1969), and Willowbrook (Leach 1966).

Ceramic Stage

The Ceramic Period in Eastern Colorado is marked by the introduction of the bow and arrow, more stable housing, and ceramic vessels. These technological additions to the existing Archaic Style subsistence strategies practiced by prehistoric peoples did not considerably alter their hunting and foraging lifestyle. Some pockets of horticulture, especially those in northeastern Colorado, flourished for a time having been influenced by an influx of Eastern Woodland traditions. Horticulture brought about semi-permanent and permanent housing which lead to the formation of villages. Elsewhere along the Front Range and eastern plains of Colorado, cycles of seasonal transhumanance were practiced (Benedict 1992).

With the introduction of the bow and arrow, projectile points became smaller. Generally, points were triangular in shape (Gunnerson 1987), notched and were either serrated of unserrated. Other artifacts dating to this time period include ovoid scrapers and various forms of flakes, many with marginal retouch. Also included are hammerstones, milling stones, drills, bone awls, beads made from bone and shell, and shell pendants.

This period marks the introduction of ceramic vessels. These are characterized as being sand and grit tempered with cord marked exteriors, conical bases and rims that were either straight or curved inward slightly (Gunnerson 1987).

Burials of this period include both primary (Gunnerson 1987) and secondary forms (Scott 1979). Many have been found in ovoid pits with no characteristic pattern in body alignment. Evidence for primary burial sites along the Front Range (Cassels 1990) are found at the ossuaries at the Grahagan-Lipe and Hazeltine Heights sites. Both of these sites contain remains of six to seven individuals, and appear, based on the number of articulated bones, to have been placed in the ground shortly after death. Among the first documentation of secondary burials is the Kerbs-Klein Site (Scott 1979). Five burials were located in a 1.5 meter square along with a pottery sherd, bone tools, groundstone and chipped stone. It was postulated, based on the size of the bones, that all individuals were adult. However, the bones were severely eroded.

Early Ceramic Period (1,800 B.P.-1,100/1,000 B.P.): The Early Ceramic period is characterized by the reduction in size of projectile points. However, the transition from the larger Archaic style to the smaller corner notched point appears in some areas to be a slow one. This is also the time when initial attempts at horticulture appear. At LoDaisKa (Irwin and Irwin 1959) several specimens of maize were recovered during excavation. It is unclear whether horticultural activities actually took place at the site or the maize was the result of trade activities.

The number of documented sites dating to the time period increases over the number documented for the Archaic Period. This may be the result of an increase in population in the area or change in settlement patterns.

Middle Ceramic Period (1,100/1,000 B.P.-500 B.P.): While various forms of architecture traditionally associated with the Plains Woodland Culture in the mid-west (Gunnerson 1987) were in existence east of Colorado, they made only a slight incursion into the northeastern portion of the state. Although the Colorado sites do not exhibit the classic wattle and daub house construction of housing, other examples of this culture can be found in types of crops grown at these locations and the ceramic vessels found. Generally, sites displaying evidence for architecture are found in the stone circles in northeastern Colorado and the circular/rectangular room blocks in southeastern Colorado.

Around 1400 A.D. there appears to be a decrease in the number of documented prehistoric sites. It may be that climatic conditions such as a drought, brought about an abandonment of the area (Jepson and Hand 1994).

Late Ceramic Period (500 B.P.-200 B.P.): Following a hiatus from the plains because of climatic pressures, around 1500 A.D. migrations began to bring prehistoric peoples back into the region. At this time because of the incursion of Euro-Americans, written documentation began to distinguish between different groups of people and the archaeological complexes associated with them (Gunnerson 1987). Along the Front Range, Athabascan groups migrating from the north and Shoshonean groups from the west began to displace Caddoan peoples practicing the earlier Plains cultures. By the 1750s the introduction of the horse and firearms had altered the social and economic structures of all the plains tribes. Two cultures influenced the archaeology found in the foothills and the plains of eastern Colorado. This included occupation of the area by Shoshonean groups. Documentation of their occupation was found initially at Graeber Cave (Nelson and Graeber 1966). A ceramic vessel exhibiting the distinctive flat-bottomed style resembling the Intermountain Tradition (Gunnerson 1987) from Wyoming was found along with a rock ringed hearth, chipped stone, a side notched, serrated projectile point and a triangular unnotched point.

A second culture had its greatest influence on the far eastern plains of Colorado with origins still further east. The Dismal River Aspect was generally located in southwestern South Dakota, southeastern Wyoming, western Nebraska, and western Kansas. Characteristics of the culture include a distinctive architectural style in which dwellings were supported by five central posts; thin grey-black pottery decorated in the style of other adjacent groups, small unnotched projectile points and bone tools. These people have been

identified with Plains Apache (Gunnerson 1987) based on documented evidence which corresponds to the time span designated as Dismal River.

Overview of Prehistoric Archaeological Sites Adjacent to the Project Area

Previous archaeological investigations throughout the region surrounding the North Table Mountain site have established that the region was inhabited beginning in the Paleo-Indian period (Irwin and Irwin 1959, Stanford *et al.* 1981, Wedal 1986). Habitation of the area continued through the Archaic (Irwin-Williams and Irwin 1966, Nelson 1969, 1981) and the Woodland (Irwin-Williams and Irwin 1966, Irwin and Irwin 1959, Nelson 1967, 1969, 1971, 1981). Since the architectural manifestations found on North Table Mountain are unlike any found at sites located regionally, this section will serve as a comparison of those sites and their similarities to each other.

LoDaisKa

LoDaisKa is a deeply stratified rock shelter located near the town of Morrison, Colorado. The primary objectives at LoDaisKa were to create a typology through a comparative analysis of the artifacts found and to provide an assessment of the cultural affiliation of the inhabitants based on cultural material remains. It was determined that four cultural complexes could be specifically identified while a fifth complex was less distinctive. Two of these complexes appear to be associated with the Great Plains culture and the remaining three with the Plains.

The dating for each of these complexes was based on the naturally occurring stratigraphy of the site and the typology of the artifacts. Complex A was dated to the Fremont Period (Irwin and Irwin 1959: 129) based on similarities in pottery styles, gaming pieces and projectile points. The presence of Dent corn in this complex also was considered an indication that an ecologic orientation similar to the Fremont was present. Other cultural characteristics associated with the Fremont such as architecture or rock art were not found.

Complex B has been attributed to the Woodland culture (Irwin and Irwin 1959: 132). Artifacts in this complex include cord marked pottery and corner notched projectile points. Again corn found at this level has been related to the Plains Woodland culture. Charcoal samples taken from this complex have been dated firmly in the Woodland Period (Irwin-Williams and Irwin 1961).

Definition of complex C was complicated by an apparent mix of cultural material perhaps brought about by recurrent occupation of a number of groups. Overall this complex has been dated to the Middle Archaic based on the similarity of points found to those of the McKean and Signal I complexes. End scrapers, prismatic flakes found also showed similarities to those found at McKean sites.

The deposits of complex D at LoDaisKa are the earliest at the site. Characteristics of this complex, based on the cultural material found, were determined to be typical of the Desert Culture. Projectile points from this complex were described as being similar to those found at Danger Cave in the Great Basin, sites found in the Uncompadgre Complex and Ventura Cave. Irwin and Irwin (1959) discuss LoDaisKa as it relates geographically to both the Great

Basin and Plains cultures and its location in the hogback valley with groups utilizing the mountains, hogback valley and the plains with some cultural overlap.

Magic Mountain

The Magic Mountain site is located south of the town of Golden. This site is representative of the many sites located in and around the numerous rock shelters that predominate the landscape of the Hogback Valley. The primary emphasis for research at Magic Mountain in the 1960s was to confirm and extend the regional sequence found at LoDaisKa and to establish temporal typologies based on the cultural material found. Also in question was the way in which the Hogback Valley related to the adjacent cultural areas to the west and east.

Zone A at Magic Mountain relates to the Woodland Period based on ceramics found in this level. Sherds recovered at this site were the same type as those found in complex B at LoDaisKa. Lithic material including end scrapers and projectile points also place this zone firmly in the Woodland Period.

Zone B seems to be the most equivocal. Only a small amount of artifacts were removed from this zone. A burial recovered was similar in nature to those found on the plains, however no cultural affiliation was assigned to this zone.

Irwin-Williams and Irwin designated zones C, D and E to what they described as the Apex Complex. Material recovered from these zones reflected temporal and stylistic variations based on stemmed projectile points. However, many of the points found in the Apex Complex were absent at LoDaisKa. In both cases there is an apparent preference for end scrapers over side scrapers (Irwin-

Williams and Irwin 1966: 197). Based on this evidence Irwin-Williams and Irwin postulated that some contact might have taken place between the two groups.

The Magic Mountain complex overlaps the Apex complex at zones D and E. This overlap may represent occupation of the site by different groups and their resulting geologic disturbance. Again, projectile points and prismatic flakes are used to define this complex temporally to the Early Archaic. Site patterning is apparent in this level. Ground stone appears to be concentrated in one area while other artifacts are more equally dispersed throughout the site.

Irwin-Williams and Irwin propose that the Magic Mountain Complex and the Apex Complex are distinct from each other. This would indicate a cultural or temporal difference between the occupants of the site. These differences include stone working techniques; distinctive ground stone, triangular knives and side scrapers. The Apex Complex can be related to known distributions at LoDaisKa and other locations. Because the Magic Mountain Complex precedes the Apex Complex, it may be that their dissimilarities are related to the sequence of depositions. That is to say, the Magic Mountain Complex was laid down before the Apex complex and may be older than any stratigraphic sequence at LoDaisKa.

Irwin-Williams and Irwin used the geologic formation of the Piney Creek Alluvium to define temporal differences in both the Magic Mountain and LoDaisKa sites. Until recently, these two sites have long been the basis for cultural-chronological sequences of dating prehistoric habitation along the Front Range.

The direction of recent mitigation at the Magic Mountain site (Kalasz and Shields 1997) was to excavate both Archaic and Ceramic deposits to provide a more precise chronological sequence supported by radio carbon dating. Additionally, the investigation sought to discern climatic and environmental changes through time with relation to site function, site technology, interregional relationships and additional information on burials. The investigations conducted over a two year period found a diverse cultural assemblage representative of domestic, culinary and manufacturing activities. The high density of chipped stone found indicates that the manufacture, use, recycling, and maintenance of tools took place at the site. These findings suggest that several settlement strategies took place at the site. These strategies became more complex and lead to increased sedentism and the building of an architectural structure. It is postulated (Kalasz and Shields 1997) that the occupants of Magic Mountain were probably highly mobile hunters and gatherers seasonally with increased amounts of time spent at the site using it as a residential base rather than a short-term shelter.

Cherry Gulch

The Cherry Gulch site is located west of Denver in the Hogback Valley between Red Rocks Park and the town of Morrison in Jefferson County, Colorado. It is an open camp two miles north of the Magic Mountain Site.

Features found at this site consisted of small shallow hearths composed of 10 to 20 stones with little to no evidence of charcoal. The most distinguishing feature found was a fire rock midden consisting of fire blackened stone and a few

manos and metates. It was through the stratified deposits of the midden that a chronological sequence for the site was determined.

Projectile points recovered at the site were similar to those reported in published and unpublished data which included the Great Basin, including the mountains and the Great Plains. Projectile point types 1 and 2 are similar to those found at the Mount Albion site (Benedict and Olson 1978: 48) and also with MM3 points from Magic Mountain (Irwin-Williams and Irwin 1966) which are associated with the Early Archaic Period.

Regionally, the Cherry Gulch projectile point type 3 can be associated with the MM6 points also found at Magic Mountain. However, Cherry Gulch points lack the heavily serrated edges found on the Magic Mountain points. This type of point may be related to an early McKean complex (Nelson 1981) and therefore represent dates coinciding with the Early to Middle Archaic.

Nelson was not able to make a local comparison of point types 4 and 4a. These points are described as being corner-notched, some with serrated edges and with no serrated edges.

Point types 5 and 6 are similar to points found at other hogback valley sites specifically the MM18 (Irwin-Williams and Irwin 1966), Van Bibber Creek (Nelson 1969: 89) and LoDaisKa (Irwin and Irwin 1959). All of these points fall within the range of characteristics that have been established as the Middle Archaic.

Type 10 projectile points are small corner notched and stemmed. Some examples are serrated and some are not. Nelson assigns these points to the Woodland Period, specifically the Hogback Phase (Nelson 1971). Along with the

points found at this level were several cord marked pottery sherds which suggest paddle and anvil method of manufacture.

Nelson posits that because of an abundance of small corner notched points related to the Woodland Period found along the Front Range and the frequency of mule deer and mountain sheep remains found in the area that an upper Republican culture was moving toward the foothills and mountains adapting to a different technology. The movement from east to west is dated by such sites as Michaud at 150 A.D. (Breternitz 1969: 118) to LoDaisKa (690 to 980 A.D.) (Breternitz 1969: 119). Nelson does state that this representative sample is small but fails to discuss errors in the sampling bias. It may be that the types of animals utilized by groups occupying the Hogback valley varied little over time but what did change was the lithic technology (Michlovic 1986).

George W. Lindsey Ranch Site

The George Lindsey Ranch site is located north of Golden along the Leyden Creek Drainage near the top of a Fox Hills Sandstone outcrop. The site consists of two "stone enclosures" that are rectangular in shape. Hearths and lithic scatters were found in the structures.

The first of the rectangular enclosures contains a fire pit along the north wall as well as a concentration of lithic flakes and artifacts. Found in the second enclosure are three hearths, a possible storage basin and a concentration of lithics.

This site is unusual because of the lack of stone walled constructions at other sites along the Front Range. Stone circles have been observed in abundance on the Great Plains and have been described as tipi rings or stone constructions with ceremonial significance (medicine wheels). The rectangular alignment of stones found may suggest that these structures were used in a different manner (Nelson 1971). According to Nelson the location of the fire hearths in the interior of the structures suggests that hunters used this site as a sheltered hunting outpost seasonally. Artifacts recovered consist of small-serrated corner-notched points characteristic of the Woodland Period.

Van Bibber Creek Site

This site is a stratified open campsite situated along Van Bibber Creek north of Golden. A small irrigation ditch that runs through the site has disturbed the position of some of the artifacts.

Zones B and C have been designated as preceramic. A radiocarbon date of 2140± 145 B.P. was accessed for Zone C. A date of 100-200 A.D. has been tentatively suggested for Zone B based on its stratigraphic location above Zone C and on the lithic material recovered. Projectile points found in these zones are similar to points MM20 and MM26 found at Magic Mountain and suggest Middle and Late Archaic occupations respectively.

Zone A contains pottery typical of Plains Woodland Cultures. Projectile points found in this zone were corner-notched and side-notched. The most striking difference between the Van Bibber Creek site and other sites located in the Hogback Valley, according to Nelson, is that the points found at this site are

not serrated. Otherwise they are characteristically similar. Nelson considers the differences between Van Bibber Creek and other Hogback Valley sites is related to the stylistic influences of dissimilar cultural groups residing in the area.

Historic Use of North Table Mountain

Although use of the surrounding area prehistorically is known and documented it may also be assumed that aboriginal peoples used North Table Mountain for various subsistence and ceremonial activities. Early settlers of the area picked up many artifacts from these activities so that little remains to identify specifically what activities took place. However, some early references to Native American practices have been described in a report submitted to the Smithsonian Institution (Cannon, 1877).

> Next in importance to the fire-places are what are locally denominated "Indian circles." They are usually constructed of bowlders [sic] arranged in the form of a rude circle, about a yard in diameter, with a cavity a foot or two in depth, hollowed out in the center. The most common opinion is that they were used by the indians as fireplaces. The modern indians are said to encamp in sites similar to those in which these circles are found, and in some cases surround their fire with a wall of stones, to prevent them from being extinguished by the wind. Some have supposed that they were occupied by signal-fires, and this may have been the case, as most of them are in situations that would be suitable for the purpose. Again, it has been thought that they mark the graves of some prominent indian warrior or chief, although it was not the usual custom of the Indians to bury their dead, but rather to place the corpse on an elevated platform.
>
> One of these circles, on North Table Mountain, appeared so much like a grave, that a party of excursionists made an ineffectual attempt to open it, in hope of finding something to reward their pains, as indians frequently

> bury utensils and weapons with the dead. The wall surrounding the supposed grave differs from that of other circles in being constructed of flat slaps of basalt, instead of bowlders of quartzose rock, and on the southern side of the enclosure from the crater of an extinct volcano a mile or more distant, and had the appearance of a tombstone. The ground for some distance around give forth a hollow sound, as if there were a cavity beneath, and on a hill near by is a mound apparently intended as a mark in finding the grave.

The above account was the only documented finding of prehistoric structures on North Table Mountain until a systematic survey of the area by Robinson and Benz (1978). The first historic reference to North Table Mountain occurred in 1860 publication. The article describes an individual climbing the mountain (Robinson and Benz 1978). Additional references to the mountain pertain primarily to the geology found there.

Many museums around the country have in their collections zeolite crystals which came from a quarrying operation on the south side of North Table Mountain that began in about 1885 (Johnson and Waldschmidt 1925). A local source of zeolite became important as the internal combustion engine created a growing demand for petroleum products. Then, as today, the principle use of zeolites is as a catalyst in the refining of crude oil. Mining of zeolites continued off and on until about 1930, the last operation taking place along the northwestern rim (Johnson and Waldschmidt 1925).

Quarrying of basalt by blasting was also an important early activity on North Table Mountain. Operations on the west side of the mountain supplied blocks used to separate the tracks on Denver's streetcar system (Wilson 1917). Various companies continued quarrying and North Table Mountain became the

source of the second largest daily tonnage of basalt in Colorado until 1950 (Robinson and Benz 1978).

Historic occupation of North Table Mountain by Euro-Americans occurred in the late 1800s. Dr. and Mrs. Bryant, the Bussert family, P.D. Goss, J.F. Thompson, J.W. Gaynor, and the Colorado Svs. Bank all are shown to be property owners on a Willits Farm Map of the area dated February, 1899. Foundations of both the Bryants' and the Busserts' homesteads can still be seen. Roy F. Bussert and his wife, Dolly Tripp, remained on the mesa farming two wheat fields in section 22 until 1922. The Busserts had good and bad years and in 1916, they harvested 1800 bushels (Kilburn and White 1992). Eventually, the land was purchased by Heine Foss and in 1950, when he purchased additional portions of the mountain, the land was very overgrazed. Mr. Foss began a campaign to reclaim the grasslands by planting grasses over much of the area. He planted $1,000.00 of grass seed for the next 20 years. Additionally, he filled in eroded ditches and gullies to create a more natural landscape and to support his herd of Purebred Polled Herefords (Kilburn and White 1992).

Today North Table Mountain Corporation controls grazing on the mesa. Cattle are placed on the mesa in May and graze until fall. The length of grazing time varies with seasonal fluctuations and the productivity of the foliage.

Chapter Four

Research Design

The research design guiding this project was based on the use of stone circles and cairn lines along the Colorado Front Range and Central High Plains. This research has described these structures in terms of their relation to game drive systems (Benedict 1975a, 1975b, 1979, Frison 1991, Olsen 1970). Based on research in the Hogback Valley, preceding this study, descriptions of prehistoric events delineating chronological determinations, cultural affiliations, settlement patterns and exploitation of resources have been discussed. The goals of this project are twofold.

The project seeks to determine whether an association exists between cairn lines, stone circles, and adjacent activity areas. Understanding the relationship between the different sites in the project area will provide an understanding of how the sites were used as a possible game drive system. This knowledge will facilitate the discernment of the hunting practices used by groups populating the area not found in other sites in Jefferson County.

Second, the project seeks to determine the chronological use of the area through analysis of any temporal diagnostic cultural material found. This material may reflect changes in land use patterns over time and may not be associated with hunting practices, but with domestic or other activities. Examination of site activity and culturally imported material types may indicate seasonal movement of prehistoric groups utilizing the area.

Chapter Five

Methodology

Field and Laboratory Methods

Survey and Excavation Methods

A 100 percent survey of the project area was carried out in April of 1993. The survey involved both project directors and several volunteers from the Denver Chapter of the Colorado Archaeological Society. Surveys generally took place on the weekends however, some weekdays also were scheduled. Sites were marked with pin flags and then recorded and mapped.

Two features (stone circles), one at site 5JF962 and one at site 5JF966, were partially excavated. Four 2 m by 2 m test units were established at each of the features. Additional units were opened up around the periphery of Feature 1 at 5JF966 to determine if any manifestations of cultural activities were present around the perimeter. Only half of each feature was excavated in two by two meter units (Appendix 0). Because of the lack of soil depth at each of these sites, it was decided that the units were to be excavated in arbitrary 5 cm. levels to bedrock. All cultural material found was bagged and assigned a level and unit number. All soils excavated from the units were screened through a one-quarter inch wire mesh. Documentation was completed for each level excavated.

Protein Residue Analysis of Selected Lithic Artifacts

The decision to perform Protein Residue Analysis on the projectile points found at the site was made to address the following research concerns: (1)

survivability of proteins over time, (2) determination of plant and animal utilization by prehistoric peoples.

Although controversy continues to surround the methodology used to detect residual proteins, this project sought to create a standardized series of tests to minimize misinterpretation. Based on available information, it was decided that using an Immunoassay, specifically, an ELISA (Enzyme-Linked Immuno Sorbant Assay) would be the best method for of testing for residual proteins.

Protein Survivability

Blood consists of several elements including albumin and globulin, which occur, in plasma and hemoglobin found in the red blood cells, (Downs and Lowenstein 1995). These proteins can be analyzed to determine survivability because of their physical properties (Sensabaugh *et al.* 1971 a,b). The rates at which individual elements of blood deteriorate are dependent on environmental conditions (Downs and Lowenstein 1995). Experiments (Cattaneo *et al.* 1993, Gurfinkel and Franklin 1998, Hyland *et al.* 1990, Loy 1983, Loy and Wood 1989) dealing with protein degradation suggest that a number of factors contribute to protein preservation. Electrostatic interactions (Loy 1983) between clay particles and blood residue on artifacts may protect against microbial activity and the removal of protein by water. Gurfinkel and Franklin (1988) have shown that adhering soil does indeed protect the blood proteins on artifacts in experiments where blood was applied to soil and clay particles and allowed to dry.

Using a dried blood sample Sensabaugh et al. (1971a) suggest that proteins undergo modification and become cross-linked covalently to form a proteinaceous, high molecular weight mass. Because the process of modification also lowers the level of biological activity of the sample, the method of analysis must be sophisticated such as those used in immunoassays to detect the species of origin.

Experimentation by Gurfinkel and Franklin (1988) has shown that organic material undergoes a rapid process of degradation to the point that only low molecular fragments remain. When this point is reached, these fragments stabilize to form durable and long lasting residues, which can be detected. In his 1983 report, Loy also suggests that exposure to air diminishes the degradation of hemoglobin by a process of oxidation, which denatures serum proteins into a more stable form. Hyland *et al.* (1990) suggest that the fatty acids found in blood join with protein molecules to form an insoluble complex that renders the complex impervious to dissolution by water.

Immunoassays

In the medical profession, immunoassays are used to measure the presence of a substance by taking advantage of an autoimmune response. In humans, the immune system is responsible for fighting off foreign bacteria and viruses. Antibodies bind with the foreign proteins (antigens) to prevent disease by, in some cases, killing the antigen. Immunoassays use the immune response between antibody and antigen to produce a precipitate or a color change, which denotes a positive reaction.

There are several types of immunoassays each meeting specific needs. Each of these assays measures the presence of a substance through the detection of an immune response. The most important factor influencing the choice of test used is the concentration of the sample. Concentration determines the precision of the test needed. The more sensitive the test, the greater the potential for recovery of minute amounts of protein. The ELISA immunoassay was chosen for this project because of its ability of measure minute amounts of protein and because it can never be known just how much residual protein remains on a artifact.

Field Methods

Much of the methodology used in blood residue analysis comes from methods used by forensic researchers. At present, there are no universally acknowledged procedures for detecting protein residue on prehistoric stone tools (Marlar *et al.* 1995). Because of this, the results vary from lab to lab and researcher to researcher. This project has attempted to alleviate many of the problems inherent in other research by analyzing various aspects of assays and procedures used beginning with acquisition of the artifact in the field and its subsequent analysis.

After deposition, handling of artifacts by field workers may constitute the primary element of contamination. Contaminants from physically handling the artifact can potentially alter laboratory results. Therefore, field recovery of artifacts proceeded in the following manner. Field workers did not handle

artifacts found in situ. Using a trowel they were placed in zip lock bags and labeled. Additionally, approximately 3 grams of soil was taken adjacent to the artifact and placed in a zip lock bag. Soil samples were processed in the same manner was as the artifacts and were used to evaluate the possibility of false positive results on each of the artifact samples.

Laboratory Methods

All projectile points and soil samples found within the project area were tested for blood residue using a non-competitive ELISA immunoassay. Many tests such as Hemestix (Downs 1995, Loy 1992), Hemoglobin Crystallization (Loy and Hardy 1983), Immunoelectrophoresis (Newman 1989), and Immunoassays (Marlar *et al.* 1995, Truoss and Barnes 1996) have been used to detect prehistoric protein residues. Only immunoassays can measure residual protein in the picogram level (Tuross and Barnes 1996). This is very important when analyzing prehistoric proteins, which may not be present in large amounts on stone tools.

Dr. Richard Marlar carried out analysis of the artifacts at the Thromosis Research Laboratory at the Veterans Administration Hospital in Denver, Colorado. A non-competitive ELISA assay was used to test projectile points recovered from the project. The artifacts were placed in a buffered solution and sonicated for a period of two hours. This process has been shown to have the potential to remove the greatest amount of protein from artifacts being tested. The resulting solution was placed in Minicon concentrators, which create a highly concentrated protein solution.

The concentrated sample is pipetted onto a 96 well polystyrene microtitre plate and allowed to incubate overnight. The following day a primary antibody is added to the plate and allowed a two-hour incubation period. Finally, a secondary enzyme-labeled antibody or *detector antibody* is added to the plate. After an incubation period 0-plenylenediamine (OPD) is added to the plate and if one or more of the sample are positive, a color change takes place. The species tested for were Bison, Deer, Elk, Canine, Feline, Pronghorn, Human, Horse Bovine Rabbit Mouse, Rat, Turkey, Waterfowl, and Snake.

Laboratory Results

The results of the blood residue analysis show that only one of the nine artifacts (101.2.2 from 5JF963) submitted tested positive for deer blood. None of the other artifacts tested positive for any of the other antibodies used in testing.

Site Number	Artifact Number	Artifact Type	Material Type	Positive/ Negative	Species
5JF963	101.2.1	P. point	P. wood		
5JF963	101.2.2	P. point	Chalcedony	++	Deer
5JF963	101.2.4	P. point	P. wood		
5JF963	101.2.5	Biface frag	P. wood		
5JF965	101.4.2	P. point	P. wood		
5JF965	101.4.3	Biface frag	P. wood		
5JF989	101.6.1	Biface frag	Chert		
5JF?	IF101.8.1	P. point	P. wood		
5JF?	IF101.9.1	P. point	Quartzite		

Table 5.1 Results from Protein Residue Analysis

Because the sample size was so small, it is not possible to answer other questions that would be appropriate with a larger sample, such as whether material or tool type preferentially affects protein preservation. Additional questions that might be asked relate to preferential cultural use of animals and plants.

Chapter Six

Site Descriptions

The Sites

The six sites discussed in this report are located on the western part of the central portion of North Table Mountain (Appendix A). They occupy the peripheries of two large ephemeral, east-flowing drainages, two short west-flowing ones, and one very shallow minor drainage. These sites consist of two sets of rock cairn alignments, four stone circles, and four relatively discrete surface artifact scatters. These sites have been grouped on the basis of their geographic and spatial relationships to one another and the composition of the artifact scatters. Although the sites are in close proximity to each other, and in one case actually overlap slightly, they have separated rather than lumped them. This distinction was felt necessary, with one exception, because there was no direct association of artifacts with the nearby stone constructions or any other factor to indicate contemporaneity.

5JF966 interpreted as a game drive system, encompasses the largest surface area of the six sites covered in this report. The site consists of a pair of cairn lines, one stone circle, and three utilized petrified wood flakes. The cairn lines run approximately east to west along both sides of east/west trending ridges (Appendix A). The lines ascend their respective ridges and continue to follow more or less level planes, curving inward and ending on the west side of a divide

IFs

NTM 4 5JF2578 worked chalcedony fragment
NTM 5 5JF2579 point
NTM 8 5JF2577 [illegible] point

approximately 35 meters from the rim where the drainage drops off to the talus slope below.

The cairns themselves are made up of small basalt boulders and cobbles, the majority of which support lichen colonies on their upper and northern surfaces. Unfortunately, lichens from this low altitude have no value as dating tools due to their short life span (James Benedict, personal communication 1993). Very few stones have dead lichen colonies on an undersurface which could indicate that the stones may have been added to the cairn at some time after the original construction or had toppled from a higher position in the cairn to a lower one.

The entire cairn line creates a U-shaped structure in which the cairns are irregularly spaced. Some cairns are one to four courses high with the majority being one to two courses high. Identification of some of the cairns is problematic due to the downslope movement of the soil from the ridge, which has caused some stones to become dislodged from their original position.

Construction of the cairns varies. Approximately half of the cairns have external diameters of less than two meters, while the remaining are larger. The stones used in the construction of the cairns vary in size. The two largest cairns each contain over 200 stones, while the rest average 40 stones each. These larger cairns have stones that range in size from cobble to very large with the cobble sized stones in the center of the cairns and the larger stones making up the perimeter. The construction is such that the larger stones were placed first around the perimeter and the smaller stones were then piled on top of the base created by the larger stones. The small cairns form the arms of the U-shaped

alignment, while the larger cairns form the case of the U with the open end of the U-shape toward the east. (Appendix A). On the southeast-facing surface of one of the boulders in one of these larger cairns, is what appears to be a lightly incised pattern of vertical and horizontal lines, which may be rock art.

The stone circle included in this site is designated Feature 1 and is located on the center of the low ridge that forms the southern side of the drainage, some 10 meters south of the south cairn line. This feature was partially excavated but no cultural material was recovered. A four-meter square grid was divided into one-meter units. Excavation was concentrated in eight of these one-meter units. Because no natural stratigraphic levels were evident, and the circle appeared to be lying just above bedrock, all units would be dug in 5 cm. Increments. The units were taken to bedrock at depths varying from 2 to 25 cm.

No artifacts were found in the interior surface of the circle. 117 stones were used in the construction of the circle. In general the soil was a brown gravely sandy loam, a residual soil from the surrounding decomposed basalt. The soil around the periphery of the circle was held in place by the stones while, in the center of the circle, the level of the ground was higher.

Along the northeast section of the circle, stones appeared to have fallen to the interior of the feature. Many stones lay stacked on top of each other and this section of the circle may have been at one time two to three courses high. In unit S2-3 there appeared to be the deliberate construction of a small circular structure. This structure did not display any fire-cracked rock, charcoal staining, nor did it have the characteristics of a storage cyst.

No postholes were found around the stone circle. There was also no break in the circular nature of the feature that might indicate an entryway into a living area. It was determined, based on these findings, that this feature was probably not a habitation structure. There was no other evidence for a hearth of any kind in or around the stone circle.

During the excavation it became evident that in the lower levels, the stones had been placed on the ground not on bedrock. Stones rested on soil that was 8-10 cm. in depth above bedrock that may indicate the bedrock outcrop on which the structure rests was not exposed at the time of construction. The stratigraphy of the feature is not complex. In the upper levels the soil tended to be loose due to the root action of the overlying vegetation while the lower levels were more gravely. This was due to the freeze thaw action that takes place seasonally. The basalt undergoing this below ground erosional process, breaks off into pebble sized stones.

An additional three one meter unites were opened up in the area outside the stone circle. Each was excavated to bedrock. In unit 1 a petrified wood flake was found. The other two units revealed no artifacts.

One utilized flake was found less than a meter to the north and downslope of the outer edge of the feature. From this feature, much of the mesa top is visible, including most of the two large drainages along which the various cairn lines are situated, as are all the sites except 5JF964.

5JF963 is a sparse lithic scatter of chipped stone on the southeast end of the flat drainage that runs through 5JF966 (Appendix A). The artifact scatter,

composed of a few flakes, formal tools, and three projectile points, actually overlaps the first cairn on the south line of 5JF966. The points have been identified as a Late Archaic dart point and a Hogback Phase point. A fragmented metate was found next to this cairn, with a mano one meter away. The tip is missing from the Archaic point and it's broken edge shows use wear. The Hogback Phase point shows evidence of heat treatment. A third point found is made from chalcedony. This point is fairly symmetrical in shape and has been reworked as indicated by the wide edge angles. Flaking occurs only along one edge of the point and the base is stemmed.

The soil at this site is a gravely to sandy loam, which is again dependent on the decomposition of the residual basalt. This site is intersected by a two-track road, which has disturbed the location of some of the artifacts found. A biface fragment and a petrified wood flake were found in the road.

This site appears to be a short-term camp where some processing and lithic reduction took place. There is no evidence to suggest that the near by cairn lines and stone circles are contemporaneous.

5JF965 This small site is at the east end and just to the north of the north line of cairns in 5JF966 (Appendix A). It is located on a gentle southeast facing slope some 2 meters above the drainage bed and is centered on an outcrop of the basalt bedrock. The vegetation consists of short prairie grasses and forbs. The artifacts found at this site consist of a long narrow projectile point made from petrified wood of which the base is notched and rounded, several manos, and one stream cobble that exhibited evidence of battering. The manos found at this

site are each composed of different material. One mano fragment is made of Fountain formation sandstone. The second mano is broken in half and shows signs of battering or perhaps use as a hammerstone. The third mano is made from granite and shows heavy use wear in the form of striations along two surfaces.

5JF989 This site, a lithic scatter, consists mostly of thinning and sharpening flakes, the base of a chert biface, and two fragments of ground sandstone. The site is located just to the south of an abandoned radio tower and has probably suffered some disturbance as a result of the construction of the facility and its access road (Appendix A). All but two artifacts were found in association with recently eroded drainage channels, indicating secondary deposition by water. An original context for this material has not been located.

5JF962 is located some 250 meters west of 5JF966 (Appendix A), and is similar to site 5JF966 in that it consists of stone circles and cairns in two lines, one on each side of a drainage. The cairns at this site differ from those at 5JF966 in that they are placed lower on the slopes along the drainage, closer to the drainage channel. However, they are similar in their closeness to bedrock, the size and number of stones used in construction, and the height and diameter of the individual cairns. The overall layout is similar with the cairns converging toward the upstream end of the drainage, which ends at a low divide. A metate was recovered at the base of a cairn near the divide with a mano 11.5 meters

down the drainage. The metate was in almost perfect condition and measures 25 x 19 x .45 cm. Its surface was well worn and colonized by lichen.

The three stone circles included in this site, Features 1, 2, and 3, are located on a level soil bench at the foot of a prominent, high outcropping of basalt. The stone circles exhibit morphological differences that make each one somewhat unique.

Feature 1 is the eastern most of the three circles. It is the smallest and is the most deeply embedded of the three. The interior of Feature 1 is noticeably subcircular and depressed below the surrounding present ground surface. The soil is a gravely sandy loam and the surrounding vegetation is fairly dense consisting of short prairie grasses. The stones used in the construction of this circle range in size from 20-40 cm. in diameter.

Feature 2 is the largest of the three circles and is somewhat sub-rectangular in outline. This may be the result of wall fall as the stones were apparently stacked up as many as four courses high on the eastern side. Like Feature 1, the central portion is depressed below the present ground surface. Feature 2 was partially excavated. Again a four-meter square grid was laid out and broken down into one-meter units. The units were excavated in 5 cm. increments because of the proximity of the underlying bedrock and the absence of any natural stratigraphy. As the excavation proceeded a concentration of stones was found near the center of the circle. However, no fire-cracked rock or charcoal was found which might indicate that the structure might have been a hearth. The only cultural material recovered was one petrified wood flake in the

upper A horizon. As with Feature 1 at 5JF966, no occupation surface was observed.

Site Number	Feature No.	Description	Internal Diam.	External Diam.
5JF962	#1	Stone Circle	.88 x 1.53 m.	3.19 x 3.52 m.
	#2	Stone Circle	2.10 x 2.03 m.	3.83 x 3.52 m.
	#3	Stone Circle	Not Applicable	3.49 x 3.83 m.
5JF966	#1	Stone Circle	1.40 x 1.31 m.	3.81 x 3.52 m.

Table 6.1 Stone circle comparison between 5JF962 and 5JF966.

Feature 3, the western most of the three circles, is similar to Features 1 and 2 in its overall size, the size of the stones, and the appearance of tumbled low walls. However, the interior of the circle is covered with stones embedded in the soil, giving it a "paved" appearance. The position of these stones does not suggest wall fall, and it may be that they were intentionally placed to line the bottom the feature. Also, one of the southwest facing stones making up the wall has a number of horizontal and vertical lines lightly incised on it which are similar to those found at 5JF966. From these circles, Feature 1 at 5JF966 is visible, as is most of the southern, east-flowing drainage including all other sites discussed in this here.

5JF964 is a small activity area centered on a small knoll about 100 meters northwest of 5JF962 (Appendix A). The knoll itself is to the west and slightly below the drainage divide. A short, steep ephemeral drainage mentioned previously runs next to the knoll on its south side, emptying over the rim some 70 meters to the west. A light scatter of lithic artifacts was found on the top of the

knoll and on the west-facing slope. These included a quartz scraper, mano, and debitage mostly quartz shatter.

Chapter Seven

Material Culture

A limited number of artifacts found in the project area can be attributed to a prehistoric context. Because only three diagnostic artifacts were found discussion of changes in land use patterns over time in the project area is problematic.

The Artifacts

The total assemblage of artifacts that make up and, in most cases, define the sites on North Table Mountain, is small, comprising only 77 items, including lithic debitage (Appendix B). The artifacts are shown by site and material type in Table 7.1. They fall into two general categories, chipped stone and ground stone.

Site	Chipped Stone					Groundstone				
	Proj. Point	Uniface	Expedient Tool	Flake	No ID	Mano	Metate	Misc.	Total	%
5JF962	-	-	-	4	1	1	2	-	8	10
5JF963	3	1	-	16	2	1	-	-	23	30
5JF964	-	1	1	5	-	1	1	4	13	17
5JF965	1	-	-	2	-	2	-	1	6	8
5JF966	-	-	2	1	-	1	1	-	5	6
5JF989	1	-	1	18	-	-	2	-	22	29
Total	**5**	**2**	**4**	**46**	**3**	**6**	**6**	**5**	**77**	
Percent	**6**	**2.6**	**5**	**60**	**4**	**8**	**8**	**6.4**		**100%**

Table 7.1 Types of artifacts found on North Table Mountain.

Table 7.1 makes clear that these sites contain a low percentage of debitage. Flakes and shatter make up only 60% of the total for the six sites. At sites 5JF963 and 5JF989 debitage makes up 70% and 82% respectively. Part of the lack of debitage in the surface assemblage may be due to the highly erosional nature of the soil. Making allowances for erosion and cattle disturbance, the proportion of ground stone appears high, especially for sites closely associated with an apparent game drive, where ground stone is rarely found (Benedict personal communication).

Material Types The various material types that make up the chipped stone assemblage include petrified wood, quartz, chalcedony, chert and quartzite (Table 7.2). All but two of the six varieties of chert found on the sites on North Table Mountain are known to be obtainable locally, that is, within a 10 km radius.

Site	Material Types							
	P Wood	Chert	Quartzite	Chalcedony	Quartz	Granite	Schist	Sandstone
5JF962	2	-	1	1	-	1	-	2
Percent	29	-	14	14	-	14	-	29
5JF963	7	1	8	1	5	-	-	1
Percent	31	4	35	4	22	-	-	4
5JF964	1	1	-	-	6	4	-	1
Percent	7.5	7.5	-	-	46	31.5	-	7.5
5JF965	1	-	-	-	2	1	1	1
Percent	16.5	-	-	-	33.5	16.5	16.5	16.5
5JF966	3	-	-	-	-	1	-	1
Percent	60	-	-	-	-	20	-	20
5JF989	15	4	1	-	-	-	-	2
Percent	68	18	5	-	-	-	-	9
Total	**29**	**6**	**10**	**2**	**13**	**7**	**1**	**8**
Percent	**38**	**8**	**13**	**3**	**17**	**9**	**1**	**11**

Table 7.2 Material Types on North Table Mountain, by site and material type.

When looked at by site, the individual assemblages allow the delineation of four activity areas based on the mixtures of chipped and ground stone tools. These are sites 5JF963, 964, 965, and 989. However, the small sample of artifacts and the disturbed condition of the sites make analysis of the lithic material, statistically or otherwise problematic.

Chapter Eight

Discussion

A number of sites have been reported in the immediate vicinity of North Table Mountain. The best known of which is Magic Mountain, a large open campsite 5 km. to the south (Irwin-Williams and Irwin 1966). Excavation in 1959 and 1960 established sequential projectile point typologies for the region, based on material found in this deeply stratified site. Occupations span a period from about 6000 B.P. into the ceramic phase of the Late Prehistoric. Van Bibber Creek (Nelson 1969), 1.5 km. to the northwest of North Table Mountain, has an early radiocarbon date of 2140 B.P. Its upper level contained ceramics - the ceramic period in Colorado dated from about 2000 to 450 B.P. (Eighmy 1984). This latter date includes the period defined by Nelson (1971) as the Hogback Phase. A defining characteristic of the Hogback Phase is a style of projectile point that appears in numerous sites in the hogback valley area including Magic Mountain (Irwin-Williams and Irwin 1966), LoDaisKa (Irwin and Irwin 1959), Hall-Woodland Cave (Nelson 1967), George W. Lindsey Ranch (Nelson 1971) and Willowbrook (Leach 1966). It also occurs at high altitude sites in the Front Range such as the Murry Site (Benedict 1975a) and the Scratching Deer Site (Benedict 1975b). A projectile point identified as a Hogback Phase point was found at 5JF963 on North Table Mountain, indicating possible connection with people occupying Hogback Phase sites in this region.

The only site in the Hogback region reporting remains of stone structures is the George W. Lindsey Ranch Site (Nelson 1971) located about 8 km. north of North Table Mountain. This site consists of two rectangular stone enclosures adjacent to one another, interpreted as temporary hunting shelters, and dated typologically to the Hogback Phase.

Many sites in the Hogback Valley appear, based on available data, to be residential. Rockshelters and some open camps are stratified, suggesting continual use over time by various groups.

The cairn lines on North Table Mountain, their location in relation to the topography and the associated stone circles are similar to game drive systems described by Benedict (1975a, 1975b, 1987, 1992). Benedict reports more than 50 game drives in the area of the Indian Peaks Wilderness area and the Rocky Mountain National Park, some 50 km to the northwest of North Table Mountain (Benedict 1992). Benedicts suggests that associated stone circles in high altitude drive systems were used as hunting blinds or as areas from which to coordinate a hunt. He defines four elements that characterize a game drive system:

> a *collection* area, where animals could predictably be found grazing...; a *concentration* area, where natural topographic features and manmade structures...were used to move the animals slowly in a downwind direction; a *kill* area, where hunters lay waiting in ambush...; and a possible *overlook*, from which the hunt could be coordinated (Benedict 1987:17, emphasis in original).

Because of the lack of temporally diagnostic remains on North Table Mountain, particularly projectile points, usually numerous in game drive systems (Benedict 1975a, 1996), and the high concentration of groundstone indicating

processing activity, any definite statement about site function is difficult. Campsites, butchering and processing areas are generally located some distance from the drive systems (Benedict 1975a, 1975b, 1992).

At present, research indicates that game drive systems found in Colorado using stone construction are most often found in areas of high topographic relief such as the mountains or the basin and range area (Southwell 1995). This hunting technique has yet to manifest itself archaeologically on the plains of Colorado

Based on the data recovered at the North Table Mountain sites, it is unclear whether there is an association between the stone circles, cairns lines and activity areas because diagnostic artifacts with convincing links to particular activity areas were not found. One reason for the lack of artifacts found may be related to the nature of the soil on North Table Mountain. Soils in and around the sites tend to be very thin and are therefore easily removed from the area by water. This may explain why very little evidence was found for lithic manufacture and reduction. Reduction flakes that were found, were restricted to areas of shallow runoff drainages. Another possible reason for the lack of artifacts may be the collection practices of early residents of the area. Many projectile points were collected by residents, both young and old, of Golden (Lorraine Waggenbach, personal communication, 1994) and the surrounding ranches. Shoebox collections of projectile points and other artifacts from North Table Mountain still exist. In any case, the projectile points found during the North Table Mountain survey suggest that the project area may have been utilized at least during the Late Archaic and the Late Prehistoric Periods.

While it is possible that the stone circles were used as hunting blinds, it is also possible that they served another function. Lischka *et al.* (1983) describes some small stone circles without artifacts, in association with cairns, in North Park in Colorado. He suggests that they may be related to "ceremonial activities, such as vision quest (1983:219)." Frison points out that, "Stone circle sites are known for a lack of diagnostic cultural material (1978)." He also notes that, "small stone circles have been observed in the vicinity of buffalo jumps and may represent locations of shamanistic activity associated with communal bison kills." An example of this type of site is found in Fremont County, Colorado (5FN494). At this site cairn lines follow a shallow drainage which leads to the bison jump area at the top of a cliff. Stone circles surround the southern edge of the drainage and there is evidence for a probable sweat lodge. Benedict reports a recent fasting bed built atop the remains of a prehistoric stone "enclosure" adjacent to a drive line of cairns on the continental divide. The enclosure "may itself have been a fasting bed, rather than a game-drive blind. A hunting blind would have been superfluous at this location because the ridgecrest itself provided adequate concealment (1987:17)." Each of these examples is similar to those sites found in the project area.

In addition the presence of incised lines on one of the stones at 5JF962, Feature 3 and a stone in a cairn in the drive lines at 5JF966 may suggest some sort of ritual. One interpretation by a member of the Southern Ute tribe (Kenny Frost, personal communication 1994) is that the patterns represent corpse desiccation scaffolding and indicate the presence of a burial or a deceased user

of a vision quest site. Given these interpretations, and lack of any evidence for similar incised representations found thus far on the eastern plains of Colorado or in the mountains, the meaning and purpose of these incised lines remains problematic.

Conclusion

The relationship of the sites on North Table Mountain to other sites in the hogback valley is currently unclear. However, the stone constructed game drive systems, North Table Mountain's proximity to the hogback valley, and the presence of a Hogback Phase point suggests a probable connection with at least some of those sites. As previously noted, stone constructed game drives in Colorado have been found only in areas of high topographic relief. The association of butchering of processing sites with game drive systems in the mountains is rare (Benedict 1975a, 1978). This may be an indication that animals were removed from the site for butchering. This behavioral pattern also suggests that the animals hunted were small enough to be transported away from the kill site for processing and implies deer; bighorn sheep and possibly elk were the most likely candidates. Animals larger than deer and big horn sheep would require some processing prior to removal from the area due to the size of the animal. Because of this, kill sites found on the plains are, in many cases, associated with processing areas nearby (Malouf 1961; Roper 1990; Frison 1991).

Evidence for site architecture such as cairn lines and rock walls at kill sites away from a mountain environment appears to be limited at present to sites in Wyoming, south Dakota, Montana, Idaho and Alberta (Brumley 1983; Frison 1970; Plew 1979, 1987; Wallace 1976). In these instances bison was the primary animal hunted although remains of deer and antelope have also been found. Conversely, according to site files at the Office of Archaeology and Historic Preservation (OAHP), kill sites reported and excavated from the eastern plains of Colorado have failed to identify any such architecture. It appears that the topography of an area surrounding the kill site was used to direct game animals, especially bison, into artificial corrals, arroyos, parabolic dune traps or over low bluffs and steep embankments were animals were smothered under the weight of other animals or were crippled as they fell to the ground. Representative sites of this type include Lindenmeier, Olsen-Chubbuck, and Frasca in northeast Colorado and the Jurgens site on the South Platte River near Greeley where at least three butchering stations have been documented. While a few drives utilizing cairns and walls are found on the northern high plains (Reeves, 1978), they appear to be absent on the Central High Plains (Agenbroad 1978; Frison 1974; Frison and Stanford 1982; Frison et al. 1976; Stanford 1978; Wheat 1978). One reason for their absence may be due to modern disturbance patterns on the eastern plains of Colorado that have eradicated any architectural evidence of cairns and drive lines. It is also possible that, due to lack of suitable construction material, materials, which do not, preserve such as buffalo chips and brush were used.

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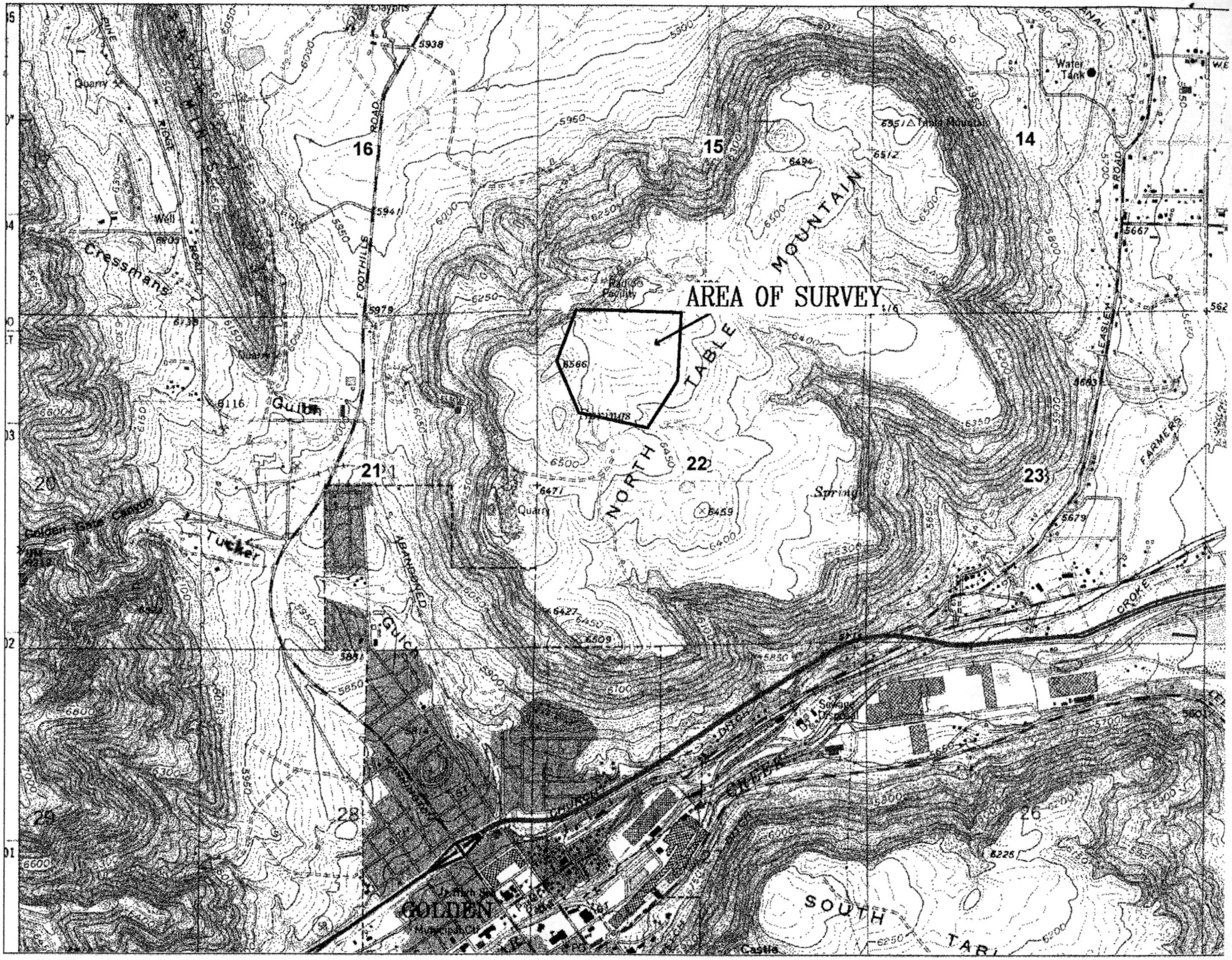
APPENDIX A

MAPS WITH LOCATION OF PROJECT AREA

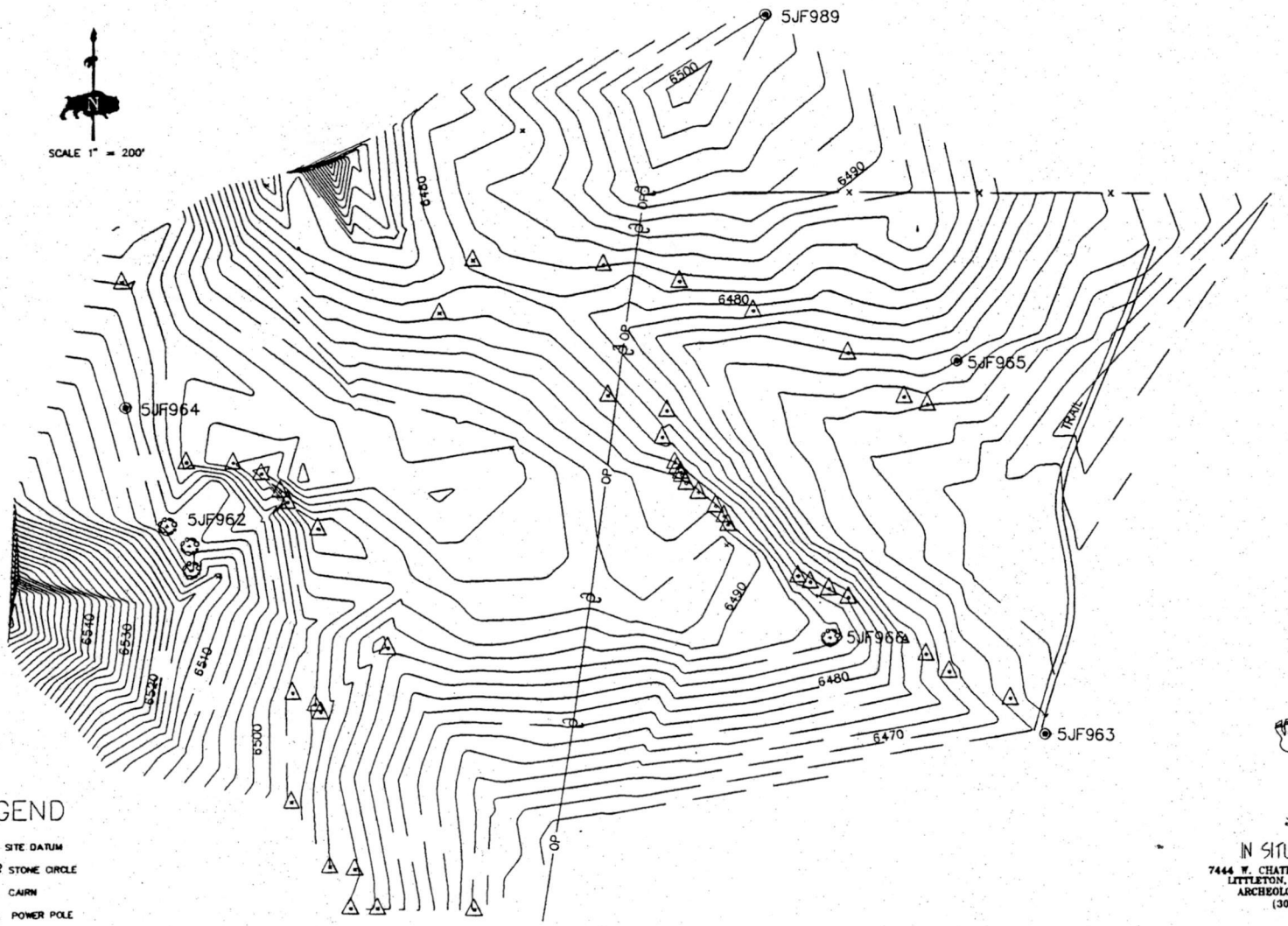
AND PREHISTORIC SITES



AREA OF SURVEY
NORTH TABLE MOUNTAIN
SOUTH TAB
GOLDEN
FOOTHILLS ROAD
LEASLEY ROAD
FARMERS
CROKE
Golden Gate Canyon
Tucker Gulch
Cressmans Gulch
Quarry
Spring
Water Tank
Table Mountain
Well
ABANDONED

SITE SURVEY

NORTH TABLE MOUNTAIN
STONE CIRCLE AND CAIRN ALIGNMENT
COUNTY OF JEFFERSON, STATE OF COLORADO



LEGEND

- SITE DATUM
- STONE CIRCLE
- CAIRN
- POWER POLE

IN SITU SURVEYING
7444 W. CHATFIELD AVENUE, UNIT E
LITTLETON, COLORADO 80123
ARCHEOLOGICAL SURVEYING
(303) 971-0955

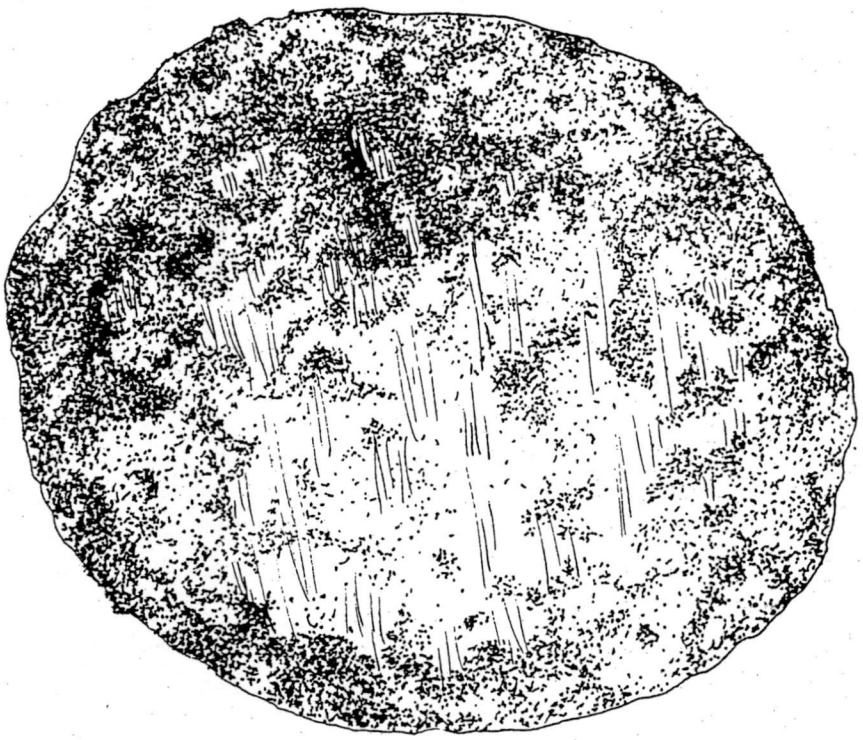
NTM
WS

APPENDIX B

ARTIFACT ILLUSTRATIONS

By

Barbara Wilson



0 1 2 3 4 cm

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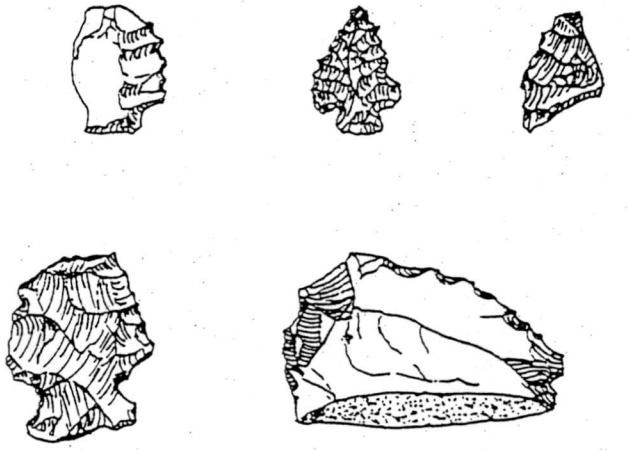
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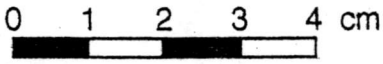

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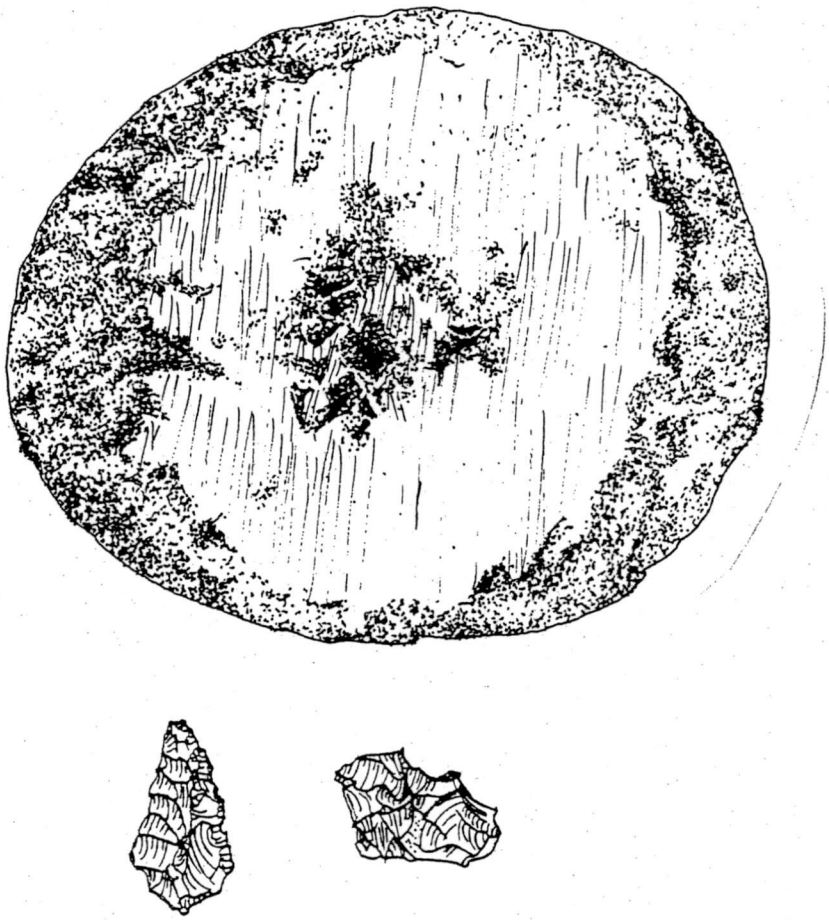

5JF965

0 1 2 3 4 cm

5JF966