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THE PREHISTORY OF THE SAN JUAN BASIN

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INTRODUCTION

Visitors and residents alike have wondered about the lives of the "ancient ones"; the builders and inhabitants of the large masonry cliff dwellings of Mesa Verde and the imposing C-shaped towns in Chaco Canyon. Yet hundreds of exposed prehistoric sites in the San Juan Basin attest to a nearly continuous human occupation since the closing stages of Wisconsin glaciation.

The foundations of American archaeology were laid upon expeditions and surveys which began in the late 19th century. Primarily interest lies in amassing museum collections and exploration of the newly opened frontier territories following the settlement of the "Indian problem." The remarkable preservation in an arid and semiarid land drew regions of graduate students to the area to dig, while the living descendants of the Pueblo peoples stoically endured the curious ethnographer's endless probing. The artifactual remains also lured pothunters and Sunday afternoon explorers to the rubble mounds and trash dumps in search of turquoise beads and whole pots destined for private collections. Artifact associations, near and dear to archaeological research goals, were thus destroyed in the search for "goodies."

Within the last 20 years or so, archaeologists have increasingly called upon experts in allied fields to deal with the abundant information obtained from large scale projects and salvage programs. The multidisciplinary approach is now an accepted mode of operation, and elicits aid from geologists, biologists, botanists, ethnographers, statisticians, aerial and infra-red photographers, as well as archaeologists skilled in specific categories of research and analysis. Ceramics, lithics, textiles, bones (anything associated with human occupation); all must be analyzed and interpreted. Always the reality of archaeologists are the logistics of setting up a field camp, and the ubiquitous shovel, screen and wheelbarrow operations.

The prehistory of the San Juan Basin has been drawn from nearly 100 years of surveys and excavations and, as the artifacts have accumulated in museum storerooms, the general outlines of prehistoric occupation have become more clear. The prehistoric technology represents a continuum of gradual changes in artifact inventory, largely the result of environmental fluctuations and the concomittant adjustments, and migrations into and within the area. The Four Corners region was seldom an area of optimum exploitation for food resources for groups utilizing a simple technology, and the prehistoric record reflects an increasing sophistication of technological adaptations to an often marginal environment. A significant problem of reconstructing prehistoric societies is the differential preservation of the record. Within a dry rock shelter, textiles, food remains and wooden artifacts accompany the more enduring pottery and stone remains and are used to better describe the life of their owners. Open sites, however, present a greatly diminished record and the scanty remains are patiently sifted and examined for clues. So much is lost. Language, social organization, folk tales, religious concepts and mythology and child rearing practices can only be speculated upon. Analogy with living Puebloan lifeways provide a valuable base upon which to build the framework of societal structure. We must keep in mind, however, that today's Indians in the Southwest have borne some 400 years of contact, often repressive and destructive of their traditional culture.

POST GLACIAL GEOCHRONOLOGY

"Prehistoric geography" is the term that Butzer (1971, p. 4) has chosen to describe the environmental basis of man's occupation of the land. Lacking written descriptive or quantitative records, the archaeologist and geologist must make climatic inferences through interpretation of evidence as seen by earth scientists. The law of uniformitarism can be culturally applied to sources of water, shelter and food. The level of technology is quite different, but the basic survival needs are much the same as the present. Artifacts and their contextual associations are but one facet of archaeological interpretations. Paleoenvironmental determination complements the scene of the man-created artifact.

Providing clues to prehistoric environment is the domain of the "soft dirt" geologist. Soils, plant remains and events related to recent glacial activity form the basic bank of information for the geochronologist. Absolute dating methods include carbon-14 analysis, dendrochronology and historic records. Pollen analysis, ceramic analysis and stratigraphy provide measures of relative dating. Interpretation of soil and sediment characteristics of structure, texture, consistency and other features can be used to reconstruct paleoenvironmental conditions within whose limits man had to fulfill his basic survival needs.

The post glacial environment in the Southwest has been discussed by a number of authors, to wit: Antevs 1952, 1955; Bryan 1925, 1941; Clisby, *et al,* 1957; Mahrer 1961; Martin 1961; Martin and Mehringer 1965; Mehringer 1965, 1967; Mehringer and Hays 1965; Mehringer, Martin and Hayes 1967; Haynes 1966, Haynes and Agogino 1966; Kottlowski, *et al,* 1965; Peterson and Mehringer 1976. These authors have recognized an alluvial chronology defined by Haynes as, *"a stratigraphic record of alluvial deposition and erosion that occurred between late Wisconsin time and the present"* (1966, p. 2). These alluvial strata have been recognized in the deep arroyos of the Rio Puerco Valley of New Mexico and the horizons have been identified and named by Fred Nials (personal communication) of Eastern New Mexico University. The correlations of Haynes' chronology, Nials' horizon nomenclature and climatic interpretations and associated culture complexes appear in Table 1.

The alluvial deposition and erosion record is characterized by three periods of alluviation separated by periods of arroyo cutting, widespread in most valleys of the Colorado Plateau,

Table 1. Summary of Alluvial Sequences (BP—before present)

Deposition Number	*Deposition Letter*	*C-14 Dates*	*Colo. Plateau Horizons***	*Rio Puerco Horizons*	*Horizon Descriptions*	*Climatic Implication*	*Cultural Period*
1	A_1, B_1	+11,500 BP*	—	Two Creekan	sands, gravels, paleosols	abundant moisture	Paleo-Indian
1	B_2	11,000-7500 BP*	Jeddito Alluvium	Cuervo	clays, silts, organic material	moist conditions tending toward gradual drying	Paleo-Indian
1	C_1, C_2	6880-4000BP* 5680± 430#		Salado	sandy layers, red sands at aeolin sites	Altithermal. Sparse rainfall, warm, dry	Archaic
2	D_1, D_2	4900-1900BP* (AD 1)	Tsegi Alluvium	Salazar-Tapia Creek	silts, clays, organic material	moist conditions	Archaic, Anasazi
2		2900-2600BP# (900 BC-600 AD)		Puerco Dam	thin sandy layers	Fairbank Drought	Anasazi
		1 AD-present#		Guadalupe	sandy layers	semiarid conditions	Anasazi
3	E	1200-1850 AD	Naha Formation	Guadalupe	thin dark layers in channel fills	moist/semiarid conditions	Anasazi, Athabaskans, Historic
		1800-present		channels		semiarid, arroyo cutting, erosion	Historic

**Kottlowski, Cooley, Ruhe 1965:205
* dates by Haynes 1966
# dates by Nials, personal communication

and ranging from late Wisconsin in age to about A.D. 1880 (Kottlowski, *et al,* 1965, p. 294). Unit A of Deposition 1 lacks positive evidence of man and contains extinct fauna of mammoth, horse, camel, wolf, sloth and bison. The buried remnants of valley fill are composed of fluvial gravels, sands, silts and clays. Pollen analyses of this earliest unit of the initial post glacial alluvial deposition indicate considerably more aboreal vegetation than today (Haynes 1966, p. 7). Also within this period of deposition are units B1 and B2 which Haynes describes as sediments and silts. B2 is marked by increasing calcification toward the top indicating weathering and weak soil development during aggradation under conditions of decreasing soil moisture, a conclusion supported by pollen records at two archaeological sites (Haynes 1966, p. 9). Associated with the now extinct *Bison antiguus* and *Bison occidentails* are artifacts from the Folsom and later Paleo-Indian projectile point complexes over a wide geographic range. Forty-two carbon-14 dates have been obtained for this depositional unit and range from 7500 to 11000 before present (B.P.) (Haynes 1966, p. 11). This entire depositional unit correlates with the Jeddito alluvium (Kottlowski, *et al,* 1965, p. 294) as well as the Cuervo horizon seen in the Rio Puerco profile. The clay-silt rich dark layers of the Cuervo horizon are indicative of relatively moist conditions and a large amount of vegetative cover.

Following the initial deposition was the altithermal interval, dated ca. 4500-6000 B.P. where erosion and wind action deeply eroded the Jeddito Formation. Sand dune blowout sites in New Mexico indicate that the altithermal, a period of higher-than-present temperatures, as aeolin-deposited layers of red sand. The red color is a result of oxidation developing from arid conditions over a long period of time. Haynes assumes a four-fold sequence of events during this period: weathering, arroyo-cutting, channel filling and soil formation (Haynes 1966, p. 17, 18). Typical composition of horizons reflecting altithermal conditions contain sands, gravels, aeolian sand in dune form, slope wash and colluvium. Modern fauna are noted (Haynes 1966, p. 11, 12). At Locality AP-4 in the Rio Puerco region, the deep Salado horizon is characterized by layers of differentially sorted sand and thinly laminated clay layers in some areas indicating less active fluvial activity. The uniform sorting of the sand, the vertical cracks and the oxidation all imply a dry, warm climate. Artifact assemblages associated with the altithermal are quite different than those seen in the earlier Paleo-Indian period. Responding to the extinction of diverse resources including small game, waterfowl and a very wide selection of plant foods. This phase of man's culture in the New World is variously termed preceramic, desert and archaic. Archaic will be used in later sections to refer to a cultural period of more diverse resource exploitation.

At about 4000-2000 B.P., conditions fostering aggradation and channel filling seem to have predominated large areas of the Southwest. Haynes reports deposition of, *"relatively great thicknesses. . . 50 to 700 feet of alluvium. .."* (1966, p. 12, 13). Underlying these alluvial deposits is the late altithermal soil, heralding the gradual beginning of a wetter climate. The Salazar-Tapia Creek horizons at the Rio Puerco appear to indicate this change in climate and partially correlate with Haynes' Deposition 2. By its compositional similarity to the earlier Cuervo horizon, the Salazar-Tapia Creek dark horizon can be seen to represent similar climatic conditions resulting in flood plain deposition of clay-rich and organic material. An interruption in the Salazar-Tapia Creek horizon is the Puerco Dam horizon. Haynes sees this as an unconformity separating deposition 2 Units (D1 and D2), which Antevs correlates with the "Fairbank Drought" (Haynes 1966, p. 13). This sandy horizon is dated at 2600-2900 B.P. Archaeological remains appear to point to a continuation of the Archaic-linked artifacts

of the Cochise culture and a later appearance of pithouses of the Basketmaker phase of the Anasazi Period in some parts of the Southwest. Partially sedentary occupation was apparently taking place in climatically attractive areas. It was during this Deposition 2 that corn and squash appeared in the Southwest from Mexico where both foods had been cultivated earlier.

Deposition 3 (E) is the most recent period of aggradation and is estimated to have begun at about 1000 B.P. (Haynes 1966, p. 21), and continued until the modern erosional cycle began in the mid-19th century. This deposition seems to have produced the wide, flat grassy floors of some valleys in the Southwest and can be seen as forming the background of the gradual flourishing of the Anasazi Period. In the Rio Puerco sequence, this deposition is reflected in the Guadalupe horizon and is marked by strata of thin, dark clays and those of fluvial-deposited sand, representing arid to semiarid conditions with channel cutting and refilling occuring since A.D. 1. [Editor's note: see paper by Love elsewhere in this volume for a discussion of arroyo cutting and filling in the Chaco Canyon area.]

Early attempts to explain the late 19th century rapid erosion of alluvial valleys in the Southwest led investigators to link the arroyo cutting with the large numbers of livestock. Claims of overgrazing masked evidence that gully erosion had occurred previous to the introduction of livestock. Using historical records of military expeditions through the Southwest, Bryan determined that, *"gully erosion had begun in some alluvial valleys by 1850"* (Leopold, *et al,* 1964, p. 392). Further use of weather records for 100 years in Santa Fe indicated the coincidence of unusually heavy summer rainfalls with decades of rapid gully erosion (Leopold, *et al,* 1964, p. 392). At a site in the Rio Puerco arroyo cutting can be seen beginning in the sandy horizons, e.g., Guadalupe, Puerco Dam and Salado. These periods were marked by less effective moisture to the vegetation that had developed during the previous flood plain depositions. Changes in the patterns of rainfall, from winter dominant to summer dominant, apparently resulted in summer thunderstorms which produced large quantities of water in a short period of time. Movement of relatively large amounts of sediment carried by the water occurred. While a good vegetal cover would tend to slow the water, a point was reached where sediment load was greater than the resistance of the vegetation. A simple decrease in moisture throughout the year would tend to diminish vegetal cover, but the presence of poorly sorted channel deposits indicate the action of high energy water carrying large amounts of material that is typical of summer thunderstorms. A further hindrance to the maintenance of adequate vegetation was the lowering of the water table which accompanies arroyo cutting.

Against this brief backdrop of alluvial deposition and arroyo , cutting and the concomittant changes of floral and faunal resources, our Southwest cultural traditions may be portrayed.

For the sake of organizing approximately 10,000 years of information, the prehistory of the San Juan Basin can be divided into several broad periods: the Paleo-Indian; the Archaic; the Anasazi; and the Athabaskan. Not all of these periods are reflected within the geographical limits of the New Mexico Geological Society field trip, but all will be discussed in the interests of continuity and general background (fig. 1).

THE PALEO-INDIAN PERIOD

Man's entrance into the New World seems to have occurred during late Wisconsin time, with dates ranging from 40,000 B.P. to 25,000 B.P. Controversy swirls around the few sites dated older than 30,000 B.P., largely on the grounds of questionable, single carbon-14 dates. The most securely dated remains are within the 10,000 to 12,000 B.P. time span and consist of chipped and flaked stone tools and weapons associated with extinct megafauna.

While the emphasis in the archaeological record seems to point to big game exploitation as a major activity to obtain food and hides. Also, we can assume that small game and wild plant collection also served to broaden the resource base. The small bands or extended family groups probably moved from campsite to campsite during the seasonal round of hunting and gathering. Typical sites are kill sites and campsites. Kill sites are recognized by the presence of large animal bones in a state of disarray indicating involvement by man. Animals were driven into swamps or boggy areas, were driven off cliffs to their death, or were herded into large enclosures where they could be dispatched and butchered. Campsites are marked by the presence of simple stone hearths, fire cracked rock, chipping debris and sometimes plant and animal remains. Typical locations for campsites of this period are on river terraces, now-stabilized sand dunes near streams and ancient beach ridges. Dwellings in open areas are assumed to be brush shelters. Caves and rock shelters have been used by man throughout his occupation in the New World, and the Paleo-Indian period is sometimes represented at the lowest levels of the stratified refuse in these protected areas. Cultural implications can be drawn from the knowledge of the social, political, economic and religious make-up of living, hunting and gathering societies. We can assume a relatively sparse population and concomitant simple societal structure. There was probably a hunt leader, called a Shaman, an individual knowledgeable in animal behavior as well as successful hunting techniques. A system of reciprocal gift giving and sharing characterizes societies having little or no surplus, although a half dozen dead mammoth would serve as at least a short-term surplus for a band of 20 to 30 people.

Large bones protruding from the banks of an arroyo near Folsom, New Mexico, were noted by a Negro cowboy, George McJ unkin, in 1893. But it was not until 1926 that the Folsom site was carefully excavated. Nineteen projectile points bearing long grooves or flutes on both sides were found in unmistakable association with 23 extinct bison (Agogino 1968, p. 1). This site is a landmark in American archaeology since it verified man's presence in the New World as one of considerable antiquity. The Folsom tradition is dated at around 10,000 B.P., and is found primarily on the Great Plains.

Another notable site in New Mexico is Blackwater Draw, located between Portales and Clovis. Situated in an area of ancient lake beds and springs, this site has more or less been continuously excavated and studied since 1933. Spear points of the Clovis type have been found with mammoth remains embedded in grey sand deposits overlying bedrock gravels. One of the partially grooved points, now called Clovis, was found one inch below a mammoth vertebra, and another between two leg bones (Wormington 1970, p. 48). The Clovis tradition has been dated some 2000 years earlier than the Folsom, and artifacts from this tradition have been found principally on the Great Plains, but also as far east as Massachusetts. Points resembling Clovis are also found in South America. The geographical extent of materials is greater than for the subsequent Folsom tradition. Eastern finds are correlated in time with the

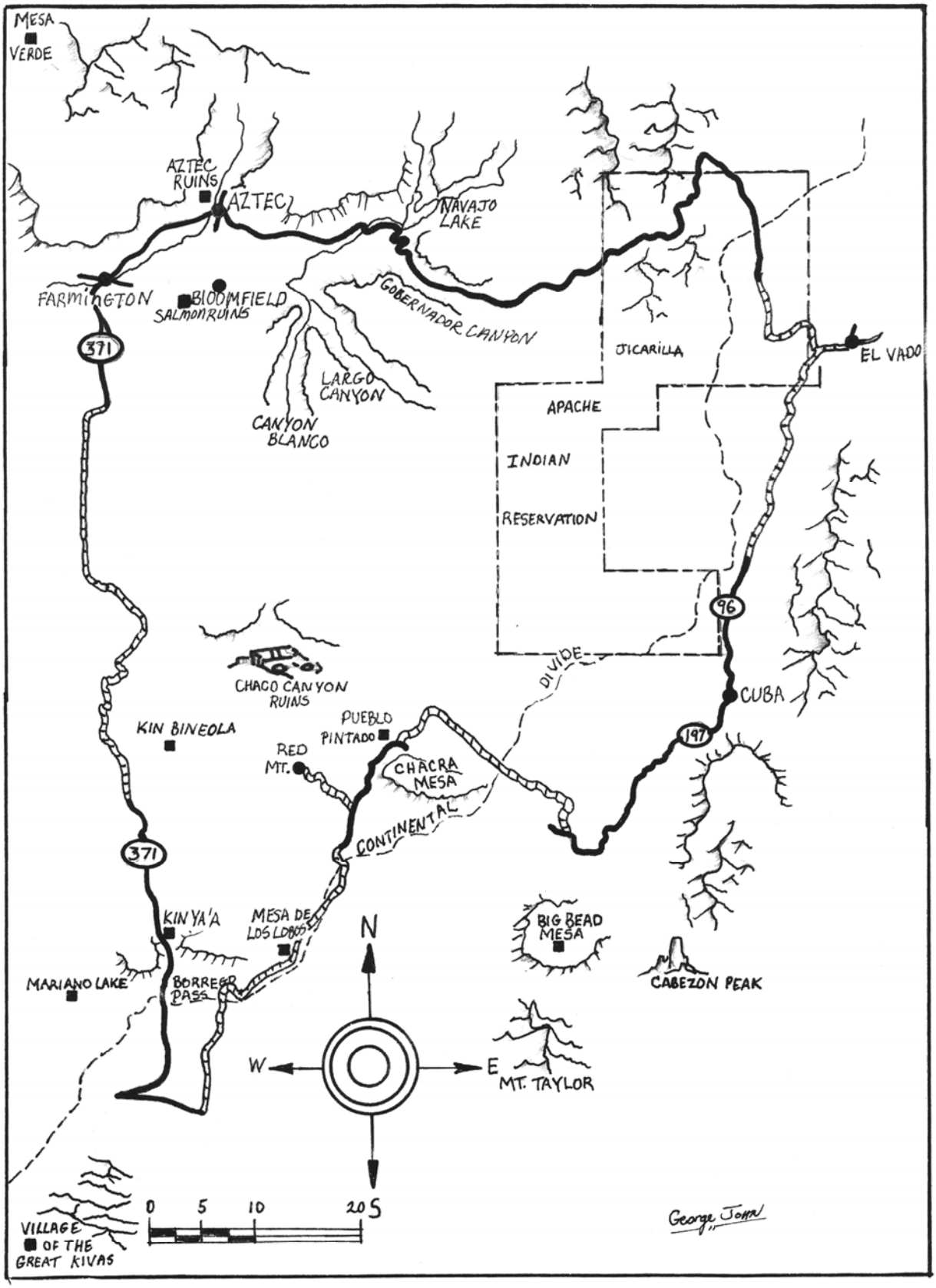


Figure 1. Major archaeological areas in the San Juan Basin.

existence of mastodon, a browsing relative of the western mammoth who preferred the grassy plains.

Probably because of the spectacular nature of the Puebloan towns and countless smaller sites of the Anasazi tradition, investigations of the Paleo-Indian Period in the Four Corners region have been largely limited to surface surveys and isolated finds by collectors of arrowheads. These sites are generally difficult to find and identify, and thus have received less attention by professionals and amateurs alike. A few Folsom points and fragments have been found in the San Juan Basin, but no stratified sites have been properly excavated and dated. Finds have been reported in the Navajo Reservoir area east of Aztec, New Mexico, near Shiprock, New Mexico, and south of Farmington, New Mexico, in Gallegos Wash vicinities (Dittert, *eta!,* 1961, p.205). A summary of an archaeological survey done in the 1950's is contained in an article by Harry Hadlock, a Farmington resident and amateur archaeologist (Hadlock 1962, p. 174-184). Some 32 preceramic sites have been located on sandy ridges overlooking the Gallegos Wash, once a flowing river. The basal portions of several fluted Folsom points were found during this survey of Gallegos Wash, usually in the sandy bottom of blowout areas or eroding from the lower levels of arroyo banks. As no excavation was performed, faunal association and datable remains are lacking. Since the archaeological survey for the Navajo Reservoir area was aimed at areas to be eventually flooded, the entire district was not surveyed for representational sites of all cultural periods. A single Folsom point fragment was found among boulders on a talus slope, not in association with any other evidence of this period (Dittert, 1961, p. 205).

At the close of this cultural period, a considerable shrinkage of areas favorable to large grazing animals is apparent. No Folsom artifacts are found west of central Arizona. Further shrinkage is seen in the terminal stages of the Paleo-Indian Period when the trend toward less effective moisture limited the range of modern bison herds. The total assemblage of these latter stages of the Paleo-Indian Period is characterized by a variety of point types, presumably reflecting greater sophistication of stone working techniques.

THE ARCHAIC PERIOD

Early centers for the development of a tool assemblage adapted for a wider environmental exploitation appear to be in the southern California, southwestern Arizona and northern Mexico desert areas at about 9500 B.C. (Irwin-Williams 1970, p. 65). Because of the temporal overlapping of the Archaic and the Paleo-Indian periods, the consensus is that the Archaic does not necessarily represent an outgrowth of the earlier cultural tradition.

Characterized by a full exploitation of the environment rather than a single focus subsistence base, the Archaic can be described as a collecting lifeway, or a combined intensive hunting-gathering pattern. It can be understood as a richer, more technologically advanced and much more versatile culture than the Paleo-Indian. More varied tools were produced for more varied purposes, and the range of artifacts is quite broad. The Archaic stage represents cultural stability, based on efficiency all over North America for many millenia. The stone tool inventory includes a wide variety of projectile points and knives, flat and basin shaped milling stones, special flint tools called pulpers, choppers and crude scrapers. Raw materials also encompassed bone, antler and wood and a few items of the preserved basic artifact core include scapula grass cutting tool, perforated bone or antler wrench, bird bone whistle, cane arrow with hardwood foreshaft and three feathers, L-shaped scapula awl, digging stick, the atlatl, solid shaft fire drill, wood clubs, tubular pipes, twine and, later in the period, coiled basketry (Spencer and Jennings 1965, p. 41).

Locations for settlements for Archaic cultures in the Southwest included caves and rock shelters, lake shores and level ground near streams and springs. Population was rather sparsely scattered except during times of plentiful food supply when several bands would gather to harvest pifion nuts, to exchange trade items, gossip and participate in annual ceremonies. Settlement types included seasonal mountain hunting camps, camps on plant-rich sand dunes, in alluvial valleys and low mesa tops near water sources. Simple brush and pole structures have been found early in this period, and later, shallow depressions underlying roughly circular dwellings. Horticulture was introduced by about 2000 B.C. Corn and squash appear to have been domesticated in Mexico earlier and probably formed only a small portion of the diet at first. Significant is the effect of restricting seasonal movements and creating a potential for more frequent sedentarism (Irwin-Williams 1967, p.442-443). Associated with the increased importance of horticultural items was the climate of gradually increasing effective moisture from 4000 B.P. to about 2000 B.P.

Archaic sites are found throughout northwestern New Mexico and the cultural pattern and site types appear to be fairly consistent with the generalized descriptions for the Southwest. In the Navajo Reservoir District, Archaic sites are generally scarce, contrasting with the higher density of sites on the upper portions of old stabilized dunes southeast of Farmington. Environmental settings in the district river drainages are on high terrain away from the permanent streams and the suggestion is that mesa tops and canyon slope resources in the juniper-piiion woodland were more important than those of the flood plain (Dittert, 1961, p. 205-207). Campsites are marked by thin, widespread sheets of refuse, implying intermittent occupation. A prominent feature of these campsites are hearth stones and eroded hearth areas. Conservation of heat was effected by lining the hearth with cobblestones, where the cooking temperatures are even and steady. This technique is applicable to roasting plant foods and small game without the use of an open flame or heat resisting containers (Dittert, 1961, p. 211). The implied social organization of the Navajo District Archaic sites is one of several patrilineal bands made up of a loose association of nuclear families and that the regional population may be accounted for by one or two small bands (Dittert 1961, p.212).

By about 100 B.C. in the Southwest, horticulture had increased in importance sufficiently to make possible more permanent and larger settlements. In the succeeding centuries, ceramics, a new strain of corn, beans, pithouses, bow and arrow and other items were added to the cultural inventory. By A.D. 400 in the Southwest, at least four distinct traditions were established on the basis of geography and items unique to the four traditions. Along the southern portions of the Colorado River, the Patayan culture area has been named by archaeologists to describe the pattern of flood water irrigation of corn, beans and squash. In south-central Arizona along the Gila and Salt River drainages, the Hohokam flourished until about A.D. 1300. Of the four subareas of the Southwest, the Hohokam was most influenced by Mexican high cultures. Emil

Haury, the excavator of Snaketown in the 1930's and the mid 1960's, feels that a Mexican colony was established by 300 B.C. with subsequent direct influences from Mexico on the basis of traits such as copper bells, ball courts, use of macaw feathers, pottery motifs and manufacturing techniques, platform temple mounds and other items dated earlier in Mexico (Haury 1967, p. 672). A third tradition, the Mogollon, is distinguishable in the rugged terrain of southeast Arizona and southwest New Mexico. Also receiving early impetus from Mexico, Mogollon traits are seen in the more northerly regions of Arizona and New Mexico later in time than their first appearance in the south. The famed Mimbres black-on-white pottery and stone masonry dwellings reflect the Anasazi influence on the Mogollon tradition. The Anasazi cultural subarea was centered in the Four Corners region and represents one of the most distinctive and vigorous traditions. It is this latter tradition that will be dealt with more fully.

THE ANASAZI PERIOD

Of the various prehistoric sites in the Four Corners region, those representing occupation between approximately 1 A.D. and A.D. 1300 are the most numerous and well known. Chaco Canyon, Mesa Verde, Aztec Ruins, Hovenweep and Salmon Ruins are all substantial settlements which stand as voiceless testimony to man's ability to adapt and flourish in an essentially marginal environment.

The word Anasazi is a Navajo term describing the "ancient ones" who had built the stone pueblos. McNitt offers the observation that, *"in a loose, vague sense Anasazi meant ancient enemies"* (McNitt 1974, p. 57). Perhaps this is a clue as to the time of arrival of the Athabaskans (Navajo and Apache) into the Southwest. Present archaeological evidence places the nearly certain arrival of the Athabaskans in the mid-16th century, well after the abandonment of the Anasazi towns and villages in the early 14th century.

Geographically, the Anasazi occupied the Four Corners region, with population centers along the major drainages. The Fremont portion of the Anasazi was located throughout most of Utah and represents an outlier region which received stimulus from the south about A.D. 400 and saw little apparent subsequent interaction. The Kayenta branch includes the large rock shelter dwellings of Keet Seel and Betatakin at Navajo National Monument. The San Juan and Chaco branches of the Anasazi will form the focus of the following discussion.

Temporally, the Anasazi can be seen in several phases as drawn up by the participants of the first Pecos Conference in 1927 called by Alfred Kidder, then excavating Pecos Pueblo. These phases at first were not assigned dates but were divided into terms of differences in artifact assemblages of sites throughout the region. Later, the phases could be dated by dendrochronological and carbon-14 methods. Cross dating could and still can be accomplished by analysis of traits, principally ceramic styles and manufacturing techniques. The original groupings were labeled Basketmaker and Pueblo and the first synthesizers saw marked differences in the material culture. As the artifacts, their associations, skeletal material, architecture, settlement patterns and trade networks became better known, a gradual continuum of development has probably been the better model. The divisions are arbitrarily placed by archaeologists so as to organize the material and can lead the observer to form categories that probably did not really exist. Nevertheless, organization of the material is necessary for an understanding. It needs to be emphasized, also, that the phases are artificially imposed on what has been preserved largely by chance.

Basketmaker I

Basketmaker I is a hypothetical phase and represents a transition from the San Jose variant of the Archaic Period to the Anasazi tradition. No sites have been found which can be identified as being different from San Jose or Basketmaker II sites.

Basketmaker II

The earliest sites of the Basketmaker II phase (100 B.C. to A.D. 400) have been found near Durango, Colorado, and consist of a number of rock shelters and a village built on a talus slope above the Animas River. The dwellings are not really pithouses, but rather shallow basins having log and mud mortar walls. Central heating pits are presumed to have held hot stones carried in from outdoor hearths. Distinctive to these dwellings are floor cists of several shapes which were used for storage. Agricultural products associated with Basketmaker II sites include corn and squash. No fired pottery has been found in these sites. This absence is considered a diagnostic trait of the phase, but a few sun-dried clay vessels were produced. Beautiful baskets and sandals were made by these people; they also produced fine woven bags, string aprons, and robes of hides or fur and feathers. Skeletal evidence from Basketmaker II sites is quite homogeneous in form and size. The chief weapon was the dart-thrower or atlatl (Wormington 1970, p. 35-45).

Basketmaker III

The succeeding period was a continuation of the basic culture, but there were several developments sufficient to warrant recognition of the Basketmaker III title (A.D. 400 to A.D. 700). The sites were larger; two locations near Quemado, New Mexico, were composed of over 50 pithouses each. Beans became a part of a firmly established farming base, and true fired pottery made its appearance. Pottery had earlier appeared in the southern Mogollon and Hohokam regions, and was a brown or reddish brown ware fired in an oxidizing atmosphere. Early pottery in the Anasazi region was grey or white and fired in a reducing atmosphere which allowed no oxygen to circulate in the conical pyre of firewood placed around the vessels. Designs were painted on the bowl interiors with a mineral paint, and in later Pueblo III times, an organic paint was used, probably Rocky Mountain beeweed *(Cleome serrulata)* boiled to make a thick paste and applied with a yucca brush. The red pottery seen during this phase is thought to be a tradeware from the south and west. Its rarity, vessel shape and contextual situation lead to the assumption that it may have been used ceremonially. The bow and arrow was introduced during this phase, as well as polished grooved axes. The domesticated turkey also became a reality during this period (Willey 1966, p. 203).

The earliest pithouses were circular, but later dwellings became more oval and then rectangular. Villages were quite variable in size, from 2 or 3 to nearly 100 dwellings. At first the dwellings were entered from a side passageway from ground level. Depths of pits excavated for houses ranged from 3 to 5 feet with diameters between 9 and 25 feet. Stone slabs or plaster lined the interior of the pits, and four posts were imbedded in the floor to hold horizontal roof timbers. Smaller

poles, set into the ground, leaned against the horizontal platform with other poles laid across the top and sides of the support poles. The whole structure was covered with brush or woven mats then topped with layers of mud plaster and earth. A center hole allowed smoke from the fire to escape. Later alterations included entrance from the roof with the side passageway becoming a ventilator shaft to allow fresh air to circulate. An upright slab is often found between the venti-lator shaft opening and the firepit to deflect the incoming air from the fire itself. Running around the inside of the house is a bench or shelf. Larger pithouses are often divided by mud and pole partitions which may have delineated work areas. Storage pits were dug into the floor. Late in the period, there is evidence of surface dwellings, some having contiguous walls. Many of the features of the pithouses of the Basketmaker III phase have been retained in subsequent phases in the construction of circular subsurface kivas, ceremonial structures associated with surface dwellings.

Because of the custom of interring grave goods with burials, early excavators made a point of locating the burial grounds. These were not cemeteries as such, but bodies were placed wherever the digging was easiest, often in trash piles, under floors in abandoned cists, or in crevices. In this phase of the Anasazi, grave goods include finely woven baskets, well made pottery and other items including ornaments, pipes, food, gaming pieces and flutes. Characteristic of burial accompaniments was a pair of newly made sandals. Turquoise was now being used for beads, pendants, set with shell pieces in wood and used with whole shells and sometimes olivella shells for jewelry (Wormington 1970, p. 56).

The Basketmaker III was an important phase of the Anasazi cultural tradition, for it provided the foundation for the later florescence in Pueblo III.

Pueblo I

The Pueblo I phase (A.D. 700-900) marked a transition from pithouse to above-ground dwellings, and is illustrated differentially throughout the region. The San Juan River drainage appears to be a focal point of these changes, probably brought about by the aggragation of population and the desire to place dwellings close together. Pithouses too close pose problems of collapse, so the apparent solution was to build above surface houses with contiguous walls. The most common settlement plan which appears at Alkali Ridge in Utah, Mesa Verde, the La Plata District, Navajo Reservoir District and other areas in the vicinity shows remarkable similarities in site layout. Sites are composed of a roughly crescentic arc of rooms, two layers deep, which opens to the southwest. In the center and within the arms of the arc is the subsurface kiva. Off to one side is the trash area. These sites are often located on relatively level areas of mesa tops overlooking a stream or tributary. Some are associated with great kivas where there are several groupings of crescentic arcs. Use of stone and mud masonry is more pronounced and rooms are rectangular, apparently the result of the limitations of stone structure.

Specialization in pottery increased throughout the Anasazi area. Improved techniques included the use of a finer paste, crushed sherds as temper, a greater variety of forms and designs all over the vessel and a general improvement through experimentation. The practice of using slips developed. A slip is a coating of very fine clay which covers a completed vessel just prior to firing and gives a smooth finish. Banding of a constricted neck of jars and pitchers is a most characteristic trait of Pueblo I pottery. Instead of using a number of pieces of clay laid one atop another, a long roll of clay was spiraled to form the vessel. Wares include white with black paint, red or orange with black paint and smoothed grey and brown utility. Basketry was still being made and used, but since more sites were in the open instead of in rock shelters or caves, perishable materials are not often preserved. Certainly pottery increased in importance but probably never completely replaced baskets, however, the record is difficult to interpret in this case (Wormington 1970, p. 69).

Other cultural traits are very similar to preceding phases. The only addition to the inventory of cultivated plants was cotton, used to produce a thread which was woven into fabrics with looms. An apparent change in cradle board materials led early archaeologists to speculate about the skeletal differences in the Pueblo period. Long-headed Basketmaker populations appeared to have been replaced by round-headed Pueblo peoples: archaeologists postulated widescale migrations and/or warfare. Further and more careful analyses revealed that the soft fiber backs of Basketmaker cradle boards were replaced by hard wooden ones which flattened the occipital portions of infants' skulls. While genetic changes also occurred in the population, there is no marked break in the continuity of physical type.

Pueblo II

During the Pueblo II (A.D. 900 to 1100), a few general trends in architecture and settlement type occurred. As a result of a drying of climate seen in the pollen record, there was a population dispersal at about A.D. 900. The large Basketmaker III/Pueblo I villages gave way to small, scattered single habitation unit communities consisting of a few contiguous rooms and a kiva. Present day Pueblo peoples of the western towns base their social organization on clans or lineages, and it is felt that this pattern is of long standing. Perhaps these unit houses of the Pueblo II period represent family groupings who trace their ancestry through the female line, as do many Pueblo people today. Masonry changed as well. Many Pueblo I buildings were constructed by placing adobe and mud between upright posts, a type of construction called jacal. Jacal type walls were gradually replaced in later times by coursed stone masonry, a trait seen almost exclusively in the Pueblo III phase sites.

Pueblo III

Pueblo III phase (A.D. 1100 to 1300) is defined by the widespread presence of large apartment-type pueblo villages or towns and is the last phase. in the Anasazi heartland (Willey 1966, p. 208). Part of the increased population was housed in the unit houses which began to be constructed during the earlier phase, but large towns sprang up in three regions: the Northern San Juan; the Kayenta; and Chaco Canyon. Best known of the large towns in each of the above regions are Cliff Palace in Mesa Verde, Keet Seel and Betatakin in the Kayenta area and Pueblo Bonito in Chaco Canyon.

In order to support large aggregations of people, agriculture must have formed a vital part of the subsistence base. There is a good deal of evidence in all areas of increased control of water; check dams or terraces in arroyos to capture runoff water; stream diversion dams; and irrigation canals. One canal at Mesa Verde is four miles long (Wormington 1970, p. 94).

Another facet of increased size of a group inhabiting a relatively small area is the necessity for changing the form of political and social control. Dispersed and small sized populations call for little or no centralized authority. Leadership is usually vested in the clan or lineage head or simply a headman or "big man" who possesses a forceful personality together with skills necessary to ensure successful hunting. Cooperation becomes essential, however, among individuals of a large group if they are to remain together and accomplish community goals. For instance, tree ring dates throughout Salmon Ruins indicate that the entire structure was built within a 10-year period. The town was preplanned, not a hodgepodge of rooms tacked on when the need to enlarge rose. Aztec Ruins was similarly constructed. A haphazard system of social and politi-cal control could probably not have marshalled a cooperative task force capable of sustained, coordinated effort. Com-munity living also has other aspects. Craft specialization is one such change. In a small unit, the people must by necessity be relatively versatile in producing items for their own use. Within large numbers of people, however, different individuals be-come proficient at pottery making, flintknapping (stone flaking), making jewelry, masonry wall construction, etc. Items can then be traded within the group as well as producing surpluses to be traded for items not obtainable within the local region. Religious observances also tend to become more elab-orate and formalized. The many kivas found in most large towns indicate that religion and ceremony played a strong part of the daily lives of Pueblo people (Wormington 1970, p. 78).

While many of the great houses have defensive features, there are other factors which mitigate against defense as a primary concern. Many of these houses were built very carefully over a period of years, such as Salmon Ruins. The large towns were often built next to an open flood plain area rather than hidden away in canyon heads, away from important trails and water sources and on remote mesa tops. While the cliff houses at Mesa Verde and elsewhere seem admirably suited for defense, they also occupied areas which could not be farmed at a time when land to be used for agricultural purposes was of vital importance. While there is evidence of death by violence, it is no greater during Pueblo III than at other periods. Barbarians from the north need not be invoked to account for bashed heads: interpueblo strife, the breaking of religious taboos and retribution for real or imagined wrongs by other clans or lineages may all result in violence.

Pottery styles were increasingly diversified in the different regions. Excellent pottery was produced at Chaco Canyon, Kayenta and Mesa Verde. Black-on-white wares at Chaco during the Pueblo III phase were fired at higher temperatures and were thinwalled and hard. Distinctive shapes are mugs from Mesa Verde and tall cylindrical jars at Chaco Canyon. Polychromes were produced in Hopi country as well as a black-red-and-white-on-orange in the Kayenta region (Wormington 1970, p. 100).

Striking differences in wall construction and style of architecture between Chaco Canyon towns and outliers identified as being heavily influenced by Chacoan people have led to various explanations for the "Chaco phenomenon." A distinctive style of masonry was first used at Chaco Canyon and a little later in time at sites like Aztec Ruins, Salmon Ruins, Lory-Ackmen, Chimney Rock, Sterling site (south of the Bolack ranch on the San Juan River), Village of the Great Kivas on the Nutria River in Zuni country, Guadalupe Ruin on the Rio Puerco just south of Cabezon plug and at several other sites in the region. Many of these towns have great kivas, and all show carefully constructed banded masonry walls with rubble cores. Pueblo towns are D shaped with the open portion facing south or southeast. Chacoan pottery is found at these sites, although mixed with locally made wares. Most Southwest archaeologists posit an internal development emanating from Chaco Canyon. As population grew in the canyon itself, the demand upon natural resources may have become too great to support increased numbers. Colonizing groups may have been sent forth to build at permanent water source locations, retaining ties with the main center and perhaps sending tribute in the form of raw materials—perhaps food to the larger population at Chaco. A system of roads connects these outliers with Chaco Canyon; at Pueblo Alto, on the mesa top just behind Pueblo Bonito, seven roads from various directions end here. The Great North Road connects Salmon Ruins with Pueblo Alto and has at least three half-way stations where travelers could stop for rest and supplies. Closer to Chaco Canyon, there are four outlier sites which were connected by roads to the main center at Chaco Canyon: Kin Bineola, Kin Ya'a, Kin Klizhin and Pueblo Pintado. Another explanation for the "Chaco phenomenon" uses as its model the Spanish entradas and their aims of exploration and exploitation of natural resources found in the Southwest. Charles DiPeso has been surveying and excavating various sites in northern Mexico, principally Casas Grandes. He feels that traders of leading families of at least three Mexican high cultures established extensive trade networks from Mexican sites to the Southwest. In the early 16th century, Cortez found the *pochteca* trade network actively supplying the Aztec capital of Tenochitlán with goods throughout the central plateau region. Coinciding with the florescence of three cults in Mexico was the building of great kivas in the Southwest. Following DiPeso, Kelley and Kelley note that the similarities of architecture between Casas Grandes and other Mexican and Southwestern sites, the presence of Mexican-made artifacts as well as macaws and parrots in Southwestern sites, and the presence of turquoise and other materials from New Mexico at southern sites strongly suggest active trade networks. The great kivas appear in clear association with large population aggregates in the Southwest and may have been as focal points for ritual practices associated with the three Mexican cults (Kelley and Kelley 1974, p. 201, 209). While the generalized concepts of stimulus diffusion and colonization are viable, Kelley and Kelley feel that a specific mechanism should be and can be invoked to explain contact between the two regions (1974, p. 179). Early excavations at Pueblo Bonito produced abundant quantities of turquoise jewelry. Finished products include mosaics, inlaid bone, shell, effigy figures and strings of matched turquoise beads. *"It looks as if the inhabitants of the Chaco Canyon were producing as much turquoise and shell jewelry in the eleventh century A.D. as modern Zuni does today; probably some ancestors of the Santo Domingo people were bringing them the raw turquoise from the Cerillos mines (and others), just as they do today"* (Kelley and Kelley 1974, p.204).

There are three Pueblo III Chacoan sites near the route taken by the field trip; Kin Bineola, Kin Ya'a and Pueblo Pintado. Approximately 10 miles south of Tsaya and Lake Valley School is one of the most extensive of the period Chacoan ruins, Kin Bineola. The major construction activity is

dated by tree ring specimens as being between 1119 to at least 1124 (Bannister 1964, p. 169). The ruin is described as having at least 100 ground floors and 10 kivas within a four story structure (Bannister 1964, p. 168). Kin Ya'a is an outpost situated about 30 miles to the south of Pueblo Bonito in Chaco Canyon proper and a few miles east of Crownpoint. No excavation has been carried out in Kin Ya'a, but six dendrochronological dates cluster around the date 1106 (Bannister 1964, p. 173). The ruin is known principally for its tower kiva of several stories in height surrounded by several small living rooms (Bannister 1964, p. 172). The third pueblo of the Classic Period can be seen from the road and is near the boarding school bearing the same name—Pueblo Pintado. The most easterly of the major Chacoan pueblos, it originally had as many as four stories with at least 60 ground floor rooms. The six tree ring dates taken at two different times show a remarkable clustering around 1060-1061 (Bannister 1964, p. 190, 191). The ruin was stabilized by the National Park Service in the 1960's and was reroofed for a trading post in historic times.

The consensus among present Chaco Center archaeologists is that the "Chaco phenomenon," whether its impetus derives from internal or external factors, represents an unusual situation in the Southwest. The emergence of large pueblos within an environmentally marginal canyon, the construction of numerous outlier sites, the network of roads which occur nowhere else this far north of Mexico, and the presence of stone circles on prominent mesa tops at Chaco Canyon and near its outliers which may have represented signal stations—all indicate that something unusual happened about 900 years ago. The imminent threat of strip mining could remove all traces of evidence from large areas immediately outside of protected sites, and there is a current flurry of activity to understand this phenomenon by the various archaeologists in the San Juan Basin.

Marking the end of the Pueblo III phase of the Anasazi sequence is the shifting of population movements and the gradual abandonment of the northern regions. The building activity now centers upon areas where water supply is more dependable; the Rio Grande and more southerly drainages. There are as many theories (if not more), for the abandonment of the large Anasazi towns as for their rise. Probably the best explanation includes all of the theories combined. Tree ring dates indicate that the last major construction in Chaco Canyon ceased early in the 12th century. By A.D. 1150 many of the Chacoan people had left their canyon, while to the north, likewise, the builders of Samon and Aztec had also left. There are few signs of violence at this time, and since a permanent water source was probably present at both San Juan sites, the pressure of a drought is a little difficult to fully support. A shortening of the growing season for several years could better explain abandonment for a people now nearly totally dependent upon cultivated crops. In the same century people from the Mesa Verde and McElmo Canyon regions began moving south and reoccupied many of the Chacoan-built towns and also built new sites of their own in Chaco Canyon. The rock shelter towns of Keet Seel and Betatakin were occupied between A.D. 1260 and 1284 inclusive, and the last building date for the Mesa Verde dwellings is A.D. 1273. Final abandonment is estimated to have occurred at some point of the Great Drought, dated by tree rings at A.D. 1276-1299 (Wormington 1970, p. 96).

Abandonment of Chaco Canyon is more easily understood. Even during the best conditions for agriculture, the area is somewhat marginal and lacks good soils for agriculture on the scale necessary to support nearly 6000 people. Large scale building projects could have led to deforestation, erosion, arroyo cutting and subsequent lowering of the water table. Farmers utilizing the flood plain would have been dismayed at this turn of events, and there is evidence late in the Chacoan occupation of concentrated efforts toward water control devices to catch runoff. While there was no really severe droughts at this time, there were some dry years which could have pushed an already overtaxed system beyond recovery. A series of late spring frosts and early fall frosts could have placed another burden on agriculture and wild plant and game resources might well have been insufficient to supply the needs of a large, dense population.

The presence of "barbarians from the north" is difficult to verify. On linguistic evidence, the Athabaskan people of the Southwest separated from their northern parent population between A.D. 900 and 1200. Peoples speaking Athabaskan languages still live in the Alaskan interior and northwestern Canada. Archaeologically, the earliest certain Navajo-Apache sites are dated by tree rings at around A.D. 1540, long past the abandonment period of the Anasazi. In the Navajo Reservoir District, there is intriguing evidence of Pueblo-like occupation extending from the beginning of the 12th to the middle of the 13th century (Wormington 1970, p. 102). Labeled the Largo-Gallina phase, the sites reflect many of the typical Anasazi traits with a few differences. While both pithouses and surface dwellings exist, the latter have massive walls of uncoursed masonry up to four feet thick and are relatively large. These sites are in the Largo drainage, have black-on-white pottery that is Puebloan in character and a quite different sort of utility ware. These vessels have pointed bottoms and were smoothed by holding a mushroom-shaped object inside the still plastic vessel and striking the outside with a wooden paddle. Known as the paddle and anvil technique, this method was used in the eastern United States in the production of a type of utility ware known as Woodland. Also hinting at eastern contact are elbow-shaped pottery pipes (Willey 1966, p. 219). The Navajo utility ware of later times is distinguished by deep, pointed-bottom vessel forms showing a marked similarity to the earlier Largo-Gallina site wares. Further strengthening the similarities between the Pueblo-like Largo and later Navajo occupations is the fact that early dated Navajo sites are in the Largo-Gobernador canyons and nearby drainages.

While nomads from the north attacking large Pueblo towns may not in themselves have been sufficient to cause abandonment, the combined problems of overextension of natural resources, successive crop failures due to drought and/or shift from winter dominant to summer dominant moisture, competition among the Puebloans themselves for available water, plant and animal resources may have led to a general consensus to move south to the Rio Grande, the Little Colorado, the Zuni River and the headwaters of the Pecos River.

Pueblo IV

Pueblo IV (A.D. 1300 to 1750) includes Spanish contact and saw the consolidation of Puebloans and expansion of villages already present in the better watered areas. The larger towns along the Rio Grande, as well as Hopi and Zuni, were also multistoried, terraced, planned apartment houses grouped

around plazas (Willey 1966, p. 211). Spanish contact occurred in 1539 when Estavan entered the Zuni domain and was shortly dispatched because of his indiscretions. The major contact occurred a year later when Coronado led his expedition through the Southwest searching for the Seven Cities of Cibola, now thought to be Zuni villages seen in the sunset glow. Direct colonization and missionary activities did not become an oppressive activity, however, until nearly 80 years later. In 1680 the Pueblo towns joined in a cooperative effort to evict the Spanish military, religious and colonist residents. This was probably the first and only occasion that the various towns organized to achieve a common goal. The tradition was, and still is, one of town autonomy and self determination. Heads of religious fraternities form a town council who decide on legislation, military activity and judicial matters. The Spanish reconquered the Southwest in 1692 and from that time the Puebloans have offered more or less passive resistance to subsequent intrusions.

Pueblo V

Pueblo V commences at A.D. 1750 and continues to the present with influenced modernization reflective of the coming of the Anglo into the Southwest (Willey 1966, p. 187-188).

THE ATHABASKAN PERIOD

As discussed earlier, the entry of the Navajo-Apache ancestors into the Southwest is somewhat obscure. Non-Puebloan traits may be accounted for by the presence of Utes or by groups on the western fringe of the Plains culture area. In any event, sites exhibiting the Navajo traits of the forked stick hogan and a crude pointed bottom pottery, as well as corn and beans agriculture, occurred from about A.D. 1500 to A.D. 1700 in the Gobernador area. Late in this period the Navajos were joined by refugees from the Pueblos, chiefly from Jemez, who refused allegiance to the returning Spanish. The cultural inventory of the period between A.D. 1700-1775 shows a florescence of the combined traditions. Stone pueblitos, or small stone-walled pueblos, stone masonry hogans, a great variety of Pueblo trade wares and a locally produced polychrome pottery mark this period that archaeologists have named the Gobernador phase. One of the more striking features of this phase is the rock art which apparently had religious connotations. The drainages of Largo, Gobernador canyons and the San Juan River abound with various painted and pecked designs. The present day elaboration of religious beliefs and rituals of the Navajo is seen to have had its genesis in this period of Puebloan residence in the Navajo homeland. The Jicarilla Apache Reservation today hosts many sites dating to the refugee period of prehistory, as well as sites of the Jicarilla Apaches themselves in both prehistoric and historic times.

At about A.D. 1739, migrations out of the Gobernador area began with people gradually moving southward and westward, apparently in response to increasing raids by now horse-borne Plains groups and the Utes. Spanish sources cite a severe drought in 1738, a moderate one in the early 1750's and rather dry years in the late 1750's as also a reason for the general movement out of the traditional homeland (Brugge 1972, p. 1). The Cabezon phase of Navajo prehistory is dated at about 1739 to 1 863 and is marked by decreasing Puebloan influence in terms of architecture and pottery; increase of fortified and well hidden sites; adoption of a largely herding economy of sheep and goats; and intermittent Navajo-Pueblo-Spanish alliances and hostilities. Sites of this period are scattered from the Rio Puerco of the East; to Zuni on the south; and Black Mesa to the north and west. This area is currently occupied by Navajos and forms much of the present-day reservation. In the vicinity of the field trip, a few Navajo sites which date prior to the Long Walk to Fort Sumner of 1863 are located at La Ventana, Mesa de los Lobos, Mariano Lake, Borrego Pass, Chacra Mesa and Mesa Prieta. Prior to the Long Walk, Navajo culture differed somewhat from the Puebloan life style although showing many Puebloan traits. In the realm of non-material culture, social organization was characterized by a focus on the extended matrilocal family. Groups of families lived in encampments, clustering into local groups for purposes of warfare and religious ceremonies. This basic organization typifies the Mescalero and Chiricahua Apaches who were hunting types and probably describes Navajo cultural patterns prior to the influence of the Puebloan refugees as well. With the Navajo and Western Apache groups, social organization was developed as matrilocal clans with more or less permanent villages. Religion centered on curing rather than rain making and fertility was directed by priests instead of Shamen. Following their return from confinement at Fort Sumner, the Navajos returned to northwest New Mexico and northeast Arizona to rebuild as herders and farmers.

POSTLUDE

A construction and land surface altering activity reaches ever outward toward the exploitation of more natural resources in the Southwest. The question is often posed: Why should prehistoric sites be saved? The archaeologist would answer: Why should they be destroyed without investigation?

Prehistoric sites represent a portion of our human cultural heritage of the Southwest; a heritage shared by many of the descendants of early peoples. While artifacts in themselves are admired for their quality of workmanship, utility and aesthetic appeal, what can be more important than the story of man's adaptation to a still marginal environment. What were man's past successes and failures?

It is estimated that at about A.D. 1000 in the Four Corners area, there were as many occupants as in A.D. 1950. And yet there was an apparent economic collapse and the region emptied by A.D. 1300. Why? Surely there is something to be learned from the prehistoric record that can benefit present and future occupations.

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