

Anasazi Communities in the Red Rock Plateau, Southeastern Utah

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INTRODUCTION

In this paper, I attempt to reconstruct some aspects of the social organization of the Anasazi groups that occupied the Red Rock Plateau at various times in the prehistoric past. The archaeologist is, of course, handicapped in the investigation of social organization, because he cannot observe the full range of social behavior as it is being carried out. He is left only with the material traces of that fraction of social behavior that impinges on the material world so as to leave traces. If, however, these traces can be identified, that is, if they can be seen as clues, the archaeologist may be able to infer that particular activities were carried out. From no single clue or kind of clue can more than a tiny fragment of a prehistoric social system be constructed, but if the archaeologist can assemble enough of these fragments, he can begin to rough out some parts of the system. What I have tried to do in this paper, then, is to set forth some of the Red Rock Plateau data that I see as clues to past social organization and to give some of the reasoning leading me to relate a particular observation to a partic-

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ular inference. In some cases, I have tried to suggest what kinds of future observations we might make to acquire additional clues or to test the inferences we have already made.

The paper is basically a long compilation of specific small inferences about specific items of data. There are, however, several themes or foci running through it, including (1) a regional approach to the problem, (2) an ecological emphasis on the ways in which the prehistoric social systems of this area interacted with and adapted to various physical and biological systems, and (3) an emphasis on reconstruction of localized residential groups, specifically the group of immediate domestic coresidence or household and the larger residential group or community.

The regional focus seems useful first because prehistoric Anasazi groups usually depended on utilizing the resources of a rather wide area. If the analysis of activity loci is a fruitful source of inference about prehistoric behavior, then we must be prepared to seek and to relate such locations in a large area. In much of the western part of the Anasazi area prior to the middle or late 1200s, the community and all but the most minimal social units were probably seldom localized in a single site.¹ Furthermore, regional studies usually allow one to sample more than one occurrence of a particular class of phenomena and thus should increase the reliability of the sample. Last but not least, the archaeological salvage project during which nearly all the data I have used were collected was by design and necessity a regional study. I consider this a blessing and have preserved this orientation.

The ecological emphasis stems from my belief that sociocultural systems serve to adapt their populations to their total physical, biological, and social environments. Therefore, a productive way to investigate sociocultural systems should be to attempt to understand their adaptive functions. In this paper, adaptation to physical, and to some extent, to biological environments has been stressed, because the Red Rock Plateau was climatically, physiographically, and biologically marginal for the Anasazi people. The requirements of successful adaptation here must have been both especially stringent and somewhat different from those of their usual highland habitat. Some of the distinctive characteristics of Red Rock Plateau community organization may be related to problems of coping with particular aspects of the natural environment, as discussed in the following pages.

An emphasis on residential units and communities was chosen because

the data lend themselves to this kind of analysis, and because I think this kind of information is crucial to our understanding the evolution of Pueblo social organization. The shift from a highly dispersed settlement pattern with short occupancy of small sites to a pattern of residence in large, permanent, highly nucleated, village communities was, it seems to me, a watershed in Pueblo history. It is inconceivable to me that some of the distinctive aspects of modern Pueblo social organization, such as the very tight systems of social control, could have developed prior to the appearance of large, permanent, densely populated communities. The concept of community that underlies my approach is largely derived from Arensberg (1961). The community is seen as a minimal, territorially based population aggregate, including individuals of the two sexes and at least three generations, capable of maintaining itself through time, including opportunities for enactment of or articulation with the main social roles present in the larger society, and including mechanisms for transmission from one generation to the next of the principal content of its culture.

Before moving into the body of the paper, I should also say something about how the data were collected. What we know archaeologically about the Red Rock Plateau is almost entirely the result of the work done by the University of Utah branch of the Upper Colorado River Basin Archeological Salvage Project (more conveniently referred to as the Glen Canyon Project), directed by Jesse D. Jennings and sponsored by the U.S. National Park Service. I was fortunate enough to have been an employee of this project from 1958 through 1960 and again in the summer of 1961, and to have been allowed to study collections and records in the project laboratory in Salt Lake City in the academic year 1962-63.

It seems to me that the philosophy behind the field work of the Glen Canyon Project was something like this: A salvage project cannot focus on any single specific problem, ignoring data not relevant to that problem. Because the sites under study will be irrevocably lost, the salvage archaeologist must collect the specimens and make the observations that will serve the greatest variety of important archaeological problems of which he is aware. Further, he must do his best to predict what kinds of problems, and therefore what kinds of data, will be important in the years to come. He is, in effect, working for the whole profession of archaeology rather than just for himself.

None of us who worked on the Glen Canyon Project was especially committed to trying to reconstruct prehistoric social organization; I know

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that I was considerably more naive about what data to look for than I am now. But I think all of us felt that cultural and societal reconstruction was one of our ultimate goals, and we did our best to make observations that might help us or someone else to eventually attain this goal. After reexamining the data, I find it surprising that so much that was relevant was collected; it is also clear that more and better observations would have been made had the theoretical orientations we brought to the field been different or our formulation of the problems more precise.

In using the Glen Canyon data as the basis for this paper, I am relying on the field work, notes, and publications of many people in addition to myself. In general, I have not given full citations when I have relied on material published by the project staff; the result would be too cumbersome. Tables specifying the published record for nearly all the sites discussed here, however, can be found in my doctoral dissertation (Lipe 1967; Tables 4 and 6). Jennings (1966) also provides a comprehensive bibliography of the rather extensive literature stemming from the Glen Canyon Project.

Archaeological survey and excavations were conducted in the Red Rock Plateau in the summers of 1958 through 1962 as part of the Glen Canyon Project. The Red Rock Plateau was but one part of the area encompassed by this project, which was designed to salvage archaeological materials in the area to be flooded by the Glen Canyon Dam at Page, Arizona. Jennings (1966) has summarized the objectives, methods, and accomplishments of the project.

Glen Canyon Project field teams located 512 sites in the Red Rock Plateau, of which thirty-six were only test-pitted and fifty-nine were excavated somewhat more thoroughly. Five phases of prehistoric occupation of the region have been recognized (Lipe 1967: 6), as follows:

Phase	Estimated Date, A.D.	Stage/Period in Pecos Classification
1. White Dog	200-300	Basket Maker II
2. Kletthla	1100-1150	Pueblo III
3. Horsefly Hollow	1210-1260	Pueblo III
4-5. Jeddito and Sikyatki	1300-1600	Pueblo IV

Only the first three phases are discussed in any detail in this paper.

The site sample, on which the inferences discussed here are based, consists of all the identifiable components of the White Dog, Jeddito, and

Sikyatki phases, and the larger components of the Kletthla and Horsefly Hollow phases. For these two phases, only components yielding 100 or more typologically identifiable potsherds were included. Although it represents only a small fraction of the Pueblo III sites located in the area, the selected list of sites includes nearly all the habitation and most of the frequently used campsites and special-function sites known for the Kletthla and Horsefly Hollow phases. These sites also produced the great majority of the artifacts of these phases recovered in the region. Other admittedly important sampling problems are treated in detail by Lipe (1967, especially 115-20, 160-65, 268-79). It is sufficient to say here that the differences in site characteristics among the various phases seem to be due primarily to factors other than sampling error or differential site preservation.

THE REGION

The Red Rock Plateau (Figs. 4 and 5), an area of about 750 square miles, is a physiographic subdivision of the Canyon Lands section of the Colorado Plateau and is noted for a degree of dissection extreme even in the Canyon Lands. It is bounded by the Glen Canyon of the Colorado River, the canyon of the San Juan River, the Red House Cliffs, and Red Canyon (boundaries slightly modified from those of Gregory 1938).

Most of the areas immediately adjacent to the Red Rock Plateau apparently were less hospitable to Anasazi populations; to this extent the region was isolated, although its inhabitants were affected at times by events occurring elsewhere. To the south, the Red Rock Plateau was bordered by the San Juan Canyon. With a few exceptions (for example, the Beaver Creek community reported by Lindsay in 1961), this canyon and the lower parts of its southern tributaries lack evidence of substantial occupation, probably because of a general paucity of cultivable soil and of manageable water supplies for augmenting rainfall in agriculture. (Within 10 miles of the San Juan, however, exist large highland regions that were heavily populated at various times.) The Red Rock Plateau's northwestern boundary, the Glen Canyon proper, was also sparsely occupied, although for slightly different reasons, as discussed below. The lower parts of the tributaries entering the Colorado from the northwest also showed evidence of only light prehistoric occupation. The closest highlands in the northwestern direction lie at a considerable distance from the river. To the north, the Red Rock Plateau is bounded by the extensive drainages of

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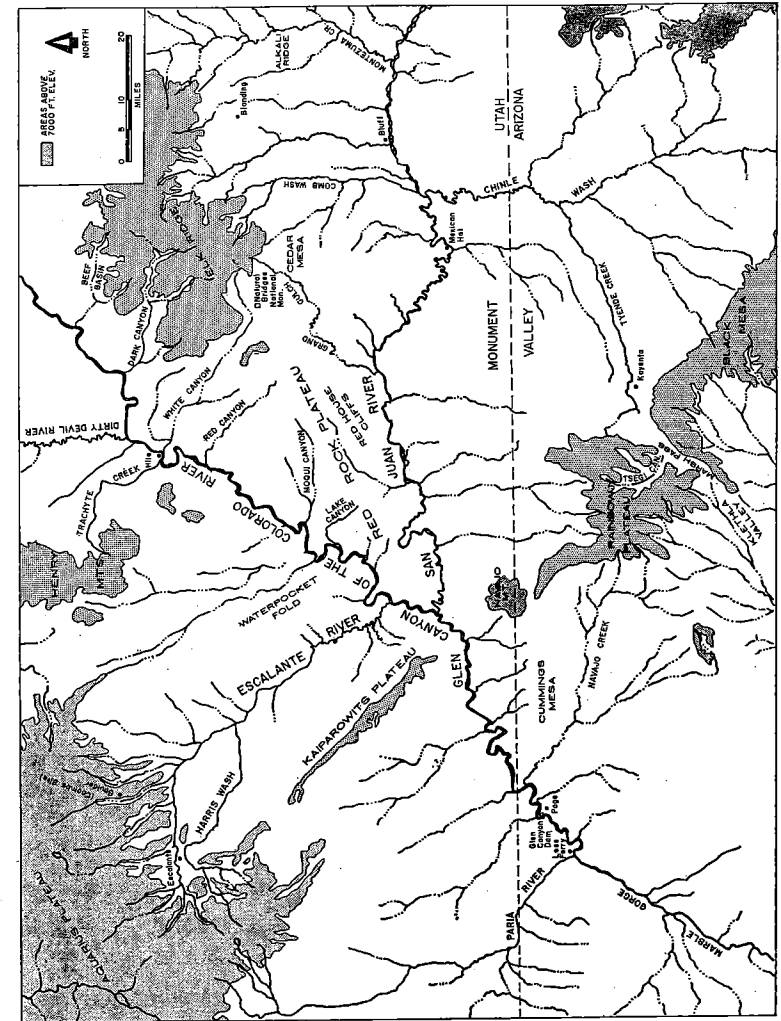


FIGURE 4. GLEN CANYON AREA

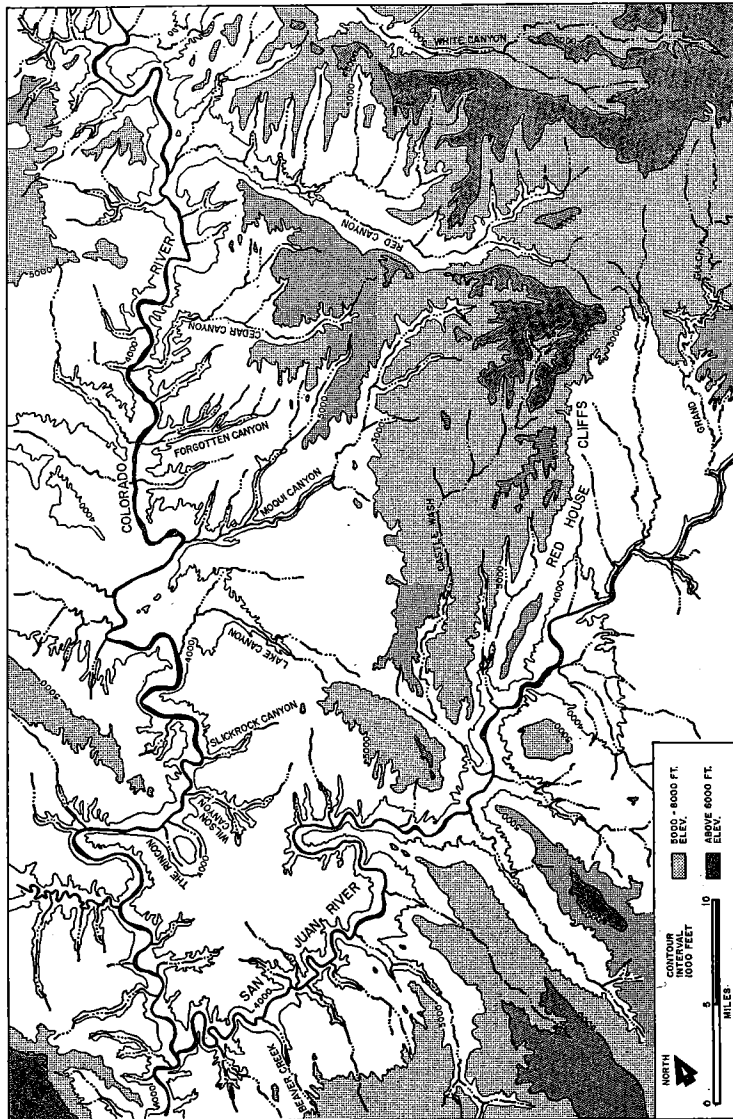


FIGURE 5. TOPOGRAPHY OF RED ROCK PLATEAU

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Red and lower White Canyons; much of this is uninhabitable badlands of exposures of Chinle formation. To the east, there are also extensive exposures of Chinle, and there are few sites at the base of the Red House Cliffs. The bordering Grand Flats area is low and poorly watered. Only to the northeast does the Red Rock Plateau join an area that was probably well populated at the same times that the plateau was occupied. Here, Castle Creek and Steer Pasture Canyon head in a dissected but fairly extensive highland that is also drained by the heads of Steer Gulch, Grand Gulch, Red Canyon, and the southern tributaries of White Canyon.

The Red Rock Plateau itself is environmentally marginal in terms of the usual Anasazi requirements for settlement. Most of the region is considerably less than 5500 feet in elevation (Fig. 5), and thus is well below the normal zone of Anasazi occupation. All but a small fraction of the area is a true desert, receiving an average of from 5 to 10 inches of rainfall per year. Dry farming would have been out of the question everywhere in the region.

Special physiographic features serve, however, to concentrate water and cultivable soils in a number of the Red Rock Plateau canyons; Anasazi occupation was largely confined to these canyons. The most favorable canyons were those cut into the Glen Canyon sandstones—the Wingate, Kayenta, and Navajo formations. The Navajo and Wingate are permeable and are excellent aquifers; springs and seeps usually occur at their contact with underlying, less permeable formations. These spring-rich contact zones are most often exposed where canyons cut through the Navajo or Wingate formations; hence such canyons have good supplies of surface and ground water.

In this sparsely vegetated region, the Glen Canyon sandstones also provide much eolian sand, some of which is trapped in the canyons as it blows across the plateau surface. Much of this sand is reworked by water when the canyons flood after showers. Where these floods have lacked power to flush out all the sand, thick deposits of alluvium have accumulated. While these deposits were stable or aggrading, floods were probably not confined to a single channel but spread out over the floodplains. Most Anasazi farming in the Red Rock Plateau probably depended on these easily worked, occasionally flooded alluvial soils of the canyon floors. Nearly all these alluvial bodies are now deeply trenched by erosion, and thus are unsuitable for cultivation. There is evidence, however, that arroyo-cutting of the present magnitude did not occur during the period from

about A.D. 200 to 1600 with which this study is concerned (Lance 1963).

In addition to providing source material for alluvium, the dunes and sheets of sand derived from the Glen Canyon sandstones help store ground water. Nearly all the rainfall received by these sandy deposits sinks below the surface; much of it eventually percolates into the permeable Navajo and Wingate sandstones and may then contribute to spring flow. Some of the larger dunes in the canyons also have a water table sufficient to support springs at their bases.

The Red Rock Plateau canyons that are entrenched into the Glen Canyon sandstones have much better water and soil supplies than other canyons or than the barren plateau surface between drainages. Most of the archaeological sites found in the region therefore occur in or near such canyons. Of this group, the two (Fig. 5) most richly endowed with soil and water in prehistoric times were (1) Lake Canyon, particularly the broad, low-walled part around former Lake Pahgarit, and (2) the broad, shallow upper part of Castle Wash (including Steer Pasture Canyon). Moqui Canyon is also fairly well supplied with water and alluvium but is deeper and has a narrower floodplain than either Lake or Upper Castle Wash. The Glen Canyon proper has numerous relatively broad floodplain remnants preserved as low terraces, but its flood regimen is somewhat different from that of the tributaries. Farming lands would have been flooded only in the spring, in response to melting snows in the Rockies and the high plateaus; these floods tend to be prolonged and violent. The floods in the tributary canyons, on the other hand, follow any substantial local shower, including those occurring during the growing season. These floods are brief and are violent only in narrow, steep parts of the canyons, or where they are confined within arroyos.

Other Red Rock Plateau canyons possessing adequate water and soil are Wilson, Slickrock, Forgotten, and Alcove Canyons, as well as parts of the San Juan Canyon. The area suitable for farming in each is small. The total amount of cultivable land of whatever sort in the Red Rock Plateau is quite limited—probably no more than a thousand acres altogether.

In addition to scattered oases of good soil and water, the Red Rock Plateau offered Anasazi farmers a very long growing season, averaging about 200 days. A growing season this long would virtually eliminate frost danger and would enable food crops to be planted and harvested more than a month earlier than in the highlands. It would also favor the heat-loving cotton plant, which was poorly adapted to the cool highlands. Cot-

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ton bolls, seeds, and fibers have been found in a number of dry Horsefly Hollow phase sites, and weaving implements and loom anchors are even more common.

Minor factors that probably helped make the Red Rock Plateau habitable are:

1. There is an abundance of natural rock shelters—favored locations for habitations during the White Dog and Horsefly Hollow phases and for storage structures during both these phases and in the Kletthla phase.
2. Numerous high Pleistocene gravel terraces near the Colorado and San Juan Rivers contain lumps of chert, jasper, and other siliceous rocks. These gravels furnished raw materials for chipped stone tools, not only for the local people but probably also for inhabitants of adjacent regions as far away as the Tsegi Canyon area (Turner and Cooley 1960).
3. The canyons incised into the Glen Canyon sandstones, because of their reliable water supply and varied physiography, have a rich flora, including many plants normally confined to the highlands, as well as those of the desert zone and some peculiar to the canyons. Thus, the Anasazi, though living outside the altitudinal zone they normally occupied, were not deprived of most of the wild plants that they normally used as raw materials, medicines, and supplementary foods. The main deficiency in the canyon flora for the Anasazi was probably the scarcity of piñon and juniper trees.
4. Wild animals were common enough in the Red Rock Plateau to permit regular hunting and to ensure that the region's inhabitants occasionally ate meat. Animal bone (most commonly bighorn sheep) and hunting gear (usually projectile points) occur at most Red Rock Plateau sites and generally seem much more common there in relation to other types of refuse than at most of the larger highland sites.

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The White Dog Phase (circa A.D. 200-300)

The Basket Maker II stage in the Four Corners area represents the earliest demonstrable occupation of this region by peoples possessing domesticated plants. In the western part of the Four Corners area, this stage is manifested by the White Dog phase, best known from sites near

Kayenta, Arizona; from Grand Gulch in southeastern Utah; and from Cave Du Pont in south central Utah. White Dog phase sites typically occur, or at least, typically have been found, in canyon environments, where spring- and flood-water farming on alluvial soils is possible and where natural shelters are abundant. Thus, the Red Rock Plateau canyons resemble the typical environments of sites of this phase, although they are somewhat lower in elevation.

The White Dog phase people seem to have been the first inhabitants of the Red Rock Plateau, and therefore must have migrated into the region. The most likely source area for this migration is the Grand Gulch region (Fig. 4), only a few miles to the east. Basket Maker sites are relatively frequent in the Grand Gulch, and some are apparently of sufficient size and depth to imply a long occupancy. Comparably large centers of White Dog occupation have not been demonstrated for other regions within a 10- or 20-mile radius of the Red Rock Plateau. Furthermore, as noted earlier, the highlands around upper Grand Gulch connect directly with the northeastern part of the Red Rock Plateau, whereas the other boundaries of the region are isolated to some extent from surrounding highland areas by barren lowlands.

If my dating estimate is correct, the White Dog occupation was brief and probably occurred in the third century A.D. After this, the region was largely or entirely unoccupied until the late 1000s or early 1100s. The dating of the White Dog occupation is anchored by a single radiocarbon determination of A.D. 250 ± 80 (M. Stuiver, personal communication) and given general support by the finding of White Dog materials stratified below Pueblo materials at several sites. The inference that the occupation was rather brief is based on the sparseness of cultural remains at most of the sites. The inference that all or most of the sites were occupied during the same brief period is supported only by artifactual similarities among them.

The White Dog movement into the Red Rock Plateau may have been initiated by a prolonged period of somewhat above-average rainfall during the last part of the second and first part of the third centuries A.D. (Schulman 1956: Table 49; Lipe 1967: 129-30).² Such a favorable climatic period would have promoted population growth among the White Dog people, leading some families or bands to seek new territory, and would also have made the Red Rock Plateau canyons more attractive by raising water tables and strengthening spring flow. Withdrawal of White Dog people

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from the region and its subsequent long abandonment are hard to explain but may be the result of improved cultigens (Galinat and Gunnerson 1963), agricultural techniques (especially dry-farming techniques), and housing that made large areas of the open highlands more habitable and, conversely, canyon environments relatively less attractive. A decline in the amount and reliability of rainfall in the late third and the fourth centuries may also be involved in the abandonment of the Red Rock Plateau at this time.

White Dog sites in the Red Rock Plateau are not abundant, and most occur in two small clusters—in Moqui Canyon and Upper Castle Wash (Fig. 6). These areas have natural shelters, good deposits of occasionally flooded sandy alluvium, and numerous springs. Other canyons with these characteristics, however, apparently were not much used by the White Dog people, although later Puebloans found them attractive. Lake Canyon, for example, was the area most heavily occupied by Puebloans but seems not to have been used by the Basket Makers at all. The restricted distribution of the White Dog sites may be due perhaps to the fact that Moqui Canyon and Castle Wash are the only habitable canyons permitting easy access to the highlands north and east of the Red Rock Plateau; the other habitable parts of the Red Rock Plateau are cut off from these highlands by stretches of barren slickrock desert. The upper part of Castle Wash, where the White Dog sites occur, is located in the lower part of the juniper-piñon zone.

There seem to me to be two different (though not mutually exclusive) explanations for the location of White Dog sites on the margins of the highlands. The first is historical and sociological: the earliest inhabitants of the region settled in the parts most accessible from the east because they came from the east; because only a few families ever lived in the Red Rock Plateau, they had no need to expand into new areas, and the locations of the original settlements enabled them to maintain close contact with families of the same or related bands centered in the Grand Gulch area.

A second, and to me more probable, explanation is that the Red Rock Plateau was settled by a single, small, rather isolated band and that the pattern of site distribution reflects only the demands of the White Dog subsistence pattern. Although farming was probably the single most important means of livelihood during this phase, hunting and gathering clearly seem to have been more important than they were to the late

interpretation of site distribution would not be disproved, but it would require additional support from demonstration that it is a recurrent adaptive pattern in the general area.

Two main geographic site clusters and three main functional or activity classes of White Dog sites have been distinguished in the Red Rock Plateau (Lipe 1967). An examination of all the data on the White Dog occupation of the region has yielded a few rather tenuous hints on the composition of the social units occupying the site clusters and carrying out the activities associated with the site types. These "hints" are briefly inventoried below.

Moqui Canyon Cluster

The Moqui Canyon site cluster is centered on a group of three habitation and burial sites, located in natural shelters within an area of about 2½ miles in diameter. Four small food-collecting campsites are located in a small tributary to Moqui Canyon about 12 miles from the habitation sites. Two storage sites are also peripheral to the habitations; one is located several miles down the canyon from the habitation sites, the other several miles upstream from them.

1. *Habitation and Burial Places.* Three sites, all natural shelters, contained White Dog habitational residue and burials: Bernheimer Alcove (Sa736), Rehab Center (Sa681), and Sa772. All are located near the upper end of the canyon's body of floodplain alluvium and amid the major concentration of springs occurring above the mouth of North Gulch. Painted pictographs adorned the walls of all three shelters, and at all three were rather heavy midden deposits. Evidence of fire was abundant at Sa736 and Sa681. Sa772 was excavated by the 1929 Bernheimer expedition; the composition of the midden deposit was not recorded. Although a cache of whole corn ears was recovered at Sa736, storage structures as such were not found at any of the three sites.

Of the approximately twenty burials found at the three sites, twelve were at Sa736, which probably was the most heavily occupied (although Sa681 yielded much more food bone and more elaborate hearth structures). A full range of ages was shown by the Sa736 burials, but most interesting for our purposes was an undisturbed group of five infants under three years old (ages about 2½ years, 1 year, 6 months, and two newborn) discovered at the bottom of a crevice. The infants were crowded together

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in a small space, suggesting that they were buried at about the same time, which in turn indicates that at least three nuclear families, and probably more, were using the shelter at the same time. This inference must be qualified, however. The burials were tied onto cradle boards, and the location was dry enough so they had not entirely decomposed after 1500 to 2000 years. Conceivably the grave could have been opened repeatedly over a number of years and new interments made without noticeable derangement of the earlier burials taking place (a relevant ethnographic example of repeated infant burials in the same grave by the same Hopi family is given in Simmons 1942: 261, 270, 284, 290). On the other hand, the sand around the burials was fairly clean even though overlaid by a trash deposit; this suggests that the grave was not opened repeatedly.

That habitation residue is concentrated in a fairly small space in all three sites indicates that the population using each site was small. It seems reasonable to postulate that two to four nuclear families used each site. The coresidence of three generations is suggested by the juxtaposition in a single grave at Sa681 of an adult female, a newborn infant, and a middle-aged to elderly male.

Whether or not the three habitational sites were used by three coexisting social units is not clear, in the absence of precise absolute dating for each. I would guess that they were occupied contemporaneously, because all seem to have been used for more than a brief interval and because they appear functionally equivalent, rather than complementary, to one another.

2. *Food-Collecting Camps.* The four shallow, essentially "surface" sites in Camp Canyon all yielded a number of thin sandstone grinding slabs (mostly broken), one-hand manos, and projectile points, as well as a considerable quantity of flaking debris. All these items are rare in the habitation sites. The camps, on the other hand, have little or no midden deposit and few traces of fire; this is true even in spots where wind erosion has not been active.

These sites do not appear to have been connected with farming. Camp Canyon, though well watered, is choked with huge falling sand dunes, has little alluvium, and was ignored by the later Puebloan farmers of the region. It seems likely to me that these camps reflect the gathering and grinding of wild seeds, perhaps of the Indian ricegrass or Indian millet (*Oryzopsis hymenoides*), which now is fairly common on the Camp

Canyon dunes and which must have been more abundant before the introduction of cattle. Seeds of this plant were a staple for most Paiute groups (Steward 1938), including all the Southern Paiute bands (Kelly 1964: 41-42, 153, 170, 179), and were collected by the Hopi in times of famine (Whiting 1939: 65). Caches of these seeds have been found in Basket Maker sites (Morris 1939: 15). The time of harvest seems to have been June, at least for the Hopi (Nequatewa 1943). This would probably have been a time of food shortage for the White Dog people, because it lies after planting, when the people would have to stay fairly close to their fields, but before the earliest crop harvests.

Among the Southern Paiute, Indian rice was often ground shortly after collection; this practice would explain the quantities of grinding slab fragments at the Camp Canyon sites. Several complete grinding slabs were found at each of the sites; at Sa748 these were turned face down as if their users anticipated a return in the future. The numbers of unbroken grinding slabs at these sites suggest that several persons, probably women, shared the grinding of the seeds that had been collected.

As previously noted, the Camp Canyon sites also contained a number of projectile points and considerable flaking debris (including chips, cores, and hammerstones). These seem clear evidence that the work parties using these sites included men as well as women. Perhaps after helping collect seeds, the men made or repaired hunting equipment while the women prepared the seeds for eating. Sweeney and Euler (1964) report that sites identified by their (male) Southern Paiute informants as "hunting camps" had thin sandstone grinding slabs as well as points and flaking debris on the surface.

The Camp Canyon sites were probably not often used for overnight stays, because none of the three main habitation sites was far away; this may explain the general scarcity of traces of fire at these sites. The fifth probable food-collecting camp in the Moqui Canyon cluster, Sa369, at the mouth of Moqui Canyon, shows abundant evidence of fire; there are stone-lined hearths and the fill is stained with ash and charcoal. This site may have been an overnight camp used by wider ranging collecting parties.

3. *Storage Sites.* Two sites, Echo Cave (Sa583) and Honeycomb Alcove (Sa754), fall into this class. The former is located well downstream from the cluster of habitation sites, the latter upstream from them. Both consist largely of pits and jar-shaped cists dug into natural clay-like hard-

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pan on the floors of dry shelters. Echo Cave contained 16 storage features ranging from a few inches to 5½ feet in diameter. With the exception of one shallow pit containing a caked organic substance, all had been cleaned out by the Basket Makers, by rodents, or by later Puebloans, who had utilized the cave in a minor way. The small amount of trash present is mostly attributable to the Pueblo occupation.

Honeycomb Alcove, which apparently was not reused by Puebloans, contained 58 pits and cists ranging from a few inches to about 3½ feet in diameter. All had been fairly thoroughly cleaned out in prehistoric times. The few items left included piñon nuts, corn kernels, squash fragments, a flint core, a digging stick, a bundle of unworked bighorn sheep metatarsals, fragments of a large carrying basket, and pieces of juniper bark and yucca matting probably once used to wrap cached materials. There was no habitational residue and virtually no trace of fire.

The sites apparently were used to store paraphernalia used in hunting and gathering and in cultivation, as well as foods and other materials obtained through these activities. The peripheral locations of the storage caves with respect to the habitation sites is difficult to explain. It may have something to do with the demands of the food-collecting component of the subsistence pattern, or with the cultivation of outlying fields, or both. Or perhaps the locations were simply dictated by the presence of suitable hardpan floors. Such caves are not particularly common in the region.

The question of who was using these sites and the various storage features in them is a perplexing one. The considerable spatial separation of the sites from one another and their lack of spatial correlation with particular habitation sites suggest that the whole local community had access to them, that one was for "downstream" activities, the other for "upstream" activities. Despite the large number of pit and cist features, neither site had a very large total storage capacity. Most of the features are small, rather shallow pits; the jar-shaped cists, on the other hand, tend to be larger; most have diameters of between 20 and 48 inches. These cists seem better designed for storing food than the pits, but whether food actually was stored in the cists is conjectural, since clearly a variety of items was stored at the sites.

Despite the large number of storage features at these two sites, their capacity is not large; probably neither has greater capacity than one of the small two- or three-family pueblos of the Horsefly Hollow phase. The storage requirements of the Puebloans were probably greater, however. A

study of the volumes of storage features in relation to other kinds of structures for all phases in the Red Rock Plateau is under way, but no patterns have emerged as yet.

Castle Wash Cluster

In contrast to the Moqui Canyon cluster, the Upper Castle Wash White Dog phase sites occur in a much smaller area, are fewer in number, and include at least one constructed house.

1. *Habitation Sites.* The only clearcut example is the Lone Tree Dune site (Sa363), a single shallow circular pithouse about 20 feet in diameter with a nearby deep jar-shaped cist about 5 feet in diameter. Only one small firepit was found in the house, located slightly off center. Filled with charcoal rather than ash, it may not have been a true indoor fireplace. A large outdoor slab-lined hearth was found, however, about seventy feet from the house. According to Naroll's (1962) cross-culturally derived formula relating house-floor area to household size, an occupancy by only three or four adults, or perhaps a married couple with several children, is indicated.

Two unexcavated nonceramic sites on adjacent sand ridges several hundred yards away show surface evidences similar to Sa363, although they are more eroded. If they represent similar structures, a local residential unit of several nuclear families, probably related by marriage or descent, is implied. Since no attempt was made in the field to test this postulated similarity of the three sites, it must remain speculative.

Two other unexcavated house structures probably similar to Sa363 in size and construction were noted recently by the author during a brief unsystematic survey of a highland area near the eastern rim of Grand Gulch. These two structures were about a half mile apart; cursory examination of the intervening area failed to reveal any other houses.³ Caves with pictographs, probably Basket Maker in style, were noted less than a mile away in Grand Gulch proper.

2. *Storage and Camp Site.* Only one site of this sort, Sa356, was found. Located in a dry alcove, it contained three slab-lined cists, one unlined storage pit, and two slab-lined firepits. The thin layer of trash yielded corncobs, squash fragments, piñon nuts, and a few perishable artifacts, but little animal bone and almost no stone artifacts.

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3. *Camp Site.* The several thin nonceramic strata at the Greenwater Spring site (Sa444) may relate to the White Dog phase. Little was found here except three slab-lined hearths and a few nondiagnostic chipped flint artifacts. As the name indicates, the site is close to a spring, probably the best one in this canyon.

Conclusions

The rather meager evidence assembled above indicates that the White Dog phase inhabitants of the Red Rock Plateau maintained, for at least part of the year, local coresidential groups of probably no more than two or three nuclear families. It seems reasonable to suppose that these families were linked by kinship, either of common descent or of marriage, or a combination of both.

If the three habitation sites in Moqui Canyon were occupied simultaneously, the existence of a local community larger than the unit of immediate coresidence seems evident. Storage sites, but not individual storage pits, may have been used by the whole Moqui Canyon community. There is no other evidence of any other means of community integration. It seems quite likely that the small residential units occupying the canyon were also integrated by kinship ties, but I can present no evidence to support this proposition.

The relationship between the site cluster in Moqui Canyon and the one in Upper Castle Wash is far from clear. One speculation is that the pithouse, or possibly pithouses, in Castle Wash were winter residences for some of the families that occupied Moqui Canyon in the summer. The move to the highlands for the winter would have been to take advantage of the piñon nut harvest. A similar adaptive pattern was followed by some of the Southern Paiute in the nineteenth century.

Studies of associated pollen, growth-ring stages in charcoal from hearths, artifact functions, and so forth, might produce evidence on whether or not these two groups of sites were occupied seasonally. These studies have not been carried out, and it is unlikely that the relevant data are included in the collections made from these sites. Even if it were to be shown, however, that the two site clusters were used at different seasons, it would still remain to be demonstrated that the same group of people was responsible.

If there were three house structures in the Upper Castle Wash clus-

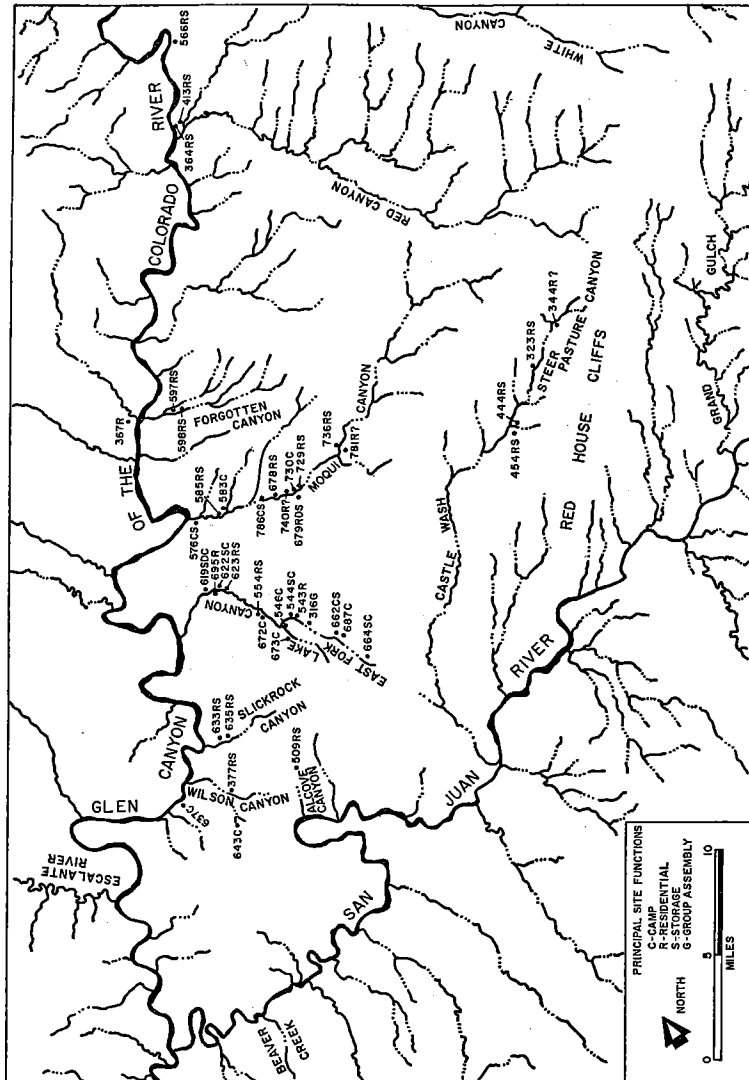


FIGURE 8. DISTRIBUTION OF HORSESHOE HOLLOW PHASE COMPONENTS

AREA	PHASE	SITE	PHYSIOGRAPHIC SETTING		ARCHITECTURAL FEATURES							SHERD COUNT	PRINCIPAL SITE FUNCTIONS			
			ELEVATION	SHELTER	SUBSTANTIAL ROOMS		INSUBSTANTIAL ROOMS		KIVAS	EXTERIOR HEARTH	STORAGE STRUCT.			DEFENSIVE STRUCT.		
					With Hearth	Without Hearth	With Hearth	Without Hearth								
WILSON CANYON AREA	HORSEFLY HOLLOW	643 (E) ¹	Low Bench	Alcove			1			2			129	C ³		
		633 (E)	High Talus	Alcove	5		3	4	1	1	6		448	R ⁴ , S		
		509 (S) ²	High Talus	Alcove	1?					1?		4?		180	R, S	
		635 (E)	High Ledge	Alcove	2	1	1			1	1	2		426	R, S	
		377 (E)	High Ledge	Overhang	1		1			1		2		159	R, S	
		637 (E)	Canyon Floor	Open											197	C
		693 (E)	Canyon Floor	Alcove								6			134	C, S ⁵
LAKE CANYON AREA	KLETHLA	565 (S)	Canyon Floor	Open										160	C	
		651 (E)	Canyon Floor	Open										1076	C	
		544-2 (E)	Canyon Floor	Open	2										248	R
		627 (E)	Canyon Floor	Open	1?				2						3070	R
		620 (E)	Canyon Floor	Open								1			584	C, S
		540 (E)	Canyon Floor	Open								1			161	C
		316 (E)	Low Bench	Open	2						1				1199 (M) ⁶	G ⁷
		672 (S)	Low Bench	Open					1?						259	C
		664 (S)	Low Bench	Alcove					1?			2			167	S, C
		695 (E)	Canyon Floor	Open	2				1		2+				319	R
HORSEFLY HOLLOW	HORSEFLY HOLLOW	544-1 (E)	Canyon Floor	Alcove						4	14+			2034	S, C	
		623 (E)	Canyon Floor	Open	1		1	1	1?		1			325	R, S	
		619 (E)	Low Ledge	Alcove		1					1	2	1		190	S, D, C

¹(E), Excavated; ²(S), Survey Only; ³(M), Body Mixed Collection; ⁴(C), Composite; ⁵(M), Residential Site; ⁶(S), Storage Site; ⁷(G), Group Assembly Site

FIGURE 9. CHARACTERISTICS OF KLETHLA AND HORSEFLY HOLLOW PHASE SITES

(a) Lake Canyon and Wilson Canyon areas

AREA PHASE SITE	PHYSIOGRAPHIC SETTING		ARCHITECTURAL FEATURES							SHERD COUNT	PRINCIPAL SITE FUNCTIONS		
	ELEVATION	SHELTER	SUBSTANTIAL ROOMS		INSUBSTANTIAL ROOMS		KIVAS	EXTER- IOR HEARTH	STOR- AGE STRUCT.			DEFEN- SIVE STRUCT.	
			With Hearth	Without Hearth	With Hearth	Without Hearth							
LAKE CANYON AREA HORSEFLY HOLLOW	673 (E)	Low Bench	Open									166	C
	622 (E)	Low Ledge	Alcove						2			174	S,C
	662 (E)	Talus	Alcove			1	2		1			539	C,S
	543 (E)	Canyon Floor	Overhang	1		1			1			494	R
	554 (E)	High Ledge	Overhang	1	1		1		1	1		207	R,S
	687 (S)	Low Bench	Open							1?		161	C
	782 (E)	Canyon Floor	Open									154	C
MOQUI CANYON AREA HORSEFLY HOLLOW	681 (E)	High Talus	Alcove	1	2		1		1		1	332	R,D
	675 (E)	Canyon Floor	Open	1				1	2			284 (M)	R
	583 (E)	Low Bench	Alcove			1			1			256 (M)	C
	576 (E)	Low Bench	Alcove				1		4	1		265	C,S
	786 (S)	High Ledge	Alcove				1?			1		458	C,S
	585 (E)	Low Talus	Alcove	2	1		1-3	1	1	3+		1269	R,S
	730 (S)	High Ledge	Overhang				3?					116	C
	729 (E)	High Ledge	Overhang	1		1	1		3			305	R,S
	736 (E)	Low Talus	Alcove	1		1	4		4			211	R,S
	678 (E)	High Ledge	Overhang	2			1	1	1	2		352	R,S
	781 (E)	Canyon Floor	Open	1					1			209	R?
	679 (E)	High Ledge	Open, Overhang	1		1			1	4		869	R,D,S
	740 (S)	High Ledge	Open				7?					228	R?

Fig. 9, continued. (b) Moqui canyon and Lake Canyon areas

AREA PHASE SITE	PHYSIOGRAPHIC SETTING		ARCHITECTURAL FEATURES							SHERD COUNT	PRINCIPAL SITE FUNCTIONS		
	ELEVATION	SHELTER	SUBSTANTIAL ROOMS		INSUBSTANTIAL ROOMS		KIVAS	EXTER- IOR HEARTH	STOR- AGE STRUCT.			DEFEN- SIVE STRUCT.	
			With Hearth	Without Hearth	With Hearth	Without Hearth							
FORGOTTEN CANYON AREA HORSEFLY HOLLOW	367-1 (E)	Canyon Floor	Overhang							10		416	C
	366 (E)	Low Talus	Alcove					1?	1	1		979	R?,S
	368 (E)	Canyon Floor	Open						2			388	C
	367-2 (E)	Canyon Floor	Overhang	2					2			823 (M)	R
	597 (E)	High Talus	Alcove	1		1	1	1	1	3		110	R,S
	598 (E)	High Talus	Alcove	3		1	1	1		4		569	R,S
UPPER CASTLE WASH HORSEFLY HOLLOW	1010 (E)	Canyon Floor, Ledge	Open, Shelter	2	1		1		3	1		389	R,S
	454-1 (E)	Canyon Floor	Open	2?	1?							552	R
	463 (E)	High Talus	Overhang	1					2	1		363	R,S
	344-2 (E)	High Dune	Open									176	C
	323-1-2 (E)	Canyon Floor	Boulder	1?			1?		5			913 (M)	R?
	444-1 (E)	Canyon Floor	Open									274 (M)	C?
	344-1 (E)	High Dune	Open				2?	1				101 (M)	R?
	454-2-4 (E)	Canyon Floor	Open	2	2			1		1		1094 (M)	R,S
	444-2 (E)	Low Talus	Overhang	1	1?					2?		257	R,S
	323-3 (E)	Canyon Floor	Boulder	1			2	1		4		528	R,S
UPPER GLEN CANYON HORSEFLY HOLLOW	564 (E)	Canyon Floor	Boulder	3								753	R
	701 (E)	Canyon Floor	Open				1	1?		2		2359	C
	439 (S)	Low Bench	Open	3?						5+		100	R,S
	413 (E)	Low Talus	Overhang	2					1+	1		100 (M)	R,S
	566 (E)	Ledges	Overhang	2			1		2			135	R,S
	364 (E)	Low Bench	Open	4-6	3?			1		3?		1239	R,S

Fig. 9, concluded. (c) Upper Glen Canyon, Upper Castle Wash, and Forgotten Canyon areas

AREA PHASE		SUMMARY												
		SITE ELEVATION		SITE SHELTER		ARCHITECTURAL FEATURES						SITE FUNCTIONS		
		CANYON FLOOR	OTHER	OPEN	SHELT. ERRED	SUBST. ROOMS	INSUBST. ROOMS	KIVAS	EXTER. HEARTHES	STORAGE STRUC.	DEFEN. STRUC.	CAMP	CAMP & STORAGE	RESI- DENTIAL
WILSON CANYON AREA	K. ¹													
	H.H. ²	1	5	1	5	11	9	4	4	14		2		4
LAKE CANYON AREA	K.	7		6	1	3	2		1	7		3	2	2
	H.H.	4	10	7	7	9	12	1	9	23	2	4	5	4
MOQUI CANYON AREA	K.	2	1	2	1	4	1	1	3		1?	1		2
	H.H.	1	10	2	9	10	25	3	8	18	1	2	2	7
FORGOTTEN CANYON AREA	K.	2	1	1	2			1	13	1		2		1
	H.H.	1	2		3	6	4	2	3	7				3
UPPER CASTLE WASH AREA	K.	4	2	4	2	8	2		10	2		2		4
	H.H.	2	2	2	2	7	7	3		7				4
UPPER GLEN CANYON AREA	K.	2	1	2	1	6	2		2	5		1		2
	H.H.		3		3	13	1		3	4				3
TOTALS	K.	17	5	15	7	21	7	2	29	15	17	9	2	11
	H.H.	9	32	12	29	56	58	13	27	73	3	8	7	25

¹(K.), Kivaite Phase; ²(H.H.), Horsetly Hollow Phase

FIGURE 10. SUMMARY OF SITE CHARACTERISTICS BY AREA

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the region, and has not biased the sample significantly, but alternative viewpoints have been expressed (for example, Jennings 1966).

An explanation is needed for the architectural feature labels used in Fig. 9. Substantial rooms have (or can be inferred to have had) (1) solidly built walls of masonry or sometimes of jacal, (2) roofs, and (3) adequate interior space for comfortable habitation. Most of the "substantial" rooms that were excavated had hearths, but some did not. Insubstantial rooms usually have rough dry-masonry walls and were probably never roofed; only a few of these structures that were excavated had hearths. Many were probably just low windbreaks.

Kivas were in some cases difficult to identify (see Smith [1952: 154-65] for a discussion of "when is a kiva?"), but in general, this rubric was applied to large well-built pithouses having a deflector, ventilator, and central firepit, and sometimes, pilasters or a southern recess. "Exterior hearths" include fireplaces noted at camp sites, as well as those appearing in courtyards and outdoor work areas at residential sites. This category is probably underrepresented at sites known only from survey and at large canyon floor sites which seldom were as completely excavated as rock-shelter, ledge, or talus-top sites. "Storage structures" include cists and small substantially built aboveground masonry buildings whose interior dimensions or doors were too small to permit comfortable habitation. Buried pottery vessels, most of which were probably used for storage, were not tabulated.

"Defensive structures" refers to a specific type of building element, found at only four sites. This element is a substantial masonry wall enclosing the front of an alcove or part of an open site and breached only by a narrow door and by small "peephole" openings at irregular intervals. Residential sites located in defensible positions were not classed as defensive structures, although many may well have been built in hard-to-reach places for defensive reasons.

The "principal site functions" are rather speculative and provisional. The main division of functions is into residences versus camps. Residential functions were assumed if the site contained one or more substantial rooms with hearths. Camps lack such rooms. Storage and defensive functions are also noted when structures of these sorts occur.

This assignment of functions may not be very realistic; particularly troublesome is the distinction between "residential" and "camp" sites. Many of the camp sites yielded more artifacts than residential sites with

numerous structures. If artifact quantities are any indicator of the length of time a site was occupied and/or the number of people using it, then it seems apparent that in some areas of the Red Rock Plateau, many of the people spent most of their time away from formal complexes of substantial structures.

In general, architectural features are probably underrepresented in the record at canyon floor sites and other open sites because of the greater chance for structures to be obscured or obliterated by the elements or to escape the excavators' spades. Kletthla architectural features, especially, are probably underrepresented in the tabulations, because (1) these sites tend to be in the open and on the canyon floors, (2) Kletthla sites are older and so have been longer exposed to damage, and (3) the Kletthla people more frequently built small slab-and-jacal constructions which decompose rapidly.

The Kletthla Phase (circa A.D. 1100-1150)

Five hundred to 800 years after its abandonment by the White Dog people, the Red Rock Plateau was reoccupied, in the late 1000s or early 1100s. The new inhabitants belonged to the Kletthla phase of the Kayenta branch. Although other explanations cannot be ruled out at this point (see Lipe 1967: 246-51), the hypothesis best supported by the available fragmentary evidence is that the Red Rock Plateau was reoccupied at this time because populations in the highlands to the east and south had increased to the point of "spilling over" into the environmentally marginal Red Rock Plateau. This hypothesis can probably be confirmed or refuted to the extent that the site distributions it implies could be checked by properly designed surface surveys in the highlands.

In addition to the scanty evidence that now exists of site distributions in the highlands, there is also some evidence that a long period of consistently above-average rainfall occurred between about 1050 and 1150 (Fig. 11) and that a warming trend took place concurrently (Baerreis and Bryson 1965; Lipe 1967). Both these developments would probably have led to population growth in the highlands.

The Kletthla occupation of the Red Rock Plateau was only part of a general movement of Kayenta peoples into the Glen Canyon area as a whole. Substantial numbers of early Kletthla phase sites were also established on the Kaiparowits Plateau and Cummings Mesa and on the south-

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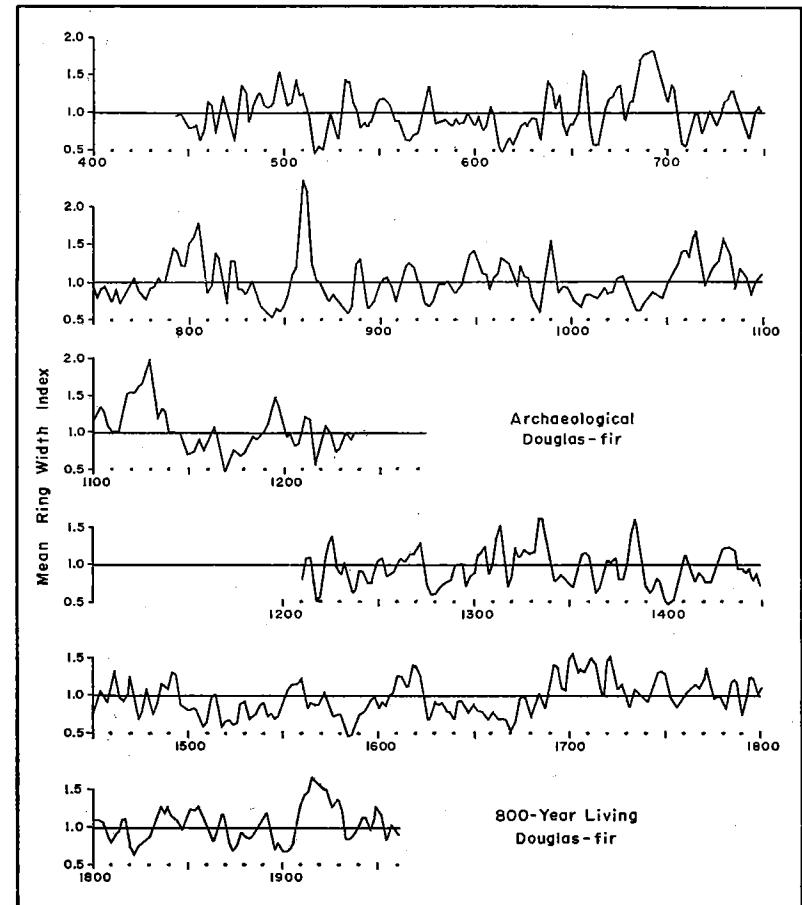


FIGURE 11. TREE-RING INDICES FROM MESA VERDE (after Fritts et al. 1965)

eastern fringes of the Aquarius Plateau near Boulder, Utah. This period was also the time of maximum northward and westward (if the Virgin branch is considered a Kayenta subbranch) geographical extent of the Kayenta Anasazi.

About 1150, Kayenta population in southern Utah apparently declined sharply. The Red Rock Plateau seems to have been either entirely or nearly abandoned at this time, as was most of the northern and western part of the Glen Canyon area. This abandonment of much of the Glen

Canyon area about 1150 correlates with a general southward retreat of the northern boundary of the entire Kayenta branch, with the disappearance of the Virgin subbranch (Aikens 1966a: 56), with the eclipse of the Fremont culture of central Utah, and probably with continuing population decrease on the Mesa Verde (Hayes 1964). The Coombs site, located in a highland setting near permanent streams, seems to have continued to be occupied during this period, and perhaps until A.D. 1200. Some Fremont communities in north central and northern Utah may also have survived, continuing until perhaps as late as the 1400s (Aikens 1966b). In general, however, the population of southern Utah seems to have declined sharply about 1150.

These events correlate well with the onset, at about 1150, of a severe drought, as recorded in the Mesa Verde tree-ring record (Fig. 11), which indicates that this drought was extremely intense and lasted about 40 years. Schulman's (1956) tree-ring chronology does not record such a severe drought but does indicate a marked decline in moisture relative to the preceding period. Other dendrochronological evidence indicates substantial regional variation in rainfall in the northern Southwest in the late 1100s (Jeffrey Dean, personal communication).

During the Kletthla occupation of the Red Rock Plateau, sites were much more numerous and were less restricted in distribution than in the earlier White Dog phase (Fig. 7). The principal Kletthla site clusters are in Lake Canyon and in the Upper Castle Wash area; a smaller cluster is at the mouth of Forgotten Canyon, and there are scattered Kletthla sites in the Upper Glen Canyon and Moqui Canyon. The number of Kletthla sites recorded from Moqui Canyon may be misleadingly small—the sample from this canyon has probably been disproportionately diminished by arroyo-cutting and alluviation. Nevertheless, it is doubtful that Moqui Canyon was as intensely occupied as Lake Canyon or Upper Castle Wash.

Kletthla sites tend to concentrate in the few areas where the canyons are accessible and open and where relatively large patches of flood- and/or spring-watered soils occur. It appears that the Kletthlans, unlike the earlier White Dog people, occupied all the parts of the Red Rock Plateau most favorable for farming. Other potentially habitable areas, chiefly in the deeper and narrower canyons such as Wilson, Slickrock, and Upper Forgotten, were largely ignored. These canyons were probably less desirable because their soils occur in small scattered patches and because fields were more subject to violent flooding.

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None of the sites of the Kletthla phase has more than a few structures, including sites yielding large numbers of artifacts. The largest Kletthla site in pottery yield—Dead Tree Flats in Lake Canyon—had only one substantial room, a large masonry-lined pithouse that may have been a kiva. This room may have been constructed during a light Horsefly Hollow occupation of the site, for it closely resembles a definite pithouse or kiva of this phase found at the nearby Lyman Flats (Sa623) site. Fairly extensive trenching at the Dead Tree Flats site revealed only insubstantial structures; however, the site was not fully excavated. The second largest collection of Kletthla sherds comes from the Creeping Dune site (Sa701) in the Upper Glen Canyon. Here, a rather elaborate reservoir and system of ditches had been built to irrigate plots of land with springwater (Sharrock et al. 1961). Pottery was scattered over several acres, but only two small room-like structures were found. Extensive trenches failed to reveal any pithouses.

Lake Canyon, the most heavily occupied part of the Red Rock Plateau during Kletthla times, judging by numbers of sites and artifacts, had only a few structures assignable to Kletthla origins. The only definite Kletthla house in Lake Canyon is a small (10 foot diameter) slab-lined, shallow pithouse on a dune in front of the Horsefly Hollow site (Sa544); it apparently had a jacal or pole superstructure. Associated was a small deep unlined pithouse that seems not to have been finished.

More extensive building during Kletthla times seems to have gone on in Upper Castle Wash and the Upper Glen Canyon. At the Steer Palace site (Sa454) in Upper Castle Wash, there is an unlined pithouse with five mealing bins on the floor, arranged in a semicircle around a central firepit. One and possibly two slab-based jacal surface rooms seem to have been levelled and rebuilt by later Horsefly Hollow occupants of the site. The disturbance produced by this later occupation makes it difficult to determine whether other Kletthla structures were present or not. At the nearby Scorup Pasture site (Sa1010), a single small shallow slab-outlined pithouse like the one noted from Sa544 was found. Nearby, under a ledge, were the remains of one to three vertical-slab and jacal structures; masonry structures built atop them had largely obliterated their traces. The rebuilding was probably done during the later Horsefly Hollow phase.

The largest and best preserved Kletthla structures in the region are in the Upper Glen Canyon, at Daves site (Sa564) and Ga439. Daves site consists of three surface masonry rooms built around a large slump boulder. Ga439, which was previously excavated by unknown parties and re-

ported only from surface observations (Steward 1941: 335-36; Lister 1959: 120), consists of three or four contiguous surface masonry rooms located near the mouth of Trachyte Creek.

Kivas are rare at the Klethla sites. Other than the questionable one at Sa627, only two structures are likely to have served as kivas. The most clearly identifiable one, at Sa675 in Moqui Canyon, is deep and masonry-lined and has a southern recess, ventilator, deflector, and central firepit. The Husteds Well site (Sa366), at the mouth of Forgotten Canyon, also has these features, but is smaller and not fully masonry-lined. The only other structure at Husteds Well was a collapsed jacal storage room. Klethla remains at Sa675 were largely buried in alluvium and the site was not fully excavated. One other room, probably of Klethla age, was found.

The probably misnamed Fortress site (Sa316) in Lake Canyon, which may have served what I have called a group assembly function in the Horsefly Hollow phase, may have also been so used in Klethla times. The walled plaza and large masonry rooms at the site almost certainly date to the later phase, but Klethla pottery does appear, although it is not predominant. Furthermore, the peculiar scarcity of gray ware sherds characterizing collections from the Fortress is present among the Klethla as well as the Horsefly Hollow types, suggesting that this location may have had a similar special function in both phases.

One of the "defensive wall" structures may possibly belong to the Klethla phase. At site Sa681 in Moqui Canyon, one of the few Klethla components located in a high cave, a large well-built masonry wall with peepholes closes off part of the cave floor. Since some Horsefly Hollow pottery does occur in the site Sa681 deposits, and a probably Klethla jacal room at the back of the cave had been burned and levelled, it may be that the "defensive" wall was built during the later phase.

Storage structures are rare at Klethla sites, at least in comparison to their frequency in Horsefly Hollow sites. Of course, some of the small coursed-masonry granaries that occur throughout the canyons in sheltered spots may be of Klethla origins. Such granaries are built into many Horsefly Hollow sites, but their association with Klethla sites is not so clear. The only case of probable association is at Ga439 in Upper Glen Canyon at the mouth of Trachyte Creek, where Lister (1959: 120) reports several masonry granaries under ledges near the main structures.

Large campsites are more abundant in Klethla times than in the Horsefly Hollow phase. The Buried Olla site (Ga367) is a large campsite that

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may have been a stopping place on a popular trail during Klethla times. It is located in Glen Canyon at a point where there is a good fording place and where two tributary canyons lead in opposite directions away from the Colorado, providing a convenient pathway for east-west travel across the canyonlands area. One of the largest panels of petroglyphs in Glen Canyon is also associated with the Buried Olla site, as if each traveler had left some mark of his passage. The levels of the Buried Olla site at which Klethla pottery was dominant contained ten hearths and several buried storage jars but no house structures. Later, during the Horsefly Hollow phase, two masonry pithouses were built, but the site probably continued in use as a trail stop as well.

Because of the scarcity of definite structures and because potentially relevant data on artifact variation and distribution were not collected, the nature of the social units and activities of the Klethla people are difficult to infer. In the few sites where houses have been found, the evidence points to a very small unit of coresidence. The several small, isolated pithouses noted from Lake Canyon and Upper Castle Wash could have been occupied only by small nuclear families. The largest Klethla sites, in architectural elaboration, have shelter space for only two or three families. The grinding room at Sa454, with its five metates, could have been staffed by the women of two or three families. The other Klethla structures discovered at the site do not seem to provide enough living space for more than this number.

In sum, the scanty evidence available on living arrangements suggests that despite a larger total population, despite greater dependence on what must have been a more productive agriculture, the unit of coresidence during the Klethla occupation of the Red Rock Plateau was no larger, and perhaps not as large, as it had been during the White Dog phase, hundreds of years earlier. The Klethla immigrants into the region probably came as single nuclear families, or in small groups of two or three families. Probably the individuals coming into the region were young people unable to secure suitable farming land in their home areas. So, at least at first, residential units including three generations would have been rare, and the total number of people in a given residential unit would have been small.

There is some evidence of the occasional formation of larger groups of people and of mechanisms for integrating several minimal residential units. The Creeping Dune site (Sa701) in the Upper Glen Canyon (Sharrock et al. 1961) affords perhaps the best evidence of this. Here, a masonry

reservoir some 27 by 12 feet in plan, with walls up to 6 feet high and 5 thick, was built to collect water from a now defunct spring. Ditches extended from this reservoir and perhaps from other springs in this area for a distance of at least 400 feet downslope, along sandy spurs extending out from the cliffs. Artifacts are thinly scattered over an area of 6 or 7 acres, and it seems probable that an area one-third to one-half this large was irrigated. The construction and maintenance of the irrigation system at this site and the farming of the irrigated plots must certainly have drawn labor from a group consisting of more than a single extended family.

The two or possibly three Klethla phase kivas recorded for the Red Rock Plateau seem not to be associated with particular groups of residential structures. It seems likely that the kivas, too, served to integrate groupings larger than the coresidential unit, or household. If the kiva at Dead Tree Flats was in use during Klethla times, it is associated with what appears to be a very large Klethla campsite; the total amount of pottery present here is probably greater than at any of the Klethla sites having definite house structures. Perhaps gatherings here were related to use of the kiva. The importance of kivas in the early Klethla phase probably should not be overemphasized, however. Kivas are rare in the western Kayenta area before the end of the Klethla phase and do not appear at all in some of the northwesternmost early Klethla phase settlements, such as those of the Kaiparowits Plateau and Coombs village near Boulder, Utah (Aikens 1966a: 47).

The Fortress site (Sa316) in Lake Canyon has already been referred to as a possible place of group assembly, perhaps for dances or other ritual activities. This site is on the edge of a prominent bench overlooking the broadest and probably the most productive part of Lake Canyon. The large plaza and room structures at this site probably belong to the Horsefly Hollow phase, but Klethla pottery is also fairly abundant at the site, although not predominant. The distinctive characteristic of the pottery here—both for Klethla and for the later type—is that decorated wares are much more common than are gray wares; the reverse is normally true.

Another site in the same part of Lake Canyon that shows similar pottery frequencies is Sa540, the Pahgarit Dune site. This is simply an open, essentially surficial "camp" site, on the edge of what was, in the late nineteenth and early twentieth centuries, a shallow lake dammed by an alluvial fan or falling dune. There is some question as to whether a lake existed here in prehistoric times (Lance 1963), but the area was probably at least

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swampy. In any case, Sa540 yielded materials attributable to the Klethla and Horsefly Hollow phases, to Pueblo IV period Hopi, perhaps to nineteenth-century Utes, and certainly to nineteenth- and twentieth-century Mormon cowboys. The bulk of the pottery found is attributable to the Klethla occupation, however. A historically known north-south trail leading to the Navajo Mountain area crosses Lake Canyon at about this point; if it were in use in prehistoric times as well, this might account for the great variety of materials at Sa540, though not necessarily for the skewed pottery frequencies.

Although it seems certain that communities spatially more extensive than the individual sites existed, there seems no way of precisely delimiting these at the present stage of analysis. A distributional study of pottery style variation at the attribute level, such as Longacre (1964a, 1964b) has carried out, might be fruitfully applied to this problem.

In summary, a review of the evidence from the early Klethla phase occupation of the Red Rock Plateau indicates that the only identifiable residential unit was small, consisting of no more than one to three nuclear families, that the people may have been living as often in temporary shelters or open camps as in houses, and that a certain amount of integration of the small coresidential units into larger communities may have derived from cooperation in irrigated farming and from participation in group rituals. At this point the data do not seem to permit postulation of community boundaries within the region.

The above analysis has implicitly assumed that the Klethla migrants into the Red Rock Plateau stayed there the year around and became independent to some extent of their parent communities outside the region. Obviously this analysis is misleading if these people were in fact only seasonal occupants of the region, migrating annually to and from villages in the adjacent highlands so that their highlands communities could have the benefits of both the highland and lowland environments in cultivation and food collecting. Hypotheses of this sort have been used by Long (1966) and Adams and Adams (1959: 36) to account for various groups of small sites in the Glen Canyon area.

A fuller statement of the seasonal occupation hypothesis would hold that the canyons of the Red Rock Plateau (with the possible exception of Upper Castle Wash) were only seasonally occupied by the Klethla people, who maintained larger, permanent habitations in the surrounding uplands. In the spring, small parties (perhaps only of men) would have left

their home villages, traveling several tens of miles across rough desert terrain (again excepting Upper Castle Wash) to the low-lying, hot, but well-watered canyons of the Red Rock Plateau. These parties would have camped near the fields while the plants were maturing, as required by the intensive nature of Pueblo cultivation. Small houses might occasionally have been built for shelter. After harvest, part of the yield would have been carried back to the home village, the rest being left in storage to provide food and seed for the next spring.

A hint that seasonal occupation was being followed in the Red Rock Plateau comes from Daves site (Sa564) and the Creeping Dune site (Sa701) in Upper Glen Canyon. At both, pottery is abundant, but food-grinding tools are rare. None were found at Daves site, and only seven manos and no metates were recovered at Creeping Dune. Either women were not available to grind corn, or it was taken elsewhere for grinding; both interpretations imply seasonal use of the sites.

That scarcity of grinding tools is not universal in the Red Rock Plateau Kletthla sites. This was demonstrated at Sa454 in Upper Castle Wash, where, as previously noted, a pithouse containing five mealing bins was found; many manos and several metates occur in the total collection from the site. This site is at the lower margin of the highland zone where the postulated home base villages would have occurred. As was also noted, however, the Upper Castle Wash sites do not seem significantly larger or more permanent than do the postulated summer farm houses located elsewhere in the region.

The biggest disadvantage of the seasonal occupation hypothesis, in my opinion, is the logistical prowess it requires of the Pueblo farmer. So that he and his dependents could enjoy during the winter the fruits of his summer labors, he would have had to make several trips back to his home village, heavily laden, over long stretches of dry, rugged country. Also, food and seed for the next spring would have had to be stored unattended in the canyons for use the following spring. As previously noted, there is little evidence of the requisite storage structures in association with the Red Rock Plateau Kletthla sites.

An alternative interpretation is that the ephemeral Kletthla settlements of the Red Rock Plateau were more or less typical of the western Kayenta Anasazi (including the so-called "Virgin Branch") at this time in their prehistory. This involves discarding our assumption that the typical settlement of this period should be a solidly built village that was continu-

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ously occupied for a number of years. Recently, Jennings (1963, 1966) has questioned this assumption for the Anasazi in general and for the Kayenta in particular. He suggests that the assumption derives from the Southwestern archaeologists' concentration on only the larger sites of all periods and from the attention given to the very large sites occupied just prior to the abandonment of the northern Southwest (a time when population definitely does seem to be aggregating in increasingly large settlements). I might add that the Southwesternist's familiarity with the large, sedentary modern Pueblo villages has probably helped lead him to expect that villages of this sort were also typical well into the past. Jennings (1963: 12-13) has stated his point of view as follows:

One forgets that [the] huge centers are rare and scattered, found only in very favorable locations. . . . Most settlements are small family settlements; they consist of one or two dwellings and a cluster of storage rooms, which can be most descriptively called little ranches or *rancherías*. The settlement pattern can be described as a scattered single family homestead type. . . . If the Pueblo can be seen as subsistence gardeners representing a culture whose limits were closely geared to some minimal rainfall line, if we can see the Pueblo as expanding and contracting territorially in almost annual response to climatic/rainfall conditions . . . then perhaps we can understand [their lifeway's] survival and better understand its details. . . . The real Anasazi were clever, ingenious small ranchers whose ability to exploit the environment was equal to, and possibly derived from, the desert culture ancestor whose skills were retained in large degree.

In this perspective, then, the small size and transient quality of the Kletthla Red Rock Plateau sites is not surprising. The lack of abundant and well-made house remains may be no more than a reflection of the region's relatively warm winters. The numerous contemporaneous early Kletthla sites on the Kaiparowits Plateau southeast of the Red Rock Plateau are small, and none yielded more than about 1000 sherds during thorough excavation (most produced much less pottery), yet each site has, on the average, two or three masonry rooms. At 7000 feet, the Kaiparowits is considerably colder, both summer and winter, than the low-lying Red Rock Plateau. Houses would be much more useful at the higher elevation.

Jennings' hypothesis, then, is that the large sites of this time period, such as the Coombs site, are atypical and require special explanation. The Coombs site does have some unusual features that may help explain its

size. In the first place, it is very well-favored ecologically, being in a high valley with abundant good soil and permanent streams small enough for easy diversion. It was also on the extreme northwest frontier of the Kayenta branch and is one of the few sites with evidence for substantial and continuing contact between Anasazi and people of the Fremont culture. Village size and permanency may have been especially advantageous here for defense or in establishing trading relations with the Fremont people.

A test of the seasonal farming hypothesis with respect to the Red Rock Plateau sites will require further fieldwork in the highland regions. If Kletthla sites approaching the Coombs site in size are relatively numerous in the highlands near the Red Rock Plateau, then it seems to me the seasonal farming hypothesis would be favored. If, on the other hand, most highland sites are like those of the Red Rock Plateau, or like the two- or three-room-plus-courtyard Kaiparowits variety, then the interpretation derived from Jennings' ideas would be favored.

Jennings' hypothesis about the nature of Kayenta Anasazi settlement patterns during the Pueblo II and III periods is an important one that could be tested by systematic surveys designed to gather quantitative information on settlement patterns. Because of the highly variable nature of Kayenta settlements, care would have to be taken to sample a number of locales within the Kayenta area.

The Horsefly Hollow Phase (circa A.D. 1210-1260)

After a 50- or 60-year period of complete or near abandonment, the Red Rock Plateau was repopulated and saw its heaviest occupation in the early and middle 1200s. The southeastern part of the Glen Canyon basin also seems to have gained population at this time, as indicated by data from Cummings Mesa, where sites became larger and much more numerous in the early 1200s (Amber, Lindsay, and Stein 1964). The western part of the Glen Canyon area, including the Kaiparowits and the Southern Aquarius Plateau, remained unoccupied.

Several factors probably favored repopulation of the Red Rock Plateau in the early 1200s: (1) The extreme drought of the late 1100s was broken. (2) The environmental zone available to Anasazi farmers may have been contracting at the highest elevations, because of the onset of the cool neo-Pacific climatic episode (Baerreis and Bryson 1965). This put more population pressure on the habitable parts of the medium-level high-

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lands and on entrenched canyons, including those of the Red Rock Plateau. (3) More land was being destroyed by a cycle of arroyo-cutting that was trenching alluvial floodplains. Canyons that remained unchanneled, such as those of the Red Rock Plateau, were therefore relatively more attractive than before. (4) Population may have been increasing in the Navajo Mountain area in the early 1200s, as it became a refuge for groups abandoning other parts of the shrinking Kayenta territory. The southern Red Rock Plateau may have received some population surplus from the Navajo Mountain area.

Pottery type distributions indicate that the populations entering the Red Rock Plateau in the early 1200s came from several directions. The southern and westernmost sites have high frequencies of the Kayenta pottery common in the highlands around Navajo Mountain to the south, while the northern and western sites have high frequencies of Mesa Verde-like pottery resembling that found in the highlands to the northeast around Elk Ridge. Many sites in the central Red Rock Plateau have substantial frequencies of the ceramics of both traditions. The Horsefly Hollow phase, which includes all this variation, was named after a site in Lake Canyon where both Mesa Verde and Kayenta pottery were abundant.

As noted earlier, the Kletthla people had settled primarily in areas where the canyons are relatively broad, shallow, and accessible, and where the alluvial soils are present in fairly large, continuous plots. The Horsefly Hollow people heavily occupied the same areas but also settled the narrower, deeper, less accessible canyons—Moqui, Wilson, Slickrock, Upper Forgotten, and Alcove (Fig. 8). Here, the cultivable areas are smaller, more dispersed, and more likely to be damaged by violent floods. This pattern of settlement supports my earlier contentions that (1) the Horsefly Hollow phase was a time of maximum population for the region, and (2) because fewer potential farming locations were now available in surrounding areas, the Horsefly Hollow people were forced to make fullest possible use of the land resources of the region.

The Horsefly Hollow sites, compared to the earlier Kletthla sites, tend (1) to be located more often in elevated, sheltered positions than on the canyon floor, (2) to have more structures, with greater use of masonry, (3) to have kivas more often, (4) generally to have considerably more provision for storage, and (5) at least in some areas, to show more clear-cut functional differences among sites.

Several site clusters of the Horsefly Hollow phase can be distinguished

by geographic distribution, interaccessibility among the sites, and similarities in pottery and architecture. Each of these clusters perhaps may represent a small community.

The site cluster/communities postulated on this basis are (1) Wilson-Slickrock-Alcove Canyons, (2) Moqui Canyon, (3) Forgotten Canyon, (4) Upper Glen Canyon, (5) Upper Castle Wash, and (6) Lake Canyon. The clusters on the margins of the Red Rock Plateau perhaps may be part of communities outside the region, either through such mechanisms as seasonal occupation or because the cluster extends outside the boundaries of the region studied and therefore was not fully mapped. The latter possibility seems applicable only to the Castle Wash cluster. The treatment of these six site clusters as separate communities in no way implies that they were isolated from one another; on the contrary, contacts must have been fairly frequent.

Below, attempts are made to reconstruct some of the social characteristics of these communities. Site Clusters 1-3 can be discussed together, since their site characteristics are rather similar, although they are geographically separated.

Analysis of Site Clusters

Site Clusters 1 (Wilson-Slickrock-Alcove Canyons), 2 (Moqui Canyon), and 3 (Forgotten Canyon). The most common site in these three clusters is a small residential pueblo, with structures standing alone or in small groups, rather than being built in a compact block. The structures are usually strung out along a narrow ledge or talus top. In two cases, however (Sa679 and Sa740 in Moqui Canyon), such sites were built in the open on the edge of a rock bench or spur. Of the twenty Horsefly Hollow sites from these three clusters (Fig. 9), twelve are of this type.

Characteristically, these sites have: (1) one to five substantial living rooms with a firepit and sometimes also with a mealing bin; (2) a small courtyard or open-air work area, often with a fireplace, and sometimes with a mealing bin or set of loom anchors; (3) usually a kiva, sometimes with loom anchors in addition to the regular central firepit, deflector, and ventilator; (4) several insubstantially built rooms, probably never roofed, occasionally containing a hearth or other floor features, and (5) several well-built masonry storage structures in a variety of sizes and shapes. The number of potsherds recovered from these sites is never very great, with the

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exception of Doll Ruin (Sa585), perhaps in part because refuse was usually thrown over the edge of the living area and well scattered. Other kinds of artifacts, such as food-grinding tools, hammerstones, and chipped stone tools, are occasionally quite abundant, but not always. The small numbers of habitation rooms at these sites suggest that they were generally occupied by only a few nuclear families, probably comprising an extended family or minimal lineage. The smallest sites may have sheltered only a single nuclear family.

Within the group of canyons considered here, the number of these small residential sites to be found in a particular canyon varies rather closely with the size of the area available for farming. The smallest canyons contain only one or two, whereas the largest canyon of the group—Moqui—has five. Two other sites of this sort, known only from surveys, would probably have become incorporated in the Moqui Canyon sample had they been excavated or had the surveyors made larger collections. In general, the Moqui Canyon sites listed here are smaller than the small-canyon pueblos. Only four or perhaps five of the seven sites mentioned have a kiva. Although all are located above the canyon floor, Sa678 and Sa679 are the only ones in high, easily defensible positions. In contrast, all the residential pueblo sites from the smaller canyons are in high locations.

Other residential sites from the site clusters discussed here include Tamarix Dune (Sa781), a canyon-floor pithouse in Moqui Canyon, and the Buried Olla site (Ga367), located in Glen Canyon opposite the mouth of Forgotten Canyon. This site, used as a trail-side camp in Kletthla times, was "improved" during the Horsefly Hollow phase by the construction of two small canyon-floor-level masonry houses. The site probably continued to be a trail-stop camp as well, however. An indication of this is that a large outdoor masonry firepit was built in Horsefly Hollow times; it contained much animal bone (mostly bighorn sheep), as if it had been regularly used by hunting parties bringing in fresh game.

As noted in the previous Kletthla phase discussion, site Sa681 in Moqui Canyon contained a defensive structure, a large wall with loophole perforations that closed off part of the cave. This may have been constructed during the Horsefly Hollow phase, but the evidence is not conclusive.

The pottery at the site clusters discussed here varies somewhat. The Wilson-Slickrock-Alcove canyons cluster produced pottery very predominantly of Kayenta branch types. Both Moqui Canyon and Forgotten Canyon, on the other hand, showed various mixtures of Kayenta and

Mesa Verde types. In this, they resemble Lake Canyon and Upper Castle Wash.

The separation of the Moqui Canyon and Forgotten Canyon clusters is questionable perhaps, because the two areas are close together, the Forgotten Canyon cluster is very small, and the pottery from both areas is a mixture of both Mesa Verde and Kayenta types. The separation was made on a geographic basis; a traveler going directly from the main part of the Moqui Canyon site cluster to the principal Forgotten Canyon site, Sa598, would have to cross dry, deeply entrenched North Gulch. Access from Moqui Canyon and into Forgotten Canyon at their closest approaches to one another would also be difficult. A route via the mouths of the two canyons would be easier, but much longer. In other words, in travel time, Forgotten Canyon is probably as far away from Moqui as is Lake Canyon.

Site Cluster 4: Upper Glen Canyon. Three sites from the sample of fifty-seven are here. The largest by far is the Loper Ruin (Sa364), which sits on the edge of a low bluff overlooking the Colorado River and the flats at the mouth of Red Canyon. This site, partly two-story, is L-shaped in plan, with five ground-floor rooms and a kiva in the angle of the L. Under the overhanging edge of the bluff are several substantial masonry rooms that were probably used for storage. Artifacts, especially pottery, are plentiful. This small "unit pueblo" differs in a number of respects from the small pueblos previously discussed. It has better masonry, its rooms are built together rather than being essentially independent structures, and the courtyard work areas and insubstantial unroofed "rooms" common at the other sites are lacking. The structural differences may relate partly to the nearby outcropping of tabular Moenkopi sandstone, which makes excellent masonry and is not generally available elsewhere in the region. In terms of the number of people the site could shelter, Loper Ruin is probably equivalent to the largest cliff dwellings, such as Widow's Ledge (Sa633) in Slickrock Canyon or Defiance House (Sa598) in Forgotten Canyon. The principal differences, however, are in site plan and construction, rather than size or function.

The other sites in this cluster, Ledge Ruin (Sa566) and Forked Stick Alcove (Sa316) are more similar to those of Clusters 1-3. Ledge Ruin consists of three small, poorly constructed rooms and a granary, widely scattered along a sheltered ledge. Forked Stick Alcove has a crudely built pithouse, a small surface room, and a small granary. Despite their architec-

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tural differences, all three sites in this cluster had very similar pottery profiles, with almost all pottery being Mesa Verde in style.

Site Cluster 5: Upper Castle Wash. The four Horsefly Hollow sites from this area that were included in the sample were all occupied during the Klethla phase as well, so it was difficult in some cases to determine which structures related to which occupation. The size of these sites and the variety of structures present at each—rooms, kivas, storage structures—are about the same as in the cliff dwellings of Clusters 1-3. The site plan is also typically loose, with scattered structures or groups of structures. The chief differences between these sites and those of Clusters 1-3 are that the Castle Wash sites are either in the open or are not completely sheltered and are either on or not far above the canyon floor, differences perhaps primarily related to the physiographic setting. Upper Castle Wash is rather shallow in comparison with the deep canyons of the first group, which offered numerous sheltered and canyon wall site locations.

Site Cluster 6: Lake Canyon. The site groupings described above are dominated by sites having residential rooms. In Lake Canyon, on the other hand, the thirteen Horsefly Hollow sites contained in the sample include only four small sites with residential structures. Three of the remaining nine were considered to be primarily camps. Another five showed evidence of both camping and storage functions. The last of the thirteen is the previously discussed "Fortress" (Sa316), interpreted as a place of group assembly. In addition to these sites, seven other probable Horsefly Hollow phase sites were excavated but produced too little pottery to be included in the sample on which this discussion is primarily based. Tentative classification of these "unproductive" sites indicates they do not contradict the pattern shown by the thirteen larger sites mentioned above.

Because of the distinctiveness of the Lake Canyon site cluster, I will discuss each of the functional site types occurring there. Emphasis will be on the sites from the basic sample, but some information from the seven low-pottery-yield sites will also be used.

1. *Residential Sites.* These are relatively rare and are uniformly small; none has more than two substantial rooms with hearths, and artifacts are not very abundant. The only ledge or talus-top dwellings are Rogers House (Sa554) and Wasp House (Sa373). (The latter, one of the seven sites from outside the regular sample, is less than a mile from the canyon mouth and is the most solidly constructed residential site in the canyon.) The other residential sites are on the canyon floor or canyon rim.

These Lake Canyon residential sites have a loose layout, with some or all the structures being built as separate units. Kivas are found only at Wasp House (Sa373) and (probably) at Lyman Flat (Sa623). Storage structures are found at some but are not nearly as common as at the residential sites of Clusters 1-3. Since there seems to be a tendency for residential sites to be built on the canyon floor, the sample may be somewhat biased against them, for reasons previously given.

2. *Camp Sites.* Sites of this sort large enough to yield substantial artifact collections are uncommon in Lake Canyon during the Horsefly Hollow phase. Most of the camp sites that were excavated contained a few loosely built structures, probably windbreaks. Exterior hearths were not common.

3. *Camp and Storage Sites.* This group includes the Horsefly Hollow site (Sa544), the highest pottery-yield site in the canyon and by this standard one of the largest in the region. Although it is evident from the several hearths and numerous potsherds and stone tools found here that the site was a favored camping and/or working place, its primary function was storage. Eight large masonry-lined storage cists, ranging from about 3 to 5 feet in diameter and up to 5 feet deep, were sunk into the sandy floor of a small alcove overlooking the broad alluvial flats of lower East Fork. Several smaller cists and thirteen large storage vessels were also found. Since only about two-thirds of the sheltered area was excavated, other cists and vessels probably remain. I speculate that the large storage cists held food for individual households or other small residential groups, while the storage jars and small cists may have been the seed corn repositories for individual farmers. The corn undoubtedly was grown on the extensive alluvial flats in front of the cave.

The remaining camp and storage sites, most of them in the lower part of Lake Canyon, also show primary emphasis on storage. In these sites, however, the storage structures, instead of being at the canyon floor level as in the Horsefly Hollow site, are usually in high, dry shelters. Typically, the storage structures are small tightly built rooms of masonry or sometimes of jacal.

One of these storage sites—Gourd House (Sa619)—has several small rooms built in a shallow alcove, but also includes a massive masonry wall, unbroken except for a narrow door and numerous peepholes, that closes off the front of the shelter. Although it is not high above the canyon floor, the alcove can be entered only by pecked hand-and-toe holds. Inside the area enclosed by the 5-foot high wall is a large firepit and a set of loom

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anchors. The site thus appears to have been a place of refuge as well as of storage. I have observed a strikingly similar site in Fable Valley, in the highlands of the Elk Ridge area to the northeast. It is Pueblo III in date and has Mesa Verde pottery very similar to that from the Loper Ruin (Sa364).

4. *Defensive Site.* Gourd House probably had defensive functions, but this interpretation could be questioned. There seems little room for alternative explanations of the function of Sa655, one of the "low-yield" excavated sites noted earlier. This site is built across the narrowest part of a steep-sided rock peninsula that extends into old Lake Pahgarit from the canyon's right bank. The single structure at the site is a masonry room about 10 feet wide and 60 feet long, constructed of tabular limestone brought from $\frac{3}{4}$ mile away. A line of holes pecked in the rock leads from one end of this building down the more gently sloping side of the rock peninsula, suggesting that a fence was built here to complete the blocking of entry to the peninsula. The few artifacts found at the site consisted of several sherds of characteristic Horsefly Hollow pottery types, plus two sherds of Jeddito corrugated. The latter indicates that Jeddito phase Hopis visited the site. The remains of three small campfires found inside the building atop a layer of what appeared to be melted roofing clay, mortar, and/or plaster may derive from this visit.

5. *Group Assembly Site.* The probably misnamed "Fortress" site (Sa316) consists of a large walled rectangular plaza, 75 by 50 feet in dimension, oriented roughly east-west, with two large masonry rooms at its west end. Over most of its length, the plaza wall seems never to have been high enough to have served a defensive function. In the center of the plaza is a circular fireplace 4 to 5 feet in diameter. Each of the two long walls of the plaza is breached by a doorway just opposite the fireplace. The symmetry of the two rooms exiting onto the plaza and because there are two symmetrically opposed outside doorways to the plaza, each giving equal access to the central hearth, suggest that a dual social segmentation was recognized at whatever assemblies were held here. Chang (1958: 307) has noted, on the basis of a cross-cultural survey, that segmented communities, usually composed of several lineages, often have a large common plaza or other place of community assembly. The two rooms at the west end of the site are similarly built, and both open only onto the plaza, through separate doorways. The sills of both doors are built up above the room floor and plaza level, so that one must step up

and over them to enter or leave the room. In both rooms, the fireplace is built against the front wall immediately adjacent to the doorway, a mode of fireplace location not quite like anything observed elsewhere in the Red Rock Plateau, though it may be related to the Kayenta entry-box complex (Lindsay et al. 1966), which does appear in the region. A person stepping up to the plaza from one of these rooms would pass through the smoke of the fire, much as would someone climbing up through a kiva hatchway. The relative rarity of kivas in Lake Canyon suggests that the structures at Sa316 may have been performing some of the ceremonial functions conducted elsewhere in kivas. Further indications that Sa316 may have had some ceremonial use are (1) the finding of a *tchamahia* stuck in between wall stones in one of the rooms, and (2) the presence of a rough dry-laid masonry structure in the plaza in front of the rooms. This feature, little more than a pile of large stones, is similar to structures that Hayes (1964: 113-14), on the basis of ethnographic analogies, has called "shrines." If the structure at Sa316 is a shrine, it must have been built sometime after the site's abandonment.

As already noted, a further indication of the unusual nature of Sa316 is the abnormally low frequency of gray ware sherds in the collections. The great bulk of the sherds are from painted types. If large gray ware jars were used primarily for cooking, holding water, and for dry storage, and the decorated vessels primarily as eating utensils, then perhaps we may surmise that already-cooked foods were brought to the site from elsewhere and that the storage functions of large jars were not needed because the site was only occasionally occupied.

COMPARISON AND DISCUSSION OF SITE CLUSTERS

In contrast to the other site clusters, Lake Canyon is distinguished by greater segregation of special-function structures. Elsewhere in the Red Rock Plateau, the dominant sites are small pueblos generally including not only residential but also storage and ceremonial-assembly (kiva) structures. Lake Canyon, on the other hand, has one large, and probably several small, specialized storage sites, a large specialized group assembly site, and at least one special defensive site. The relatively few sites with residential structures tend to lack associated kivas and storage buildings.

These differences indicate a higher level of community organization in

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the Lake Canyon area than elsewhere in the Red Rock Plateau during the Horsefly Hollow phase. The storage structures of a small cliff dwelling such as Defiance House (Sa598) in Forgotten Canyon were probably used only by the one or two households that lived there. The numerous storage structures of the Horsefly Hollow site, however, must have belonged to several different households, none residing at the site. The Sa316 plaza likewise must have been used by many different residential groups, none of them living at the site. The development of large, functionally specialized sites probably depended on the greater size and compactness of the Lake Canyon population, which in turn depended on the greater amount and more compact distribution of alluvial farmlands in Lake Canyon. Especially important in concentrating population must have been the extensive alluvial deposits in lower East Fork and around Lake Pahgarit; it is significant that the three most functionally specialized sites (Sa544, 316, 655) all occur in this area.

This is not to say that the people of the other canyons lacked social mechanisms for integrating families and households into larger groups, but merely that only in Lake Canyon was it possible for a number of families to farm in a relatively small area so that they could easily come together for various kinds of group activity. In the other areas, farmlands were limited to smaller patches, which were usually strung out at intervals along narrow canyons, so that only a small number of people could conveniently live close to each patch of cultivable soil.

The surprising thing about the Lake Canyon development is that the people did not choose to establish larger residential units—true pueblos. This seems to contradict a trend, during the 1200s in the western Four Corners area, for previously dispersed populations to become increasingly concentrated into larger residential units. On Cummings Mesa, for example, at a time correlative with the Horsefly Hollow phase, sites of ten to fifteen rooms are not uncommon. This trend could, of course, take effect only in areas where resources could support a fairly large localized population, but Lake Canyon seems to have been such an area. Certain functions, notably storage, group assembly-group ceremonial, and defense, seem to have been spatially aggregated, but residence apparently was not. Furthermore, dwelling structures of any sort are rare altogether. The central problems, then, of interpreting the Lake Canyon settlement pattern are to determine (1) why residence did not undergo localization as other functions seem to have, and (2) where the people actually lived.

These problems are not easy to resolve, and I have no satisfactory answers. With regard to the problem of where people lived, the typical dwellings may have been pithouse rooms scattered widely over the canyon floors. This kind of pattern is suggested by the three excavated canyon-floor residential sites—Sa543, 623, and 695. If this is the case, then the salvage crews may simply have missed most dwelling places, either because they were covered with blowsand, had been removed by arroyo-cutting, or simply seemed too insignificant to warrant further investigation beyond making a small surface collection and reporting another "campsite." Alternatively, the Horsefly Hollow people may have spent most of their time at small campsites.

Both these interpretations assume, however, that Lake Canyon was somehow exempted, not only from the trend toward large multiroom residential sites but also from general trends toward increasing use of masonry in building, increasing use of site locations above the canyon floor, and increasing numbers of aboveground structures—trends evident not only elsewhere in the Red Rock Plateau but also in surrounding highlands such as Cummings Mesa. If we view the evidence from the Red Rock Plateau in isolation, there is some indication that these trends most readily asserted themselves in isolated areas where populations were smallest—so the largest residential pueblos, with the greatest use of masonry and aboveground construction, and with locations well above the canyon floor, occur in the most isolated and smallest site clusters—at the mouth of Red Canyon, in Upper Forgotten Canyon, and in Slickrock, Wilson, and Alcove Canyons. This further implies that all four trends may relate to defense, perhaps specifically to the need to have storage structures in safe places, guarded by on-the-spot residents.

In this interpretation, then, we see the Red Rock Plateau Pueblos clinging most tenaciously to their old pattern of living close to their fields in dispersed single households and reluctantly abandoning this pattern only when the need for security required it. Another facet of this interpretation would see these Pueblos as hesitant to build substantial masonry residential structures purely for shelter from the elements. To the highland-oriented Pueblo people, the climate of the low-lying Red Rock Plateau must have seemed extraordinarily hot in the summer and mild in the winter. Consequently, even where residential structures were built, they often were flimsy, apparently thrown together with a minimum

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of effort. That this was by choice rather than lack of skill is shown by the juxtaposition, in some of these sites, of shoddy houses and stout, excellently finished storage structures. Really well-made residences occur in a few places, but these tend to be in isolated spots, where defense was perhaps a factor.

The above arguments, however, are seemingly contradicted by evidence from adjacent regions. On Cummings Mesa (Ambler, Lindsay, and Stein 1964), for example, a population concentration probably larger and hence more secure than the one in Lake Canyon was at this time building large multiroom pueblos with storage, ceremonial, and residential rooms.

Another hypothesis about the anomalous Lake Canyon residence pattern, not necessarily contradictory to those previously offered, is that most occupation of Lake Canyon was seasonal, with small groups coming in to farm from neighboring canyons or even from outside the Red Rock Plateau. It seems unlikely to me, however, that what must have been the best farming area in the region should have been seasonally occupied, while less favorable areas were occupied the year around.

In conclusion, the most basic division within the Red Rock Plateau during the Horsefly Hollow phase seems to be between the Lake Canyon site cluster on the one hand and the rest of the area on the other. The less pronounced differences among the site clusters outside of Lake Canyon seem to boil down to differences between the clusters occupying narrow deep canyons and those in relatively broad, shallow ones.

THE PROBLEM OF KAYENTA-MESA VERDE POTTERY RELATIONSHIPS

As previously noted, pottery from two major Anasazi traditions was in use in the Red Rock Plateau during the Horsefly Hollow phase. Sites of the Upper Glen Canyon cluster have almost all Mesa Verde pottery; those of the Wilson-Slickrock-Alcove cluster have almost entirely Kayenta. The remaining clusters show substantial amounts of both traditions, although Upper Castle Wash definitely leans to the Mesa Verde side. The Red Rock Plateau during this period seems to be on the boundary between an extensive distribution of Mesa Verde style pottery to the northeast and east and of Kayenta style pottery to the south and southeast. It is reasonable to infer that the people who occupied the Red Rock Plateau during the Horsefly Hollow phase either came from both the adjacent pottery-

style areas, or engaged in extensive importation of one or the other styles of pottery, or both.

It might be postulated that in the situation described above, culturally plural communities would have existed in the central part of the Red Rock Plateau during the Horsefly Hollow phase, with perhaps part of a site or site cluster being occupied by people using one kind of pottery, another part by people using a different kind. Such seems not to be the case, however; the same people seem to have been using both kinds of pottery. Inspection of the horizontal distributions of the sherds did not reveal spatial segregation of Mesa Verde and Kayenta types within a single site or among neighboring sites. There are a few possible exceptions. The Crumbling Kiva site (Sa597) had very little Mesa Verde pottery, while it is common at Defiance House (Sa598) less than a mile upstream. Also, Rogers House (Sa554) is the only Horsefly Hollow site in Lake Canyon that completely lacked Mesa Verde black-on-white, although other Mesa Verde types occur in small numbers. These cases suggest some site-to-site segregation of the two kinds of pottery within a single area, but the evidence is not very convincing. Both Sa597 and Sa598 yielded only small sherd samples (110 and 207, respectively), so their departure from the norm could be the result of sampling error.

The evidence of recurrent distributional homogeneity cited above comes largely from refuse or room deposits, which may reflect fairly long spans of time and which are subject to mechanical admixture. Better evidence of the close association of Kayenta and Mesa Verde types comes from deposits reflecting single events or very short time spans and from which chance admixture is excluded.

At the Ivy Shelter site (Sa738), a small Horsefly Hollow phase cemetery in Moqui Canyon (Sharrock, Day, and Dibble 1963: 144-25), one burial contained three bowls, all of Kayenta types, while a second burial had two Mesa Verde black-on-white bowls. This seeming Kayenta-Mesa Verde segregation was contradicted, however, in the third pottery-yield burial; it had a Mesa Verde black-on-white mug resting inside a Moenkopi corrugated (a Kayenta type) jar. Furthermore, these three burials lay close together in the same small cemetery, the only true cemetery found in the Red Rock Plateau. This suggests it was being used by the same group of people. At the Horsefly Hollow site (Sa544) in Lake Canyon (Sharrock, Dibble, and Anderson, 1961: 39-66), a large Tusayan black-on-white (a Kayenta type) sherd covered the head of a burial, while a Mesa Verde

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black-on-white jar appeared in the fill just above it, apparently part of the grave goods. The Horsefly Hollow site also had many buried storage jars of both Kayenta and Mesa Verde types that must have been in use contemporaneously. The spatial distribution of the jars appeared random with respect to the Mesa Verde-Kayenta dichotomy.

The coherence of the two pottery design style traditions seems well maintained. That is, distinctive Mesa Verde attributes almost never appear on vessels decorated basically in the Kayenta style, and vice versa. I think the possibility of massive style acculturation can be ruled out. This indicates that the mixture of pottery in the site clusters in the central part of the Red Rock Plateau is due either to (1) extensive trading of pottery into the area, (2) the residence of some number of potters (women) schooled in each tradition in the several site clusters where the mixture occurs, or (3) a combination of the first and second situations. Some progress might be made in sorting out these alternative explanations if technical studies could be carried out that determined where the pottery was actually made (or at least where the clay came from); the trading hypothesis might be tested in this way.

If widespread trade were not occurring, and the mixture of pottery is due to the residential association of women trained in different traditions, then some further understanding might be gained by trying to identify stylistic features that can be associated with male activities, and then by comparing the distributions of such features to the pottery distributions. As a start in this direction, I would propose as a working hypothesis that most of the structures in Lake, Moqui, and Forgotten Canyons and in Castle Wash were built by men from the Kayenta area. Evidence supporting this interpretation is the occurrence in the central part of the Red Rock Plateau of the entry-box complex, extensive use of jacal in combination with masonry, and great variation in the form of kivas, all traits common in the Kayenta area at this time. Then, if we can exclude trade, we must infer that a virilocal marriage rule was generally being followed and that Kayenta men were marrying women from both Kayenta communities to the south and Mesa Verde communities to the north or northeast. If such a study emphasizing architectural features were carried out, one of the first things that would have to be done would be a survey of architecture in the Mesa Verde sites of the Beef Basin-Elk Ridge highlands northeast of the Red Rock Plateau, because this area has received little study.

We cannot simply assume that the architectural practices of the Mesa Verde proper hold true for this westernmost extension of the culture.

THE ABANDONMENT OF THE RED ROCK PLATEAU

Most Horsefly Hollow sites in the Red Rock Plateau seem to have been abandoned by about 1260, although a few may have been occupied somewhat longer. The evidence suggests that the withdrawal from the region was gradual and unhurried. At two sites, Sa598 in Forgotten Canyon and Sa364 in Upper Glen Canyon, there was evidence that the groups occupying these sites departed one family at a time—at the end of occupation some of the dwelling rooms had already been vacated and partially filled with trash.

If my dating estimate of 1260 for abandonment is about ten years too early, then the onset of the so-called "great drought" may have been a factor in the exodus of population from the region. On the Mesa Verde, this dry period started about 1270 and lasted nearly until the end of the century (Fig. 11). Its occurrence is also well attested in tree-ring records from elsewhere in the northern Southwest. Although this drought may not have been as severe as the one recorded in the Mesa Verde records for the late 1100s, the Red Rock Plateau would probably have been difficult to inhabit during the period because of depleted ground and surface water.

Also instrumental in the abandonment of the area may have been an increase in the violence of floods, which would have disrupted floodplain farming. The Red Rock Plateau seems to have escaped a thorough cycle of arroyo-cutting, but evidence from Moqui Canyon indicates that stream regimens may have been somewhat disturbed (Lance 1963). This disturbance is not dated precisely enough, however, to allow us to say whether or not it correlates well with the abandonment date. Furthermore, the Lake Canyon alluvium does not record a change in stream regimen (Lance 1963); yet this canyon was abandoned about the same time as Moqui.

Probably implicated in the withdrawal of population from the Red Rock Plateau were whatever pressures that lay behind the area-wide trend toward residence in large multifamily and multilineage pueblos. In the 1200s, the Anasazi populations remaining in the northern Southwest were drawing increasingly together in and around large pueblos. The rea-

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sons for this change in settlement pattern are not well understood, although they have been debated for many years. Cooling climates, drought, and arroyo-cutting were probably acting separately or together to make a number of previously habitable areas uninhabitable. Larger communities may have been necessary to provide for the fullest exploitation of remaining soil and water resources. Defensible site locations become common in this period, too, and it has often been suggested that warfare of some kind may have been responsible for a shift to larger communities. That many communities continued to live in essentially indefensible locations, plus the scarcity of direct evidence of violence anywhere in the area, argues against the defensive hypothesis, however.

Whatever the reasons for the formation of larger communities at this time, the process was widespread. The Red Rock Plateau is unusual in that a dispersed settlement pattern was followed until the time of abandonment in the middle 1200s. It seems unlikely that the meager and scattered soil and water resources of the Red Rock Plateau would have supported any really large nucleated communities; the people who left the region in the middle or late 1200s probably joined or founded large pueblos somewhere to the south. The nearest likely area for such resettlement would have been the Navajo Mountain area, where Kayenta Anasazi lived nearly until the end of the 1200s. Lindsay et al. (1966) show that about 1270 several large pueblos were built or greatly enlarged in the area north and east of Navajo Mountain. Red Rock Plateau emigrants probably contributed to the peopling of such sites, although this is presently a hypothesis for further testing rather than a demonstrated fact.

As noted above, drought or other environmental factors may have been primary agents in dislodging the Horsefly Hollow people from the Red Rock Plateau. On the other hand, defensive needs or other nonenvironmental pressures to join larger residential aggregates, if strong enough, could probably have depopulated the region even without significant environmental deterioration.

THE JEDDITO AND SIKYATKI PHASES (CIRCA A.D. 1300-1600)

After the Horsefly Hollow occupation, the Red Rock Plateau was never again settled by the Anasazi. During the Pueblo IV period, however, the region was briefly visited a number of times by small parties of Hopi,

some perhaps descendants of the earlier inhabitants. Twenty of the 512 Red Rock Plateau sites yielded distinctive Jeddito and Awatobi yellow ware sherds, evidence of these visits. The sites cannot be precisely dated, but the majority appear to be from the 1300s.

The Jeddito-Sikyatki components are small, have on the average very few sherds, and lack structures other than an occasional firepit. The sites tend to be in the open on the canyon floor or in other unelevated positions and usually occur in the broader, more open parts of canyons or outside the canyons altogether. Deeply entrenched canyons were apparently avoided. The distribution of sites suggests that some may be associated with an old trail running from the Navajo Mountain area north across the Red Rock Plateau.

The Pueblo IV Hopi utilization of the Red Rock Plateau obviously did not involve farming, but the precise reasons for the visits are not entirely clear. Petroglyphs at a Hopi site in Moqui Canyon show hunting scenes (Day 1963: 246-47, 290); Turner's (1963) Hopi informants also suggested that the Pueblo IV travelers may have been visiting shrines, perhaps some of those established during earlier occupation of the area by their ancestors. Also, Hopi trading expeditions to the Southern Paiute are ethnographically documented (Kelly 1964) and cannot be ruled out as an explanation. It may well be that the Red Rock Plateau was not itself the destination of the Hopi parties; they may simply have detoured into the region because of its relatively abundant sources of surface water.

CONCLUSIONS

My principal conclusions are (1) that something resembling, in size and probably in composition, the modern western Pueblo extended-family-based household was both the regular and the maximal unit of co-residence in the Red Rock Plateau from Basket Maker through Pueblo III times; (2) that mechanisms of community integration grew stronger and more extensive through time, but that the Red Rock Plateau Anasazi maintained until the end of permanent occupation an older pattern of settlement in geographically dispersed households, probably located close to their fields; and (3) that the Red Rock Plateau environment, with its limited and dispersed soil and water resources, was probably an important factor in helping maintain a dispersed residence pattern into a period of

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increasing residential aggregation elsewhere in the western Four Corners area.

NOTES

1. I think this generalization holds for Kayenta and "Virgin Branch" communities in southeastern Utah and northeastern Arizona and perhaps for the very westernmost Mesa Verde communities in Utah as well. Jeffrey Dean (personal communication, and in his paper in this volume) disputes this with respect to Tsegi Canyon. He finds that in the Tsegi, fairly large nucleated communities occur in Basketmaker III and Pueblo I times. These do, however, break down by about A.D. 1000, and a dispersed residence pattern with small sites is common until large nucleated communities appear again in the late 1100s and the 1200s.

2. It is risky to rely on Schulman's tree-ring data alone, because they are compiled from different species which may have reacted differently to precipitation, and because the earlier part of Schulman's chronology depends on specimens collected 100 miles or more from the Red Rock Plateau (Jeffrey Dean, personal communication). On the other hand, Schulman's chronology provides the best data available so far for this time period.

3. Systematic survey and excavations in this area in the summer of 1969 have confirmed these initial impressions.

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