TJ RUIN

GILA CLIFF DWELLINGS NATIONAL MONUMENT NEW MEXICO

PETER J. MCKENNA JAMES E. BRADFORD

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Aerial View of TJ Ruin Above the Gila River. (Photo by Peter McKenna)

THE TJ RUIN
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Peter J. McKenna

James E. Bradford

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ABSTRACT

Mapping and limited surface sampling of the TJ Ruin at Gila Cliff Dwellings National Monument have provided basic surface documentation for this prehistoric ruin as well as data for a brief overview of upper Gila archeology in relation to the TJ Ruin. Plane table mapping documented the surface plan of a multicomponent site of extensive time depth. Five roomblocks, several communal size pitstructures, and a partially enclosed plaza were recorded. Ceramic and lithic samples are used to evaluate the ceramic typological time-frame of occupation and profile lithic resources. Elements of the architectural documentation and design, and typological ceramic analysis are used for intra-regional cultural comparisons.

ACKNOWLEDGEMENTS

The original TJ Ruin report was drafted in 1986, shortly after we had returned from the field, but did not resurface until ·1988 as a project to be finished. Recent Congressional interest in the Mimbres area has stirred issues Mimbreño, so that this report appears at a most timely juncture when there is revived interest in the archeology of southwest New Mexico. Several people, both in 1986 and more recently, have contributed to the completion of this report.

We appreciate the courtesy of Mike Gardner, USFS Gila District Ranger, and his staff for their assistance during our stay at Gila Center. John Kramer, Resources Staff, showed us the facilities, suggested camping localities and acted as liaison with the USFS staff. Steve Lekson visited during the project and discussed Mimbres archeology, the TJ Ruin itself, and helped by flagging visible alignments and room corners on several of the house mounds. We are especially grateful to Steve for reviewing this paper and for presenting an abbreviated version for us at the 1986 Mogollon Conference in Tucson. Mike Thompson, a helicopter pilot contracted to the Gila Fire Center, gave us a fly-over of the site which provided a fine series of aerial photos.

In the lab, Jim Rancier assisted by defining the initial lithic material groups. Terry Nichols, interpreter at Gila Cliff Dwellings, and Scott Travis, a regional staff archeologist, both provided comments on this report. Scott, in particular, indicated needed revisions and clarifications. Rose Ortiz provided correction and form to the original working manuscript. Robin Frames provided initial technical editing in-between his bouts with his writers at the Albuquerque Journal.

Peter J. McKenna
James E. Bradford
National Park Service
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The TJ Ruin
Gila Cliff Dwellings National Monument

INTRODUCTION AND HISTORICAL BACKGROUND

Gila Cliff Dwellings National Monument is situated in the heart of the Mogollon Mountains along the drainage of the upper Gila River. The Monument is composed of two separate units roughly 1.5 miles apart. The western tract contains the famous and frequently visited Gila Cliff Dwellings, the eastern tract, located downstream just below the confluence of the West and Middle Forks of the Gila River, was set aside to protect the large, open "Heart-Bar Site" or TJ Ruin (LA 54,955).

Unlike Gila Cliff Dwellings, the TJ Ruin is largely unexcavated and rarely visited. TJ Ruin is one of the largest and best preserved Mimbres sites still in existence, yet it is largely unrecognized (LeBlanc and Whalen 1980; Stuart and Gauthier 1981:175-258) if not unknown, and no formal survey or ground plan of the site has ever been prepared. During the week of July 7, 1986, National Park Service archeologists James Bradford and Peter McKenna traveled to Gila Cliff Dwellings National Monument in order to map and record the TJ Ruin, held to be a large multicomponent Classic Mimbres site. This report contains the results of that documentation at the TJ Ruin, preliminary observations on the place of the TJ Ruin in the Mimbres region, and recommendations for further investigations.

Viewed from upslope, the TJ Ruin appears as low, saltbush-covered mounds on a lower cliff edge overlooking the Gila River. On closer inspection, discrete mounds, depressions and a conspicuous plaza-enclosing wall become apparent, although precise structural outlines are muted by the thick covering of brush and mantle of mixed refuse and melted adobe.

TJ Mesa, on which the TJ Ruin rests, served the early TJ Ranch (now the Heart-Bar Ranch of the New Mexico Department of Game and Fish) as a pasture and possibly a "polo field" (Watson 1927:219; Richart 1971). A large area on the mesa is indeed cleared of trees and rocks, and low rock alignments are visible between juniper trees around the periphery of the cleared area just upslope and north of the ruins. Some authors (Stockbridge in McFarland 1974:10) suggest this large open area is of aboriginal doing, but this is doubtful. Certainly the TJ Ruin was not unknown to locals and seems to have been visited almost as often as the Gila Cliff Dwellings themselves (McFarland 1974; 1967:12) before road construction into the area channeled visitation to the cliff dwellings.

Inclusion of the TJ Ruin in Gila Cliff Dwellings National Monument was a compromise to factional interests. Initiatives in the mid-1950s by the National Park Service to divest itself of the Gila Cliff Dwellings in favor of a large, open Mimbres site (Vivian 1955) aroused local enthusiasts, who rallied behind the efforts of then custodian Dawson "Doc" Campbell and the president of the Grant County Archeological Society, to save the situation by adding TJ Ruin to monument holdings. The Gila Cliff Dwellings themselves had been essentially gutted by looters and the National Park Service was apparently disenchanted with supporting an isolated shell that now faced the "improvements" of paved roads and increased visitation.

The park service desired a more convenient, open site that exhibited potential for excavation to interpret the Mimbres Mogollon culture. Campbell and associates' answer to this was the nearby TJ Ruin. Accordingly, the "TJ unit" was added to the Monument in 1962 by Presidential Proclamation No. 3467 (National Park Service 1976:3).

Acquisition of the TJ Ruin by the National Park Service satisfied both parties. Gila Cliff Dwelling National Monument, with the addition of the TJ unit, expanded to include all major architectural representations of the Mimbres Mogollon, including cave habitations, a large multi-component open site, pithouse villages, and smaller limited activity sites.

THE ENVIRONMENTAL SETTING

The TJ Ruin overlooks the half-mile-wide valley of the Gila River at the confluence of the West and Middle Forks (Figure 1). The site lies at the edge of a 100 foot high bluff of exposed Gila Conglomerate on the north side of the river at an elevation of 5775 feet. Covering the site is a dense stand of saltbush which concentrates on the house mounds and masonry features. Grama grass and other range grasses cover the exposed mesa top while mixed juniper and walnut woodlands encroach on the old "polo field" which lies just north of the ruin. In the valley below, the river supports denser stands of cottonwood, sycamore, walnut, wild grapes, willow, reeds and other plants of a more mesic community. In sheltered side canyons south of the river, Ponderosa Pine and Douglas Fir give way, on canyon slopes, to more xeric communities of pinon, yucca, prickly pear, and oaks.

Geologically, the Gila forks area is located near the juncture of three mountain ranges which, combined, form the southwestern New Mexico highlands: the Mogollon Mountains immediately to the north and northwest, the Black Range further to the east, and the Pinos Altos Range to the south. The geologic situation in the immediate vicinity is particularly complex due to the various volcanic episodes that created the mountain ranges. Local geology is dominated by the Teriary-age volcanics of the Datil formation and the Quaternary-age deposits of the Gila Conglomerate.

The higher elevations surrounding TJ Ruin consist of a variety of volcanic rocks, primarily rhyolite interbedded with younger deposits of andesidic and latitic lava flows and even younger deposits of basalt, sandstone, and conglomerates. The Bloodgood Canyon Rhyolite Tuff is the dominate rock type of the vicinity and forms the high steep canyon walls of the West and Middle Forks and outcrops between Gila Hot Springs and Gila Cliff Dwellings (Elston 1965:171) and, in the area of the cliff dwellings, is underlain by a thick section of andesite. These igneous and associated metamorphic rocks contribute most to the lithic resources used at TJ Ruin, including flakable welded tuffs, rhyolites and mudstones (see Lochman-Balk 1965:106-107 and Elston 1965).

A series of fault lines extending through the area have created the

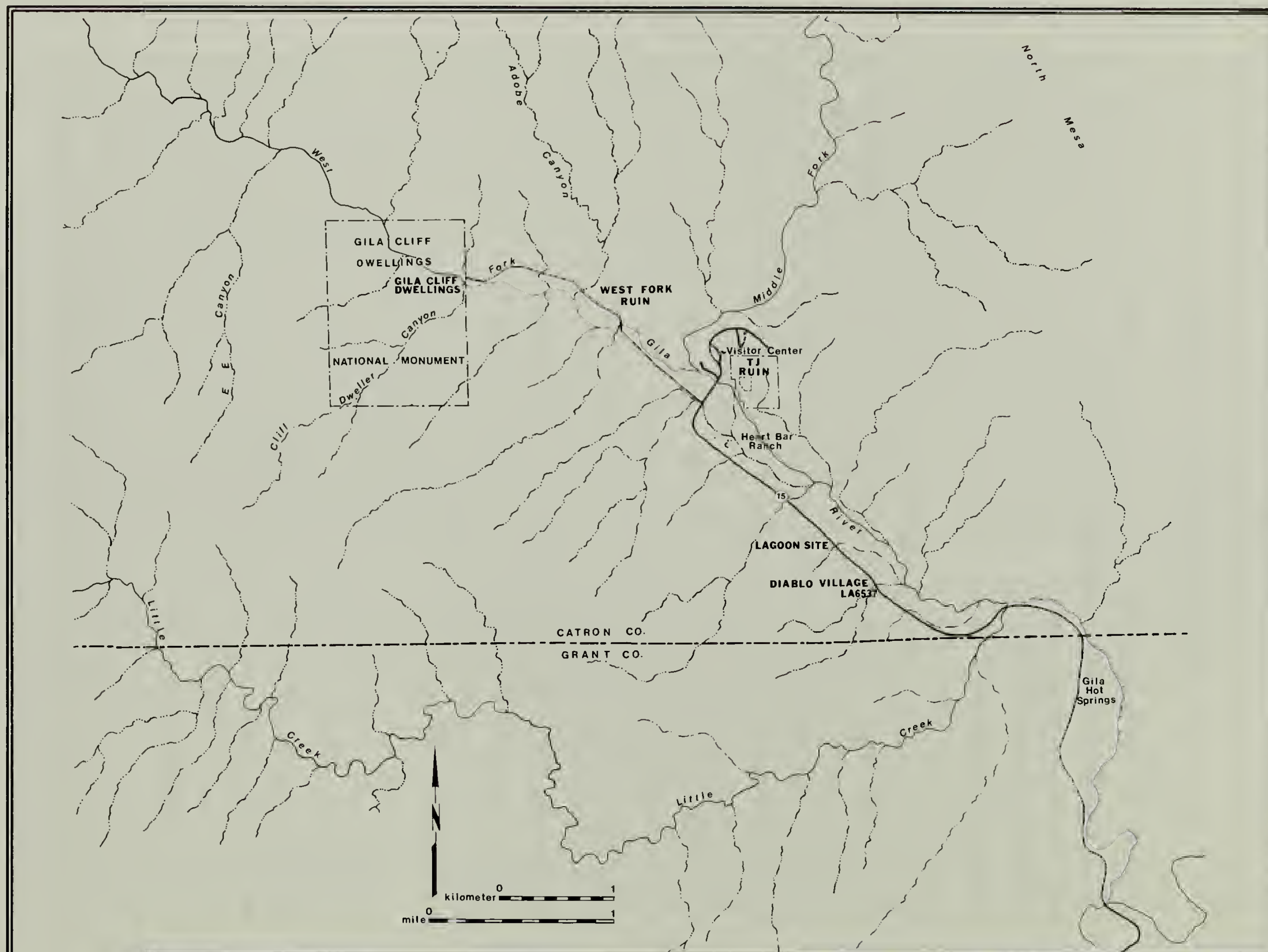


Figure 1. The TJ Ruin and the Gila forks area.

Gila Hot Springs graben which has resulted in the formation of the river valley and the exposure of the thick (several hundred feet) Gila Conglomerate in the vicinity of the Gila forks (Ratte and others 1979:30). As with the Bloodgood Canyon Rhyolite Tuff, the Gila Conglomerate contains lenses of sandstone and flakable mudstone. Also, the bluff of Gila Conglomerate on which the TJ Ruin rests is covered with stream-rolled cobbles of mixed igneous material from local sources (earlier Gila River beds) which provide an immediate source for both grinding and flaked stone tools.

In contrast to Mimbres sites at lower elevations, those in the Gila Hot Springs area seem to enjoy the advantages of a more moderate climate (see Tuan et al. 1973). Rainfall averages 18-20 inches annually with a summer dominate pattern peaking in August. The frost-free period of about 140 days runs between mid-May (the driest spring month) to early October.

The width of the valley from the Gila Cliff Dwellings to the confluence of the West and East Forks is unique in this mountainous region, where narrow, steep-sided canyons are the rule. The slope of the land and canyon width is such that the valley is usually warmer than the surrounding terrain. The land slope and canyon width also mitigate against the adverse affects of cold air drainage which, in surrounding canyons, shortens the growing season considerably. Within the Mimbres region, the TJ Ruin is situated in the area of lowest moisture deficit (<12 inches, Tuan et al. 1973: Figure 50), theoretically making possible a greater variety of subsistence strategies than at lower elevation where irrigation agriculture, at least in Classic times, was extensively practiced (Lekson 1986a). Agricultural land of adequate soil development, extent, and drainage is available on low terraces flanking the Gila River flood plain.

In addition to the agricultural possibilities, the variety, abundance and proximity of different wild plant communities to this section of the Gila River increase its potential as a gathering area. This floral diversity and permanent water attracts now, as in the past, a large number of local and transitory fauna. Faunal resources in the area today include several species of fish, ducks, muskrat, heron, beaver, mule deer, mountain sheep, bear, cougar and small mammals such as rabbits and squirrels. All of these were available in the past and undoubtedly were used in different ways according to time and species availability.

UPPER GILA ARCHEOLOGY

This section reviews the literature in regard to findings and opinions on archeology in the Gila forks area. The concerns are two-fold; first, to present a summary of what archeology has been done at the TJ Ruin and in the Gila forks area and, second, to examine Mimbres Mogollon variability in the region and how that variability has been interpreted, applied to, or conceived of, in the upper Gila River region. Time-space systematics for the region are presented and discussed in relation to their applicability in the Gila forks area.

The term "Upper Gila" has been variously conceived and defined. For the purpose of this paper, the upper Gila will be identified as that short stretch of the Gila River itself from the headwaters down to Cliff valley, New Mexico (Figure 2). This section of the river, as mentioned, is very mountainous and inaccessible, leading to a dearth of archeological work. Stories of adventures, exploration, and legends in the area are certainly more vivid than the archeological picture (McKenna 1936; McFarland 1967). Early archeological surveys were, by-and-large, simple travelogues and reconnaissance undertakings with little work comparing areas or sites (Bandelier 1892; Hough 1907; Watson 1927). More recently, a flurry of activity occurred in the mid-1960s with archeological salvage undertaken at sites impacted by road construction to the Monument (Hammack 1966; Ice 1968) and a reconnaissance survey of the Gila forks area (Morris 1968).

Stabilization reports at the Gila Cliff Dwellings and incidental letter reports from the mid-1950s make up the remainder of the local archeological investigations (Richert 1956; Vivian and Dodgen n.d.). Wheat's (1955) outline of early Mogollon traits is echoed in brief summaries regarding upper Gila archeological finds and cultural history (Reed 1965, n.d.; Steen n.d.; Vivian 1956). The archeological activity at Gila Cliff Dwellings is fully chronicled by Anderson et al. (1986).

The first surveys of the region were confined mostly to the perimeter of the Gila forks area. Hough's (1907) report was a broad reconnaissance that focused on the largest, most visible ruins in the area. Open sites on the upper Gila were not recognized (Hough 1907:29-32) in favor of cliff dwellings,

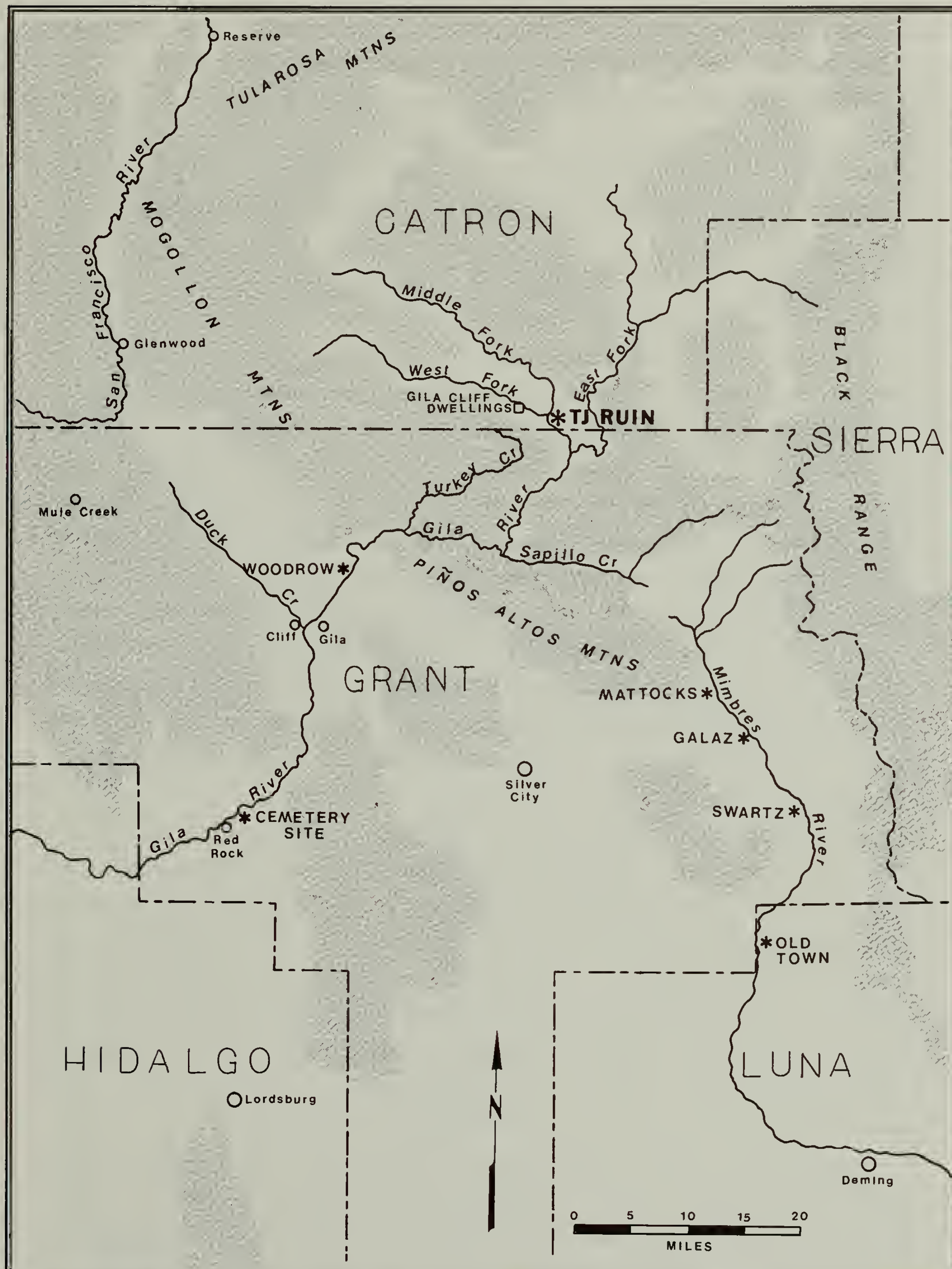


Figure 2. Large Classic Mimbres phase ruins on the upper Gila and Mimbres Rivers.

although some, including TJ Ruin, Woodrow Ruins, and Cemetery Site, easily rivaled open sites Hough reported along the San Francisco and Mimbres River systems (Figure 2). Watson (1927:219) first mentions the TJ Ruin as a site up on the "polo field" and comments on the different nature of the site's ceramics in comparison with other local ruins. The area around the TJ Ruin and the mouth of Sapillo Creek are noted as localities of particularly high site density in the upper Gila (Watson 1927:220,225). Only four sites close to modern roads were used by Danson (1957:25-27) to characterize the upper Gila area, none of which were close to the Gila Hot Springs vicinity.

More recently, several regional overviews have been presented: one offers a regional interpretation based on extrapolations from the Mimbres Foundation's work in the Mimbres Valley (LeBlanc and Whalen 1980); two less broadly conceived summaries and surveys are based on proposed water control projects for southwestern New Mexico (Fitting et al. 1982; Chapman et al. 1985); and an innovative if controversial perspective on past cultural systems encompasses southwest New Mexico and northern Mexico (Lekson 1986b). The Gila Hot Springs valley is largely overlooked in these overviews both because it is an archeological unknown and because in some respects it falls outside the area of concern for these projects. Suggested phase sequences are shown in Figure 3 (after Fitting et al. 1982) for the major river drainages in southwestern New Mexico, and the terminology of the Cliff-Gila sequence is followed in this report.

However, Fitting and others (1982:47) acknowledge that the area is distinct from the lower portions of the upper Gila--from whence comes the majority of information on Gila prehistory--and that the locality forms an interface between the San Francisco and Mimbres area populations. In response to some claims of regional uniformitarianism proposed by the Mimbres Foundation, Lekson (1984, 1986b) has shown that settlement patterns outside the Mimbres Valley are different and that along the Gila River in particular, settlement tends to be more aggregated with evidence of early development at large sites (see also Fitting et al. 1982: 50-51).

Don Morris' (1968; Anderson et al. 1986:13-20) survey provides more specifics about the Gila Cliff Dwellings and the immediate area of the West and Middle fork confluence. Morris identified a relatively dense occupation with 110 sites, including 21 pithouse sites, 25 cliff shelters containing 14

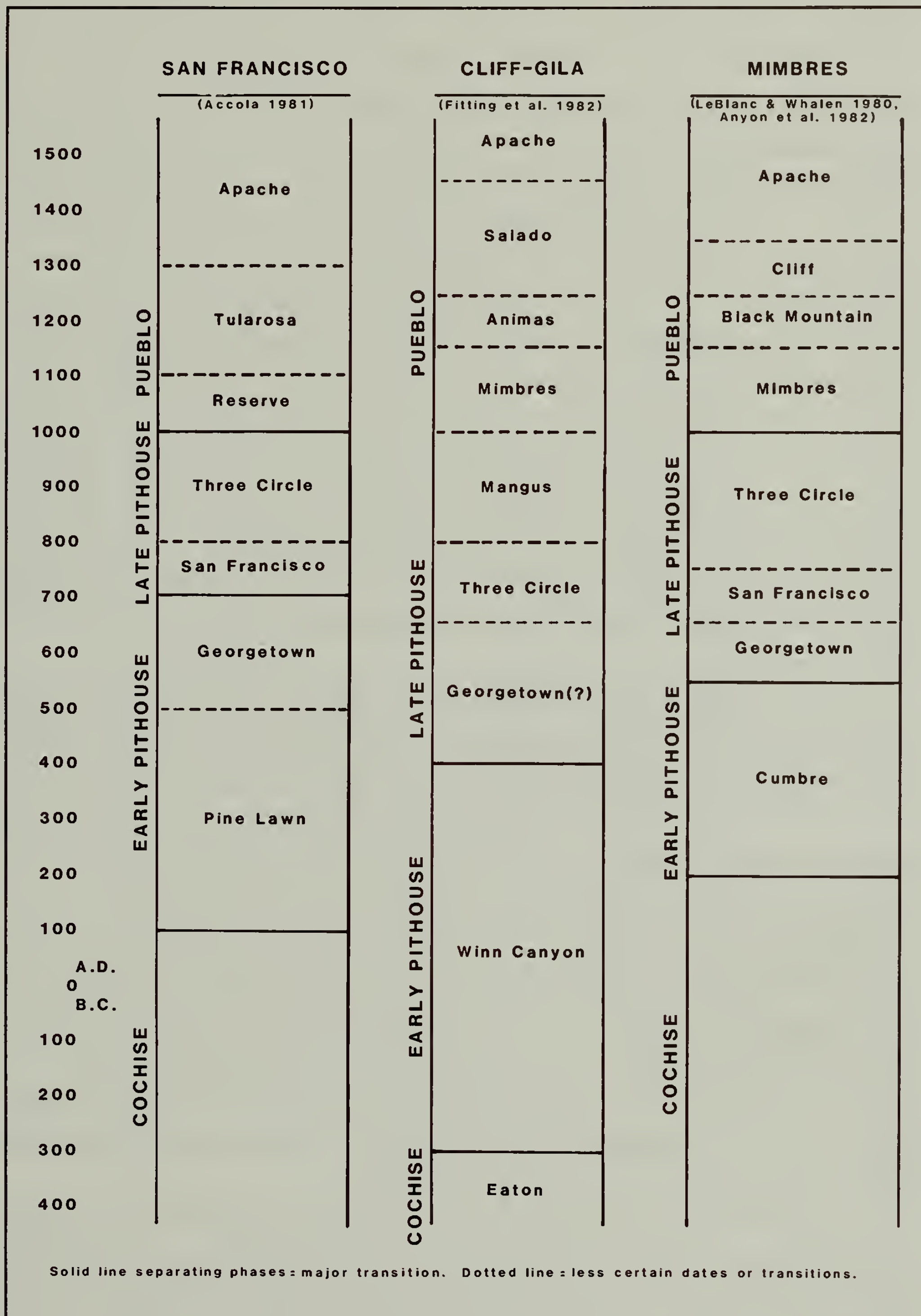


Figure 3: Cultural sequences of the San Francisco, Cliff-Gila and Mimbres subregions (after Fitting et al. 1982).

habitations, eight storage sites, two work units, and one burial. Other types of sites identified were 32 masonry pueblos of 1 to 100 or more rooms, and a few lithic scatters, check dams, pictographs, and historic structures. From this, Morris implied that the majority of these sites were occupied during the Mangus and Mimbres phases. Morris' survey, along with materials collected by Richert (1955a, 1955b), supported Vivian's (1956) earlier impressions of a long occupation in the area extending from Cochise (ca. 6000 B.C.), through the Georgetown phase (ca. A.D. 100) and the Post-Classic Animas phase (ca. A.D. 1400), to evidence of Apachean and Euro-American reoccupations. Richert's (1955b) ceramic collection at the TJ Ruin, and Haury's subsequent identifications, provided strong evidence that the TJ site was unique in the Gila forks area. It is a stratified, multicomponent ruin showing evidence of the complete sequence of Mogollon occupaton. Also suggested from these studies was that the Tularosa ceramic style trends evident in the Classic Mimbres ceramic assemblages indicate stronger trade or cultural ties with the more western Mogollon groups than was apparent farther down the Gila River.

In the Gila forks area, descriptive reports of Mogollon excavations have been limited to five sites (Figure 1): the Gila Cliff Dwellings (Anderson et al. 1986), and four valley bottom sites; West Fork Ruin (LA 8675, Ice 1968), LA 6537 and Diablo Village (LA 6538, Hammack 1966), and an isolated Georgetown phase communal structure at the Lagoon Site (Janes and Reeves 1974: Janes et al. n.d.). Of the valley bottom sites near the TJ Ruin, the first two sites are Mangus phase to early Mimbres phase habitations. The West Fork Ruin exhibited the most substantial occupation with 14 pithouses and 20 surface rooms while LA 6537 has only six rooms and one pithouse. Hammack (1966:8) suggests LA 6537 was either a field house or a site of very limited occupation. Diablo Village was a two-component site, the earlier a Georgetown phase occupation of 10 pithouses, and the other an isolated Classic Mimbres kiva with two surface rooms.

No analyses of material culture or regional comparisons accompany these preliminary reports which are primarily architectural summmaries. Georgetown component architecture at Diablo Village was held to be similar to that found in the other Mogollon branches, indicating continuity of early Mogollon vernacular architecture into the Gila Cliff Dwelling area. The isolated Mimbres kiva, however, was interpreted as an unusual ceremonial retreat (Hammack 1966:12, 14). Isolated communal structures in the Gila forks area would seem to have a history extending from at least Georgetown through Mimbres phases, which apparently runs counter to neat correlations between population size and density and the isolation or village incorporation of communal structures (cf. Anyon and LeBlanc 1980:273-274).

The notable efforts of Anderson et al. (1986) in compiling a descriptive report of materials and archeology from the Gila Cliff Dwellings by various stabilization and exploratory excavations over the last four decades have been hampered by what previously passed as acceptable collection and cataloging techniques. At best guess, Anderson (1986:4-5) postulates that the Cliff Dwellings themselves are the late 13th century residences of a relatively small number of Tularosa phase migrants into the area. Archaic and a minor Mimbres phase occupation also were noted, but could not be pinpointed as to extent or exact location.

Both Anderson et al. (1986) and Morris' survey found little if any other evidence for Tularosa or earlier Reserve phase occupation in the Gila forks area. The relative paucity of nonlocal ceramics belies the variety of species and forms in imported shell work, suggesting a selective commodities trade which has been generalized in most interpretations to represent an isolationist occupation at the cliff dwellings.

At the TJ Ruin itself, no formal excavation has been done, although at least two rooms have been vandalized and the site has been extensively surface collected, judging from the lack of surface artifacts such as large sherds, projectile points, and ground stone. As noted by others, the site's use as a pasture seems to be greatly responsible for a general reduction in sherd size. Collection by visitors is also undoubtedly a cause for loss of more diagnostic material. At least two whole pots and a turquoise "parrot" effigy have been removed from the site (McFarland 1967:39-40).

A rather appreciable scatter of sherds and flakes is associated with the "polo field," which extends up 300 to 400 meters north of the ruin. The northern extent of this scatter was tested (as LA 35,425, Janes and Smith 1975) in conjunction with the construction of the Gila Fire Center heliport and found to be only surficial in nature. Whether this represents aboriginal use of this considerable area or dispersion of material from the TJ Ruin from later (historic) clearing and leveling is not known. In either event, substantial testing would be required to examine this area adequately. Should this extensive scatter be demonstrated as aboriginal, it would bear considerably on the interpretation of the TJ Ruin.

FIELD METHODS

The present map (Figure 4) of the TJ Ruin was made with an alidade and plane table. Distances and elevations were read and plotted in the field from the (metric) stadia rod without doing chained measurements. A contour interval of 50 centimeters was also plotted from direct stadia elevation readings rather than being interpolated from a series of arbitrary radii elevation points from a datum or subdatum. The TJ Ruin required six stations from which to complete the map which encompasses an area of 16 acres measuring approximately 300 meters northwest-southeast by 150 meters northeast-southwest.

Mapping was concerned with recording two measures that would reflect the visible surface architecture of the TJ Ruin: structural mass and individual alignments indicative of rooms or depressions. Structural mass was held to be the edge of a decomposed house mound as opposed to all terrain conceptually involved in the ruin's siting. House mound margins were judged based on soil color changes and mounding above "native" soil, which was differentiated from the structural melt by increases in rock, gravel, and trash in the latter. Changes in vegetation--notably an increase in saltbush and a decrease in gramma grass in areas of structural melt--also were evident. Wall alignments were either clear linear alignments of slabs, cobbles or *cimientos*--linear topographic ridges covered by thin soil. Infrequently, slight rectangular depressions suggesting rooms were visible. Wall segments of high visibility and confidence were differentiated from more tentative alignments in the field. Pot-hunted rooms or rooms with clear foundation stones or wall tops on four sides were taped along the interior length and width axes for individual room measurements. All depressions appeared circular and were so configured for the final draft of the site plan. Depressions were recorded by plotting the

FIGURE 4. PLAN AND CONTOUR MAP OF TJ RUIN.

center of the depression with several shots around the upper margins. The diameter was then averaged around the center point.

Proving measures of structural mass as well as individually recognizable structures was assumed to afford two levels of information: 1) a conservative estimate of structural size, site plan and site design (if any), and 2) a record of specifics as observed in 1986 which could be used in comparative discussions about architectural elements at the TJ Ruin or similar regionally based architectural observations. The record could also provide some managerial baseline information for conditions at the site.

A limited sample of artifacts were collected. During the course of mapping, a general grab sample of sherds and lithics was taken. After mapping was completed, six 1-by-1-meter samples were taken from the following locations: 1) the intramural midden between Roomblocks 1 and 2; 2) between Roomblocks 1 and 4; 3) at Subdatum 3 to the north of the Roomblock 5; 4) in plaza trash north of Subdatum 3; 5) on the lower eastern margins at the center of Roomblock 1; and 6) at the exterior southwest corner of the surface structure north of Pitstructure A situated just east of the enclosing plaza wall. These collecting grids are shown on Figure 4. The samples were taken to identify the relative ceramic chronology, primary lithic sources and basic technology, and document material culture conditions at the site. The grab sample was intended to collect material that was large enough to confidently identify, and which covered, the generally observed variability in types and materials. The grid samples, placed in selected areas with observable differences in density and archeological context, are designed to give a general idea of surface contents in those field conditions. They are by no means adequate (in number or sampling design) to project patterns of temporal or functional meaning across the site.

THE SURFACE ARCHITECTURE OF TJ RUIN

The map of TJ Ruin (Figure 4) contains basic information on the site generated by the mapping project, but some discussion is necessary to clarify our observations on the site, especially in regard to characteristics not depicted on the plan view. Architectural style, village plan, and ceramics all suggest the majority of the visible site is probably late Mangus through Classic Mimbres phase (A.D. 900-1150).

The overall site structure is oriented to the local topography and not along the cardinal directions. Roomblocks are generally linearly arranged (although not all are linear in form) along the steep edge of the mesa and are oriented towards the central "plaza" as defined by the partially encircling enclosure wall. This enclosing wall extends approximately 80 meters southeast in an arc from Roomblock 2. A breach in the wall masonry about 48 meters from its northern origin suggests that a formal 5-to-7 meter wide gate or entryway into the plaza may occur just northwest of the communal structure (Pithouse A) outside the wall. The entire aspect of the ruin would have made a prominent display overlooking the upper Gila River valley below. Its placement on this high point, instead of the first bench above the river as is common (LeBlanc 1976:4; Anyon et al. 1981:212, Table 2), was surely intentional as adequate conditions similar to placement of other large Mimbres ruins was available closer to the river (notably the current location of the Gila Visitor Center). The front, as judged by building alignments relative to pit structure positions, of the site is oriented in a generally northeasterly direction up the mesa slope and across the cleared "polo field." The TJ Ruin is positioned for conspicuous display as well as use or control of the rest of the mesa top on which it was constructed.

The TJ Ruin is made up of at least five known roomblocks. The central roomblock is by far the largest, being roughly 60 meters long and 30 to 40 meters wide and rising an estimated 2 meters above natural grade in the middle of the structure. Smaller house mounds of similar configuration, if not size, are situated to the northwest, north, south, and southeast of the central roomblock (Roomblock 1). Masonry consists of slab and adobe walls, most evident in Roomblocks 1 and 5 and the enclosing wall. *Cimientos* are adobe wall foundations of "alignments or room outlines of one or more closely parallel rows of upright cobbles" (Lekson 1986b:60), which are most apparent in Roomblock 5 and intermittently in some southern sections of Roomblock 1. Coursed cobble walls and adobe walls with *cimiento* are known to be contemporary building styles, although puddled adobe constructions promote *cimiento* visibility and are usually attributed to later periods (Animas phase) of construction. A possible Salado phase adobe structure may be present, either forming, or situated on, a low terrace extending from the southeastern portion of Roomblock 1 into the plaza and creating a low "barrier" between the southern two house mounds and the central plaza. The surface architectural evidence for such a structure is, however, far from compelling.

Seven pitstructures were identified, including two, possibly three, great kivas or other communal structures and four smaller pitstructures. The communal structures range from 8 to 16 meters in diameter with the smallest, located just north of Roomblock 5, containing dense trash fill which suggests that not all communal structures saw coeval use. These structures all form distinctly circular depressions and appear to be primarily subterranean in construction. All the communal structures seem to have associated surface structures, the most obvious of which is northwest of the largest communal structure (Pitstructure A) just outside the enclosing wall. The purpose of the associated surface structures is unknown. These associated structures may be part of an entry complex. However, they do not articulate well with the communal structure, do not conform to the general orientations of similar Late Pithouse period features, and are not consistent with the usually reduced ventilator/roof entry system noted for the later Mimbres communal structures (Anyon and LeBlanc 1980). No cross-walls were evident in these structures and associated rubble is sparse, suggesting the suprastructure may have been of lighter materials. Although no surface masonry was observed in association with the communal structure in the central plaza (Pitstructure B), a heavy growth of saltbush along its northwest perimeter suggests such a structure may also exist as saltbush associates strongly with masonry construction. While the exact date of the communal structures is not known, they appear to contain Mimbres phase refuse. Anyon and LeBlanc (1980:273) note that late (i.e. post A.D. 1000) communal structures have a longer history in the northern

Mogollon area in comparison with the Mimbres Branch where a transition to open plaza areas occur. The TJ Ruin seems to be a composite of northern and southern architecture in this regard as it exhibits both the open plaza delineated by an enclosing wall and large, seemingly late, communal structures.

The remaining pit structures are probably both pithouses of earlier periods and later kivas. Pitstructure D in the southern portion of Roomblock 4 is the only recognizable roomblock-associated "kiva," although others undoubtedly occur, as suggested by the depression (Pitstructure G) in the southeastern portion of Roomblock 1. Although no depressions are readily visible, pit structures of earlier periods may well occur outside the confines of the Classic structure and extend both farther up the mesa slope and down to the southeastern tip of the mesa terrace.

Several aspects of the TJ Ruin's architecture are shown in Table 1, including actual numbers of rooms observable on each house mound, architectural areas, and room estimates. Two estimates of room area or architectural space are provided: 1) the area of rubble mound which encompasses the maximum extent of the rubble scatter and architecturally mounded material as determined by in-field observation of contact between "unimproved" soil and building associated material, and 2) alignment boundaries which restrict architectural space estimates to the areas bounded by visible wall alignments. These two measures may be taken by themselves as *maxima* and *minima* estimates of architectural space (see Lekson 1978:23-27). Room counts are estimated from average Mimbres room size as provided by Gilman (mean = 12.7 square meters in LeBlanc and Whalen 1980:244) and as estimated at the TJ Ruin (mean = 20.0 square meters, see Table 1). As with most estimates, the true figure undoubtedly lies somewhere between what are judged the most reasonable room estimates of 161 square meters and 359 square meters so that as many as 200 rooms might be expected at the TJ Ruin. It is noteworthy, however, that rubble mass estimates by Vivian (1955) and this project are very similar and that more rooms than the 200 here projected may exist (see Table 1).

Roomblock visiblity plays some part in the room count assessment. The southernmost house mounds are the most visible owing, in part, to the thinner mantle of associated trash and the partial stripping and vandalism of

		House Mound Areas							
	# Rooms	Rubble Mound		Estimated Rooms				Estimated Rooms	
Roomblock	Visible	(m)	(sq m)	12.7*	20.0	Alignments		12.7*	20.0
1	15	60x40=	2400	189	120	44x27=	1188	94	59
2	2	30x24=	720	57	36	15x17=	255	20	13
3	3	30x24=	720	57	36	16x12=	192	15	10
4	4	N-11x15=	165	13	8	N-11x 9=	99	13**	10
		S-20x 6=	120	9	6	S- none	-	(est 5)	-
5	7	24x18=	432	34	22	17x14=	238	19	12
			4557	359	227		1972+	161	104
Roomblocks 1-3 (Central Mass)		104x46=	4784	377	239				
Vivian's† Central Mass		84x30=	2520	198	126				
Vivian's All Buildings		144x30=	4320	340	216				
Entire Site		300x150=	45000						

Other Architecture	N	Measured Rooms	m	sq m	Pitstructures	m dia.
Isolated Rooms	2	Roomblock 1	5.3x2.4=	12.7	A	16.0
Great Kiva			4.2x2.5=	10.5	B	10.0
Auxillary Structures	2	Roomblock 4	5.8x4.1=	23.8	C	8.0
Great Kivas	3		5.8x4.1=	23.8	D	5.5
Pitstructures	4		4.6x4.5=	20.7	E	5.0
			4.6x4.0=	18.4	F	5.0
		Roomblock 5	5.5x4.1=	22.6	G	5.0
			4.7x3.7=	17.4		
			4.6x4.5=	20.7		
			6.5x4.5=	29.3		
		N=10 x=20.0		199.9		

*Gilman in LeBlanc and Whalen 1980:244; LeBlanc and Nelson (1976:72) use 11.7 sq m.
**field estimate of 13 used here, mathmatically this would equal 8 rooms
†Vivian 1955

Table 1. Architectural Areas, Rooms, and Room Estimates at the TJ Ruin.

Roomblock 5. The estimated 10 to 12 rooms for this southern roomblock appear to be close to the surface evidence, given that some cross-walls are obscured in portions of Roomblocks 4 and 5. Roomblocks 2 and 3 are melded in a much denser and apparently thicker mantle of trash. Separation between mounds here is much more difficult to distinguish, making room estimates for this section of the site the most problematic. The central roomblock *may* be two stories in places or *may* be simply a superimposition of slab and mortar masonry over a cobble masonry construction with the resultant mound relief a function of local geological conditions. The former situation requires structural planning in order to successfully construct a second story and implies a regularized ground floor construction, while simple stacking of later house mounds over earlier ones accounts for some variability in room size, orientation, and number (see Anyon and LeBlanc 1984:Figure 3.5). The nature of construction, then, affects the precision of room counts. Decomposition of upper rooms undoubtedly obscures the true boundaries of wall alignments, but at the same time, wall fall undoubtedly extends beyond the outermost walls, so that room estimates for this area of the site are most likely somewhere between the figures presented in Table 1.

Peripheral roomblocks may be more regular and have larger rooms than those found in Roomblock 1. Granted that observation of room sizes on structures melted to grade is open to some inaccuracy and interpretation, these figures are assumed to be reasonable because of the quality of the room surface indications on which they are based. While 33 rooms could be identified with some confidence, only 10 of these were well enough defined to provide dimensions. These measurements suggest the average room size was 20 square meters. This is considerably larger than Gilman's estimate for mean room sizes both within and peripheral to the Mimbres Valley (in LeBlanc and Whalen 1980:240, Figure 5), and 64 percent larger than Gilman's average Mimbres room size. The southern roomblocks (4 and 5) most heavily influence these figures, however, and this uneven distribution of room size data may be responsible for the inflated room size figures at TJ Ruin. Room size tends to increase through time (LeBlanc and Nelson 1976:72,77; Stuart and Gauthier 1981:205-209) and the larger rooms of the southern mounds may be later. Alignments and vague room outlines in Roomblock 1 suggest greater variability in room size in this structure. The two smallest rooms, similar to the average size cited by Gilman, are located in Roomblock 1. No rooms were measurable in Roomblocks 2 and 3.

MATERIAL CULTURE SAMPLES

Material samples collected at the TJ site encompass a variety of ceramics and lithics, including debitage, formal and informal tool fragments, and some ground stone specimens. No formal trash deposits were noted although trash density varied considerably over the site. Concentrated trash seems to lie in the area between Roomblocks 1 and 2 and on the margins of the low terrace extending from the southeastern side of Roomblock 1. It was apparent that there was insufficient time to properly surface sample this material, given its abundance, ubiquity, and condition. Some limited samples were taken to provide a preliminary assessment of the surface trash characteristics and check previous sampling by Richert (1955a), from which site dates had been established. The usual constraints of surface collections at complex sites are operative, including temporal mixing, small specimen sizes, and the selective nature of sample grids. All of these work against assemblage recognition and intrasite comparisons.

Ceramics were typed according to published descriptions and discussions (Haury 1936; Human Systems Research 1973; and Anyon and LeBlanc 1984:149-162). Recognition of Anyon and LeBlanc's (1984:151-152) stylistic subdivisions was possible but not practical for the small number of sherds at hand and their Style II (or Transitional B/w) is included in the Boldface B/w identifications; numerous Style II sherds were observed, but not collected, at the site. Future collections with better research potential and specimen quality should certainly employ the stylistic subdivisions. The inventory of ceramics collected by Richert (1955a) and this project suggests a long, if not continuous, occupation at the TJ site (Table 2). Ceramic evidence for roughly 900 years of occupation from the Georgetown through the Salado phases (ca. A.D. 500-1400) is present with the ceramic, as well as architectural, evidence suggesting a major period of occupation between A.D. 900-1150.

Table 2. Ceramic Inventory from TJ Ruin.

	Grid N	gms	$\bar{x}$ gms	Grab N	Total N	%N
Alma Plain*	184	559.5	3.0	16	200	35.3
Scored				2	2	0.3
Punched	2	11.8	5.9		2	0.3
Neckbanded	1	10.9		1	2	0.3
Smudged	2	12.9	6.5		2	0.3
Three Circle Neck Corrugated	15	54.8	3.7		15	2.6
Mimbres Neck Corrugated				1	1	0.2
Corrugated†	12	33.3	2.8	26	38	6.7
Indented Corrugated	5	24.3	4.9	3	8	1.4
Obliterated Corrugated	8	47.3	5.9		8	1.4
Punched Corrugated	1	2.7			1	0.2
Reserve Smudged	13	38.6	3.0	3	16	2.8
Corrugated Smudged	4	8.0	4.0	2	6	1.1
Indented Corrugated Smudged	1	6.2		1	2	0.3
Obliterated Corrugated Smudged	5	28.8	5.8		5	0.9
Brownware Corrugated	1	2.1			1	0.2
Tularosa Fillet Rim				2	2	0.2
San Francisco Red**	26	46.3	1.8	12	38	6.7
San Francisco Red Incised				1	1	0.2
Mogollon R/b	1	6.3		4	5	0.9
Three Circle R/w	1	4.7		9	10	1.8
Bold Face B/w	9	33.6	3.7	38	47	8.3
Mimbres B/w	3	9.3	3.1	40	43	7.6
Tularosa B/w				1	1	0.2
Reserve B/w				2	2	0.3
Gallup B/w				1	1	0.2
Red Mesa B/w	1	3.1			1	0.2
Kiatuthlanna B/w				2	2	0.3
Bold Face/Three Circle B/w				4	4	0.7
Bold Face/Mimbres B/w				34	34	6.0
unidentified M/w	26	52.7	2.0	1	27	4.8
whiteware	25	63.5	2.5		25	4.4
North Plains B/r				1	1	0.2
Heshotuthla B/r				1	1	0.2
St. Johns Polychrome				1	1	0.2
Gila Polychrome				7	7	1.2
Tonto Polychrome				1	1	0.2
White Mountain Redware	1	1.9		2	3	0.5
unidentified redware	1	0.8			1	0.2
Totals	348	1063.4	3.9	219	567	99.8%

* includes Mogollon Brownware
† includes unnamed corrugated
** includes affinis and miscellaneous red types.

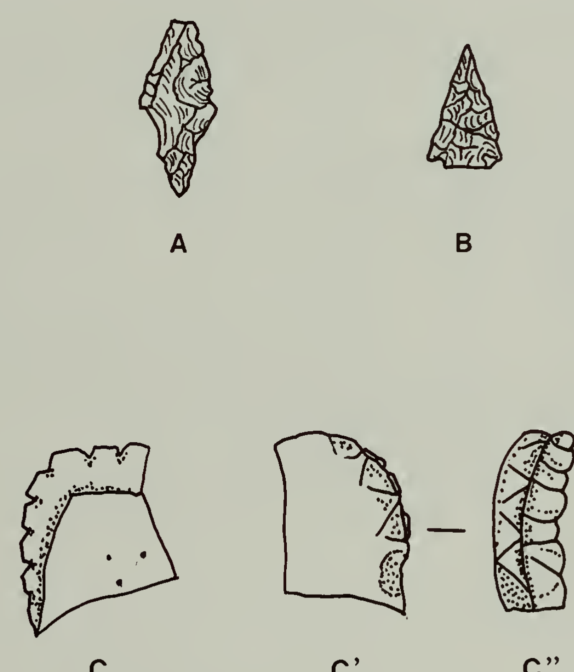
The most obvious ceramic changes are temporal, and, given the postulated population movements in this boundary area, the ceramic correlates of trade or in-migration are far from clear. Typologically nonlocal ceramics may occur as about 7 percent (8.8 percent Total N or 7.1 percent Grid N on Table 2) of the entire assemblage. The majority of this "nonlocal" material is Reserve Smudged and its corrugated varieties which may, in fact, be local products. A much stronger component of Cibola White ware, contemporary with Classic and late Three Circle or Mangus phase, is suggested in contrast with Mimbres sites farther south. Ceramic sourcing studies will be required before any accurate assessments can be made concerning ceramic exchange or mobility in the Gila forks area.

Redware and polychromes are largely associated with the late Animas and Salado phases. Strong ceramic evidence of Animas occupation is lacking, although one specimen of "San Francisco Red Incised" may be Playas Red, an Animas phase indicator (LeBlanc and Nelson 1976:73). The relative lack of these later ceramics suggests the later phases are considerably less intense than the earlier occupation. These late, highly visible polychrome ceramics are undoubtedly the origin of oral traditions concerning the uniqueness of ceramics at the TJ Ruin (see Watson 1927:219) in comparison to other sites in the area and, incidentally, are also prime targets for sherd collectors.

Polychromes of the later phases were located around the southern roomblocks. Surface observations, however, suggest the Reserve Tularosa B/w component of the decorated ceramics to be fairly strong, a situation not supported by the present figures (Tables 2 and 3). Richert (1955b; 1956:7) also observed a higher level of Reserve/Tularosa material at both the Gila Cliff Dwellings and the TJ Ruin in comparison with other local sites.

A more representative statement of surface ceramic assemblages and conditions is presented in Table 3. The most striking aspect is the almost uniformly small size of the average sherd. The average size of 3.1 grams (Table 2) is about four times smaller than a normal "keeper" (see Grab Sample 1986, Table 3). Because samples are so fragmented, weights are probably a more reliable comparative medium for the present collection (see Lekson 1977). The samples suggest, as expected, that utility ware (all brownware) is the most common pottery, usually constituting three-quarters of the ceramics (with Sample 3 being a notable exception). White wares or decorated bichromes represent a very small proportion of the overall assemblage (16.3 percent) and are evenly distributed throughout the various sampling contexts, although not so strongly as to infer a more precise date for any one sampling unit or associated feature. Ceramics are slightly larger on house mounds (Samples 1 and 5) than in areas of open sheet trash.

Ground stone was, with one exception, only collected as part of grid samples, and characteristically exhibited small, undistinguished fragments (N=5, no greater than 5 x 3 x 2.5 centimeters) of vesicular basalt or welded tuff. The incised corner of a ground sandstone palette fragment (Figure 5) was collected in an open area north of Roomblock 2 and outside the enclosing



A - Obsidian projectile point, B - Obsidian side-notched projectile point, C - Sandstone palette fragment (obverse, C' - reverse, C" - side).

Actual size

Figure 5: Artifacts from the TJ Ruin Mapping Project.

Table 3. Ceramic Sample Characteristics at TJ Ruin.

Sample 1:	B	J	N	%N	gms	% gms	$\bar{x}$ gms
Alma Plain	9	19	28	50.9	125.0	54.0	4.5
Punched		1	1	1.8	5.4	2.3	
Mimbres Corrugated		6	6	10.9	17.3	7.5	2.9
Ind. Corr.		4	4	7.3	20.0	8.6	5.0
Reserve Smudged	7		7	12.7	23.0	9.9	3.2
Ind. Corr. Smudged	1		1	1.8	6.2	2.7	
Ob. Corr. Smudged	1		1	1.8	4.0	1.7	
Mimbres B/w	2		2	3.6	7.4	3.2	3.7
Mogollon M/w*	3		3	5.5	17.8	7.7	5.9
whiteware	2		2	3.6	5.6	2.4	2.8
totals	25	30	55	99.9%	231.7	100.0%	4.2
Utility N=39, 70.9%, gms=167.7, 72.4%, mean=4.3gms							
Decorated N=16, 29.1%, gms=64.0, 27.6%, mean=4.0gms							
Sample 2:							
Alma Plain	4	31	35	49.3	118.2	45.9	3.4
Neckbanded		1	1	1.4	10.9	4.2	
Three Circle Neck Corr.		6	6	8.5	24.0	9.3	4.0
Mimbres Corrugated		2	2	2.8	4.7	1.8	2.4
Obl. Corr.		7	7	9.9	36.1	14.0	5.2
Reserve Smudged	2		2	2.8	1.8	0.7	1.4
Obl. Corr. Smudged	3	1	4	5.6	24.8	9.6	6.2
San Francisco Red†	1	6	8	11.3	21.8	8.5	2.7
White Mountain Redware		1	1	1.4	1.9	0.7	
Bold Face B/w	2		2	2.8	7.0	2.7	3.5
Red Mesa B/w	1		1	1.4	3.1	1.2	
Mogollon M/w	1		1	1.4	0.7	0.3	
whiteware	1		1	1.4	2.3	0.9	
totals	15	55	71	100.0%	257.3	99.8%	3.6
Utility N=55, 77.5%, gms=218.7, 85.0%, mean=4.0gms							
Decorated N=16, 22.5%, gms=38.6, 15.0%, mean=2.4gms							
Sample 3:							
Alma Plain		7	7	22.6	9.1	18.8	1.3
Reserve Smudged	1		1	3.2	1.0	2.1	
Corr. Smud.	3		3	9.7	5.3	11.0	1.8
San Francisco Red	4	3	7	22.6	7.6	15.7	1.1
Three Circle R/w	1		1	3.2	4.7	9.7	
Mogollon M/w	7		7	22.6	8.8	18.2	1.3
whiteware	5		5	16.1	11.9	24.6	2.4
totals	21	10	31	100.0%	48.4	100.1%	1.6
Utility N=7, 22.6%, gms=9.1, 18.8%, mean=1.3gms							
Decorated N=24, 77.4%, gms=39.3, 81.2%, mean=1.6gms							

*Mogollon M/w is unidentified B/w with black or overfired brown paint not red-on-brown. The vast majority are Bold Face or Bold Face/Mimbres B/w.

†San Francisco Red includes miscellaneous red as defined by Anyon and LeBlanc 1984:151.

Table 3. Continued.

Sample 4:	B	J	N	%N	gms	% gms	$\bar{x}$ gms
Alma Plain	11	74	85	61.6	219.5	65.7	2.6
Punched		1	1	0.7	6.4	1.9	
Three Circle Neck Corr.		5	5	3.6	9.2	2.8	1.8
Mimbres Corrugated		4	4	2.9	11.3	3.4	2.8
Ind. Corr.		1	1	0.7	4.3	1.3	
Punched Corr.		1	1	0.7	2.7	0.8	
Brownware Corrugated		1	1	0.7	2.1	0.6	
San Francisco Red	7	2	9	6.5	12.8	3.8	1.4
Bold Face B/w	4		4	2.9	12.2	3.6	3.1
Mimbres B/w	1		1	0.7	1.9	0.6	
Mogollon M/w	14	1	15	10.9	25.4	7.6	1.7
whiteware	9	2	11	8.0	26.5	7.9	2.4
totals	46	92	138	99.9%	334.3	100.0%	2.4

Utility N=98, 71.0%, gms=255.5, 76.4%, mean=2.6gms
Decorated N=40, 29.0%, gms=78.8, 23.6%, mean=0.6gms

Sample 5:	B	J	N	%N	gms	% gms	$\bar{x}$ gms
Alma Plain		6	6	27.3	46.8	35.7	7.8
Smudged	2		2	9.1	12.9	9.8	6.5
Three Circle Neck Corr.		3	3	13.6	16.6	12.7	5.5
Mimbres Obl. Corr.		1	1	4.5	11.2	8.5	
Reserve Smudged	3		3	13.6	12.8	9.8	4.3
Corr. Smud.	1		1	4.5	2.7	2.1	
San Francisco Red	1	1	2	9.1	4.1	3.1	2.1
Mogollon R/b	1		1	4.5	6.3	4.8	
Bold Face B/w	2		2	9.1	10.5	8.0	5.3
whiteware	1		1	4.5	7.1	5.4	
totals	11	11	22	99.8%	131.0	99.9%	6.0

Utility N=12, 54.5%, gms=87.5, 66.8%, mean=7.3gms
Decorated N=10, 45.5%, gms=43.5, 33.2%, mean=4.4gms

Sample 6:	B	J	N	%N	gms	% gms	$\bar{x}$ gms
Alma Plain	4	19	23	74.2	40.9	67.4	1.8
Three Circle Neck Corr.		1	1	3.2	5.0	8.2	
Bold Face B/w	1		1	3.2	3.9	6.4	
unidentified redware	1		1	3.2	0.8	1.3	
whiteware	4	1	5	16.1	10.1	16.6	2.0
totals	10	21	31	99.9%	60.7	99.9%	2.0

Utility N=24, 77.4%, gms=45.9, 75.6%, mean=1.9gms
Decorated N=7, 22.6%, gms=14.8, 24.4%, mean=2.1gms

Table 3. Continued.

1986 Grab Sample:	B	J	N	%N	gms	% gms	$\bar{x}$ gms
Alma Scored		1	1	2.5	22.3	4.6	
Neckbanded		1	1	2.5	17.7	3.7	
Mimbres Corrugated		1	1	2.5	39.7	8.2	
Neck Corrugated		1	1	2.5	11.0	2.3	
Ind. Corrugated		3	3	7.5	30.0	6.2	10.0
Reserve Smudged	3		3	7.5	62.0	12.9	20.7
Corr. Smudged	2		2	5.0	21.2	4.4	10.6
Ind. Corr. Smudged	1		1	2.5	10.5	2.2	
San Francisco Red	2		2	5.0	16.5	3.4	8.3
White Mountain Redware	1		1	2.5	13.1	2.7	
Mogollon R/b	1		1	2.5	10.9	2.3	
Three Circle R/w	1	2	3	7.5	29.6	6.1	9.9
Bold Face B/w	6*	4	10	25.0	118.3	24.6	11.8
Mimbres B/w	7		7	17.5	64.8	13.5	9.3
Tularosa B/w		1	1	2.5	7.6	1.6	
Gila Polychrome	1	1	2	5	6.3	1.39	3.2
totals	25	15	40	100.0%	481.5	100.0%	12.0

Utility N=7, 17.5%, gms=120.7, 25.1%, mean=17.2 gms
Decorated N=33, 82.5%, gms=360.8, 74.9%, mean=10.9gms

Richert's 1955 Grab Sample:	N	%N
San Francisco Red	4	2.2
S.F. Red derivatives	6	3.4
S.F. Red Incised	1	0.6
Mogollon Brownware	16	8.9
Tularosa Fillet Rim	2	1.1
Unnamed Corrugated	25	14.0
Mogollon R/b	3	1.7
Three Circle R/w	6	3.4
Bold Face/Three Circle B/w	4	2.2
Bold Face B/w	28	15.6
Bold Face/Classic B/w	34	18.4
Classic B/w†	33	18.4
Kiatuthlanna B/w	2	1.1
Reserve B/w	2	1.1
Gallup B/w	1	0.6
unknown M/w	1	0.6
unknown redware	1	0.6
North Plains B/r	1	0.6
Heshotuthla B/r	1	0.6
St. Johns Polychrome	1	0.6
Gila Polychrome	5	2.8
Tonto Polychrome	1	0.6
total	178	100.0%

Utility N=55, 30.7%
Decorated N=129, 69.3%

*includeds 1 worked sherd, one slightly convex edge shaped and ground.
†Classic B/w and Mimbres B/w are synonymous in this paper.

wall. Numerous unmodified, flat, igneous river cobbles were observed which showed evidence of grinding, but formally prepared milling equipment was noticeably absent. Those few formal milling tools observed included a single sandstone mano fragment, two trough metate fragments, and a reused trough metate as a mortar with pestle. Two large boulders, one in a drainage area at the north edge of the site, and another at the edge of the southern mesa tip served as in-place grinding stones, each with three grinding facets. The absence of formal milling stones may reflect relatively low investments in milling technology and, by extension, less reliance on maize-culture. More likely it is a function of post-occupational collection, including Apachean and more recent visitors.

Basic information on the chipped stone assemblage is presented in Tables 4 and 5. A total of 280 lithic items was collected. Of the 240 items collected in the grid samples, 10 percent showed use while only 4 percent--excluding the two projectile points (Figure 5)--were classified as "tools," the majority of which are cores. This lack of bifacially or unifacially flaked tools is common in other Mimbres and southwestern sites, which are characterized by expediant lithic technology and flake use described by Nelson and others (1978:201) as a "discard industry." Welded tuffs, rhyolites, basalts, a white chalcedony, and obsidian comprise the majority of the materials recovered (Table 4). All materials are, apparently, locally available, including obsidian which has been reported in the Gila Hot Springs valley (Hammack 1966:2-3). The traditional obsidian source for the region is commonly held to be the Mule Creek area near the Arizona-New Mexico border (Findlow and Bologuese 1982:299-300). Specimens of sufficient size to reveal prealteration characteristics indicate that small noduals, similar to those from Mule Creek, were also used at the TJ site. This suggests possible use of material from the Mule Creek locality or another similar but as yet unlocated obsidian source in the area. A glossary of material type descriptions is provided in the appendix.

In terms of workability the obsidian, agate, waxy and purple cherts, and chert-like welded tuff would seem to represent materials with the best or most easily controlled flaking characteristics and which produce the sharpest, most brittle edges. At the other end of the scale are fine-grained, mottled

Summary of Grids (count sherds:lithics 1.5:1; weight sherds:lithics 1:1.2):

	N	%N	gms	%gms	$\bar{x}$ gms	>1/2 sn	$\bar{x}$ cm L	$\bar{x}$ cm W	$\bar{x}$ cm Th	% W>L	PN	TN	$\bar{x}$D	% used flakes	% tools/ retouched	ratio used:unused
Welded tuff, fine	33	13.7	180.8	14.6	5.5	20	2.9	2.5	0.9	30	2		3.0	9	3	8:3
Welded tuff, chert-like	17	7.1	49.3	4.0	2.9	10	2.1	2.8	0.6	41	3	1	3.9	12		8:5
Rhyolite, fine	23	9.6	111.7	9.0	4.9	15	2.8	2.1	0.7	26	1		2.8	13	4	5:8
Rhyolite, coarse	5	2.1	77.8	6.3	15.6	2	4.2	3.3	1.4	20	3		2.0			
Chert, purple	6	2.5	8.3	0.7	1.4	4	2.2	1.8	0.5	17	2		3.3			
Chert, fossiliferous	7	2.9	22.3	1.8	3.2	5	2.2	1.9	0.6	29	2		1.8	28	14	2:3
Chert, waxy	1	0.4	1.8	0.2	1.8	1	1.5	2.0	0.4		1					
Siltstone, fine	6	2.5	5.4	0.4	1.1	3	2.0	1.6	0.8	33	3		2.0			
Siltstone, coarse	4	1.7	6.0	0.5	1.5	2	2.4	1.5	0.3		1	1	2.5	25		4:0
Basalt, vitreous	11	4.6	82.5	6.7	7.5	10	3.3	2.7	1.1	45	1		3.3		9	11:0
Basalt, vesicular	37	15.4	329.6	26.6	8.9	26	4.1	3.0	0.9	32	9		1.8	11	3	7:4
Chalcedony	4	1.7	6.7	0.5	1.7	4	2.1	1.2	0.6		1		2.8	25	25	2:0
Chalcedony, white	58	24.2	319.0	25.8	5.5	27	3.2	2.7	0.9	21	10		2.2	5	3	14:5
Agate	3	1.2	21.6	1.8	7.2	3	3.5	1.8	1.1		1		3.0	67		1:5
Quartz	1	0.4	0.9	0.1	0.9	1	1.9	1.1	0.4				2.0			
Obsidian	24	10.0	12.7	1.0	0.5	27	1.1	1.1	0.4	33	2	10	3.4	17	8	4:8
totals	240	100.0	1236.4	100.0	4.7	160	2.6	2.0	0.7	42%			2.7	10%	4%	7:5

Grab Sample 1986:

	N	gms	$\bar{x}$ gms	L	W	Th
Welded tuff, fine	4	96.5	24.1	3.8	4.1	1.8
Welded tuff, chert-like	2	21.8	10.9	3.9	2.9	0.7
Rhyolite, fine	7	91.2	13.0	3.7	3.9	0.9
Rhyolite, coarse	1	22.0	22.0	5.3	4.4	1.2
Chert, purple	2	3.2	1.6	2.1	1.7	0.5
Chert, fossiliferous	5	49.1	9.8	3.4	3.3	1.0
Chert, waxy	3	2.9	1.5	2.1	1.6	0.4
Siltstone, fine	5	13.7	2.7	1.9	2.5	0.8
Siltstone, coarse	3	24.4	8.1	4.1	2.8	0.9
Basalt, vitreous	1	77.4	77.4	5.2	5.1	2.1
Basalt, vesicular	1	31.0	31.0	3.8	6.4	1.7
Chalcedony	3	26.9	9.0	2.9	3.5	1.0
Chalcedony, white	1	12.3	12.3	4.4	2.8	1.0
Agate	1	2.6	2.6	2.8	2.0	1.0
Indeter. metamorphic?	1	24.8	24.8	4.3	3.6	1.5
totals	40	499.8	12.5	4.1	3.4	1.1

Where N=frequency, PN=primary flake N, TN=thinning flake N, D=dorsal scars, and sn=subsample of N.

Table 4. Chipped Stone Inventory from TJ Ruin.

Summary of Grids:

	Size Index (LxW)	Shape Index (L/W)	Control Index (LxW/Thx10)	Relative Thickness (W/Th)
Welded tuff, fine	7.25	1.16	0.81	2.78
Welded tuff, chert-like	5.88	0.75	0.98	4.67
Rhyolite, fine	5.88	1.33	0.84	3.00
Rhyolite, coarse	13.86	1.27	0.99	2.36
Chert, purple	3.96	1.22	0.79	3.60
Chert, fossiliferous	4.18	1.16	0.70	3.17
Chert, waxy				
Siltstone, fine	3.20	1.25	0.40	2.00
Siltstone, coarse	3.60	1.60	1.20	5.00
Basalt, vitreous	8.91	1.22	0.81	1.90
Basalt, vesicular	12.30	1.37	1.37	3.33
Chalcedony	2.52	1.75	0.42	2.00
Chalcedony, white	8.64	1.19	0.96	3.00
Agate	6.30	1.94	0.57	1.50
Quartz				
Obsidian	1.21	1.00	0.30	2.75
totals	5.20	1.30	0.74	2.86

Table 4. Continued.

welded tuff, rhyolite, white chalcedony, and glassy basalt which show greater structural variability resulting in a higher number of knapping errors (e.g. less complete flakes) but which also exhibit tougher, more durable edges. Judging from flake sizes and rind curvatures, the finest material seems to come from small nodual sources while the more common and coarser material comes from large parent sources. The most coarse material, such as coarse rhyolite and most vesicular basalt, seems to be a by-product of general rock shaping or dressing and not a product of systematic core reduction.

The most abundant materials, as represented by weight, are vesicular basalt, white chalcedony, and fine-grained welded tuff, with obsidian more common as flakes than as a weighed material mass. Welded tuffs, rhyolite, basalts, white chalcedony, and obsidian are ubiquitious in the sample grids. About two-thirds of the lithic material exhibited no more than minor breakage and formed the basis of the measured sample. Various summary measures and descriptive indices for flake characteristics are shown in Table 4 with information detailed in Table 5. These indices are briefly explained in Appendix A and are ultimately derived from the work of Phagan with Anasazi material (Phagan and Hrelby 1985; Phagan 1985). The interest in this analysis was to provide a preliminary profile of material types and their use characteristics, as more would be impractical.

The relative flake size index (LxW) for different materials shows that basalts, rhyolites and varieties of welded tuff tend to occur as the largest flakes, while obsidian and fine siltstones are usually found as the smallest flakes. Using the bulbar axis as the standard length measure, no clear pattern of overall flake shape can be determined from the current data, as flakes in all material categories are of only moderate length. No exceptional lengths indicative of blade production are noted in the present sample. Those that show some trend to being short or having greater widths than lengths (<1.0) or blade forms (>2.0) may be discountable as materials of low frequency. No material shows greater than half the flakes wider than they are long. A composite picture of general control during flaking (flake index) shows relatively similar values for all materials and suggests that large, thin flakes (high values) were not usually produced at TJ, a situation also reflected by the lack of blade type flakes in the shape index (L/W). Lack of quality flakes or blades may, in part, be a hazard of surface sampling. The higher

Sample 1 (sherds:lithics=1.5:1):

	N	gms	$\bar{x}$ gms	>1/2 sn	x cm L	W	Th	% Use Flakes	Used	Tools	% Cortex none	<10%	<50%	>50%	100%
Welded tuff, fine	10	69.5	7.0	6	2.8	2.4	0.8	100			70	10	10	10	
Welded tuff, chert-like	4	15.6	3.9	4	2.8	2.4	0.6	100			50	25		25	
Rhyolite, fine	3	8.5	2.8	2	2.4	1.7	0.5	33	33	33	33	33			33
Chert, purple	2	4.9	2.5	2	2.3	1.9	0.4	100			50			50	
Chert, fossiliferous	2	7.8	3.9	2	2.0	2.1	0.9	50		50c	100				
Siltstone, coarse	2	3.6	1.8	0				100			100				
Basalt, vitreous	2	34.5	17.3	1	4.2	5.1	1.9	100			100				
Basalt, vesicular	2	66.9	33.5	2	5.2	3.8	1.2	50		50hs			50	50	
Chalcedony, white	7	34.6	4.9	4	2.9	2.7	1.0	86		14c	29	29	14		29
Obsidian	4	3.4	0.9	3	1.1	1.2	0.4	75	25		100				
totals	38	249.3	6.6	26	2.9	2.6	0.9								

Sample 2 (sherds:lithics=1.3:1):

	N	gms	$\bar{x}$ gms	>1/2 sn	x cm L	W	Th	% Use Flakes	Used	Tools	% Cortex none	<10%	<50%	>50%	100%
Welded tuff, fine	3	6.7	2.2	3	2.1	2.3	0.6	67	33		100				
Welded tuff, chert-like	2	6.0	3.0	0				100			50	50			
Rhyolite, fine	8	29.3	3.6	5	2.6	2.4	0.7	75	25		75	13	13		
Rhyolite, coarse	1	5.9	5.9	0				100			100				
Chert, purple	3	3.1	1.0	2	2.0	1.6	0.5	100			100				
Chert, waxy	1	1.8	1.8	1	1.5	2.0	0.4	100			67			33	
Siltstone, fine	1	2.2	2.2	0				100			100				
Siltstone, coarse	1	2.4	2.4	1	2.7	1.9	0.4	100			100				
Basalt, vitreous	2	2.4	1.2	2	1.9	1.6	0.3	100			100				
Basalt, vesicular	6	30.1	5.0	5	2.8	1.0	0.5	83	17		33	17	33	17	
Chalcedony	2	2.2	1.1	2	2.1	1.0	0.5		100		100				
Chalcedony, white	12	28.6	2.4	9	2.0	1.8	0.5	83	17		75	8		8	8
Agate	1	1.7	1.7	1	2.0	1.8	0.5		100				50		50
Obsidian	11	3.7	0.3	8	1.0	0.7	0.2	64	27	9c	100				
totals	54	126.1	2.3	39	2.1	1.6	0.5								

Where c=core, hs=hammerstone frag, s=scraper, p=point frag, g=graver and unmarked are retouched. Other annotations as Table 4.

Table 5. Chipped Stone in Grid Samples at TJ Ruin.

Sample 3 (sherds:lithics=1:1.8):

				>1/2	x cm			% Use			% Cortex				
	N	gms	$\bar{x}$ gms	sn	L	W	Th	Flakes	Used	Tools	none	<10%	<50%	>50%	100%
Welded tuff, fine	3	24.1	8.0	2	3.8	2.9	1.3	67	33		67				33
Welded tuff, chert-like	3	12.6	4.2	1	2.9	4.2	0.9	67	33		67				33
Rhyolite, fine	8	41.3	5.2	5	3.0	2.5	0.8	100			38	12	38	12	
Rhyolite, coarse	1	1.6	1.6	0				not a flake							
Chert, purple	1	0.3	0.3	0				100			100				
Chert, fossiliferous	3	6.5	2.2	2	1.9	2.5	0.5	100			50				50
Siltstone, fine	1	0.1	0.1	0				100			100				
Basalt, vitreous	3	36.5	12.2	1	4.3	3.9	1.5	100			67				33
Basalt, vesicular	10	94.5	9.5	6	3.4	3.6	1.0	90	10		50				50
Chalcedony, white	20	94.8	4.7	8	2.6	2.3	1.0	95		5c	63		21		16
Agate	1	9.5	9.5	1	4.6	1.5	1.5		100		100				
Obsidian	3	1.8	0.6	1	1.1	1.4	0.3	67		33p	33				67
totals	57	323.6	5.7	27	3.0	2.8	1.0								

Sample 4 (sherds:lithics=2.3:1):

	N	gms	$\bar{x}$ gms	sn	L	W	Th	Flakes	Used	Tools	none	<10%	<50%	>50%	100%
Welded tuff, fine	13	70.7	5.4	9	2.8	2.2	0.8	83	8	8s	62		17	8	8
Welded tuff, chert-like	6	5.5	0.9	3	1.5	1.8	0.5	83	17		67	17		17	
Rhyolite, fine	1	3.3	3.3	1	3.1	1.9	0.5	100			100				
Rhyolite, coarse	2	67.5	33.8	1	5.9	4.9	2.1	100							100
Chert, fossiliferous	2	8.0	4.0	1	2.8	1.1	0.5		100					100	
Siltstone, fine	2	2.6	1.3	1	1.3	1.8	0.4	100						100	
Siltstone, coarse	1	0.5	0.5	1	2.0	1.0	0.2		100		100				
Basalt, vitreous	2	3.1	1.6	2	2.0	1.0	0.5	100			50				50
Basalt, vesicular	15	79.6	5.3	11	2.6	2.5	0.7	87	13		40	20	7	13	20
Chalcedony	2	4.5	2.3	2	2.1	1.4	0.7	50		50g	50	50			
Chalcedony, white	11	89.2	8.1	6	2.7	2.1	0.8	100			55	11			33
Quartz	1	0.9	0.9	1	1.9	1.1	0.4	100			100				
Obsidian	3	0.4	0.1	3	1.1	0.8	0.2	100			33	33		33	
totals	61	335.8	5.5	42	2.4	1.8	0.6								

Where c=core, hs=hammerstone frag, s=scraper, p=point frag, g=graver, and unmarked are retouched.

Table 5. Continued.

				>1/2	x cm			% Use			% Cortex				
	N	gms	$\bar{x}$ gms	sn	L	W	Th	Flakes	Used	Tools	none	<10%	<50%	>50%	100%
Sample 5 (sherds:lithics=1.2:1):															
Welded tuff, fine	3	7.7	2.6	0				100			100				
Welded tuff, chert-like	1	9.4	9.4	1	2.4	4.8	1.0	100						100	
Rhyolite, fine	3	29.3	9.8	1	2.9	2.2	1.0	100			67				33
Siltstone, fine	1	-		1	3.0	2.0	1.7	100						100	
Basalt, vitreous	1	0.7	0.7	0						100c	100				
Basalt, vesicular	3	49.3	16.4	1	6.9	4.9	1.0	100			33	33			33
Chalcedony, white	4	43.5	10.9	1	5.0	4.3	0.9	100			50		25		25
Agate	1	10.4	10.4	1	4.0	2.0	1.2	100							100
Obsidian	1	3.1	3.1	1	1.6	1.8	1.0	100					100		67
totals	18	153.4	9.0	8	3.7	3.1	1.0								
Sample 6 (sherds:lithics=2.6:1):															
Welded tuff, fine	1	2.1	2.1	0				100			100				
Welded tuff, chert-like	1	0.2	0.2	1	1.0	0.6	0.2	100			100				
Rhyolite, coarse	1	2.8	2.8	1	2.5	1.7	0.6	100			100				
Siltstone, fine	1	0.5	0.5	1	1.8	0.9	0.3	100			100				
Basalt, vitreous	1	5.3	5.3	1	2.3	2.4	1.2	100			100				
Basalt, vesicular	1	9.2	9.2	1	3.9	2.1	1.2	100				100			
Chalcedony, white	4	28.3	7.1	2	4.0	2.7	1.0	100			50			25	25
Obsidian	2	0.3	0.2	2	0.9	0.9	0.2	100			50			50	
totals	12	48.7	4.1	9	2.3	1.6	0.7								

Where c=core, hs=hammerstone frag, s=scraper, p=point frag, g=graver, and unmarked are retouched.

Table 5. Continued.

values for relative thinness suggest those materials most used in the late stages of biface production are the finer quality welded tuff and the purple cherts. That simple indices can be deceptive is shown in this instance by the moderate value for obsidian when the number of thinning flakes and actual bifacial artifacts indicate this material to be the most reduced to bifacial tools. The average number of dorsal scars per flake likewise suggests that welded tuffs, purple cherts and obsidian show more reduction than other materials.

Agate, chalcedony, coarse siltstones and obsidian occur as the most frequently used materials when considering tools and utilized flakes in relation to unused items. Only obsidian occurred as projectile points or biface fragments. The consistent high performance of vesicular basalt in the various indices suggests this material forms an important component of the chipped stone technology as well as the groundstone. Only those items with obvious retouch and patterned edge damage (not polish, striations, rounding, etc.) were recorded as used because of the dubiousness of recording the full range of possible microwear from a surface sample. The nature of raw material at TJ (e.g., largely tough, durable igneous rock) will require an extensive and specifically developed analysis to identify and interpret the variety of use-wear it should reveal (see Foster et al. 1982).

Surface material at the TJ Ruin is extensive but has been shown to be in poor condition or of questionable integrity. No definitive refuse areas or firm associations of type or material with provenience can be readily established. Although material densities and ratios vary, rough ubiquity matrices of materials in the sample grids show a uniformity of distributions. Further extensive tests of surface material should be eschewed in favor of subsurface testing which should reveal stratigraphic and architectural relationships of greater interpretive value.

THE TJ RUIN IN REGIONAL CONTEXT

The mapping of the TJ Ruin at Gila Cliff Dwelling National Monument afforded an opportunity to evaluate the structure of the site in terms of architectural components and ceramic chronology. In turn, this has allowed some preliminary assessments of the TJ Ruin and occupation in the Gila forks area in comparison with other regional frameworks. It is hardly a state secret that the following comments are speculative, being based entirely on the surface evidence from one site and with consideration for the underwhelming literature covering the area.

When Fitting and others (1982) suggest that the Gila forks area is greatly different from Mimbres occupation farther downstream on the Gila, they may be only partially correct. Most of the differences between the Mogollon occupation of the Gila headwaters and Mimbres heartland may be attributed to two things: 1) the area's boundary position between the Mimbres and the more northern Mogollon, and 2) the lack of rigorous archeological work in the area which promotes somewhat simplified interpretation. Through the majority of the Mimbres sequence, occupation seems to more closely follow patterns along the Gila than elsewhere, but late in the sequence more northern ceramics and architecture seem to become apparent. What is clear, however, is that the Mimbres occupation of the Gila forks is the most strongly represented cultural group in the area and not the Tularosa phase as is at times implied (Danson 1957:84; Stuart and Gauthier 1981:236; cf Anderson et al. 1986:1).

The similarity or continuity of occupation between the Gila forks and the Cliff-Redrock areas of the Gila River is suggested by the correspondence in settlement pattern and apparent agreement in phase sequence. If the debunked Mangus phase (Gilman in LeBlanc and Whalen 1980; Anyon et al. 1981:217-219) can be conceived of as an occupational period marked by surface architecture and Bold Face B/w and devoid of site size connotations (Fitting 1972; Lekson 1978), then the convergence of architectural style (cobble and slab masonry) and ceramics at the TJ Ruin suggests that the Mangus phase may be useful, as along the remainder of the upper Gila in the headwaters area. Other Mangus occupations have been noted on the valley floor (Hammack 1966; Ice 1968), which, together with the TJ Ruin, indicate a variety of site types and sizes during this phase. The height of occupation at the TJ site seems to be the late Mangus through Classic Mimbres phases ca. A.D. 900-1150. The size and location of the TJ Ruin is a continuance of the Gila River pattern of greater aggregation and more widely spaced large sites than is found in the Mimbres Valley (Lekson 1984). While full understanding of the settlement pattern in the Gila forks area will require an expansion and refinement of the crude results of survey reported by Morris (in Anderson et al. 1986), occupation after the Classic Mimbres phase does seem to be greatly reduced.

With the Classic Mimbres, the unclear waters of occupation become even muddier. Laumbach and Kirkpatrick (1983:131-139 and Figure 19) show the boundary of encroachment of Tularosa on the northeastern Mimbres area, which, if extended west across the Black Range, would intersect the Gila forks area. While Laumbach and Kirkpatrick make clear this boundary is a late phenomenon in their survey, they also rely on dating from the Mimbres Valley to structure their sequences. However, the temporal variability of post-Mimbres ceramics in areas peripheral to the Mimbres Valley, including the Gila River (Lekson 1984; Mills 1986), has been questioned, and these questions may be relevant to the TJ Ruin. There is some reason to suspect that the final period of Mimbres occupation (A.D. 1100-1150) saw an increase in Reserve/Tularosa ceramics and architecture, although the precise chronology is, of course, unknown. The scattered roomblocks of the TJ Ruin are similar to other Mimbres village layouts, but the large plaza-forming enclosure wall lacks any known contemporary Mimbres analog. The large circular ceremonial structures strongly resemble the great kivas of the northern Mogollon. Wall-bounded plazas would also seem to be more common to northern Mogollon architecture (Danson 1957:82). The main roomblock is more compact than other large and medium sized Mimbres sites along the Gila where northern and southern roomblocks around a central plaza are a distinct pattern (Lekson 1982:69). Although Anyon and LeBlanc (1980) see the abandonment of large communal structures during the Classic Mimbres in favor of communal plazas, this pattern may not be evident on the Gila where the large communal structures of the Cemetery Site, Woodrow Ruin, and TJ Ruin cannot be proved abandoned in Classic times. Rather these structures form an intregal part of the patterned site structure. The difference between the TJ Ruin and its Redrock-Cliff area Gila River counterparts is that the structures at TJ Ruin appear circular while the others are mapped as rectangular features. Finally, Cibola ceramics have a long tradition in the area but seem to increase during the Reserve/Tularosa period (ca. A.D. 1100-1300), although the mechanism for that increase is unknown. The

Reserve/Tularosa material may represent trade or intermittent occupations, however scant.

The ceramic indicators of later phases hold several implications, any of which would require excavation for confirmation. The Animas and Salado phases do not seem to be well represented at the TJ Ruin, and, inasmuch as the TJ Ruin is the the only known site in the Gila forks area with any evidence of these phases, it would seem that the region saw a reduced late occupation possibly similar to the Cliff phase in the Mimbres Valley; a contrast with large population centers lower on the Gila River. The Reserve/Tularosa phase may have seen an initial period during the late twelfth century, perhaps a short, late-thirteenth century occupation like that at the Gila Cliff Dwellings.

In sum, the TJ Ruin represents the most significant known stratified site in the Gila headwaters area. The physical evidence suggests a site of roughly 200 rooms in five house mounds which, with earlier pithouse components, cover an estimated occupation span of about 900 years (A.D. 500-1400). The site conforms with developments along the upper Gila River but shows an abbreviated occupation similar to that noted in the Mimbres Valley during its final phases of occupation. These late phases, in the thirteenth and fourteenth centuries, are found only at the TJ Ruin in this area. Also featured during these late occupations is an encroachment by Tularosa phase Mogollon as noted east of the Black Range.

RECOMMENDATIONS

Our recommendations are tempered by considerations of the TJ Ruin's condition and the significance of the site to the understanding and interpretation of the archeology of the Gila forks area. Currently we can forecast no foreseeable plans by the National Park Service to excavate the ruin and thereby broaden the Monument's outdoor display for the public. Without a program of excavation and interpretive development at the TJ Ruin, there cannot be meaningful archeological evaluation of the site and its full significance in the regional prehistory; professional and public interpretation will be hindered and incomplete. That the TJ Ruin will one day be excavated seems inevitable, however, and the following recommendations should provide a useful background to those future efforts as well as constitute a minimal impact on the site.

(1) *A riverine survey of the upper Gila and its headwaters.* This would be an archeological reconnaissance of the Middle and West Forks and the Gila River between Turkey Creek and the TJ Ruin. This reconnaissance would be for the purpose of identifying site clusters and any other major ruins like the TJ site that may exist in the region. This effort should provide a gross overview of settlement patterns, and clarify the significance of the TJ Ruin in the extreme upper Gila region. It may be practical to seek interagency support for such a survey, and to coordinate the effort through the State Historic Preservation Bureau as a lead agency.

(2) *A remote sensing survey of the TJ Ruin.* We recommend a systematic magnetometer survey of the TJ Ruin proper and a sampling of the "polo field" to delineate any possible annomalies which may represent pit structures or other nonvisible site components. We also recommend aerial infra-red and black-and-white imagery for the generation of aerial maps in coordination with the magnetometer survey and for other imagery analyses which should reveal further nonvisible site components and to some extent support the magnetometer survey.

(3) *Salvage of vandalized rooms.* One room in Roomblock 5 and another in Roomblock 1 have been vandalized and should be salvaged to recover remaining artifacts and document damaged features. Data from these excavations should be incorporated into any testing program.

(4) *Limited testing.* The collections and observations made during the current mapping project have strongly suggested that further sampling of surface material at the TJ Ruin would be of limited utility in establishing site chronology and occupational sequences. Limited test pits or trenches should be employed to collect a stratified, subsurface sample that will aid in the delineation of basic site structure as well as provide material from discrete proveniences. The analysis of this sample will greatly aid both the park interpretive program and professional understanding of the region's prehistory. The salvage of the room in Roomblock 1 could be extended to test whether or not this structure is indeed two stories, as held by some, or is merely stratified architectural components.

(5) *Archival search and local interviews.* Because materials are known

to have been removed from the TJ Ruin, a search of artifactual and paper archives is recommended. Interviews with local valley residents is urged to establish any oral tradition or knowledge concerning past (historic) activities and possible collections from the TJ Ruin.

Other plans have been submitted by the park service for upgrading the status of collections, survey information, and the archeological evaluation in general at Gila Cliff Dwellings National Monument. We would support the continued pursuit of these goals, but recommend these specific procedures be considered for the TJ Ruin, where the greatest potential exists for information on the prehistory in the Gila Hot Springs valley and perhaps the entire region of the Gila headwaters.

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APPENDIX

LITHIC MATERIAL DESCRIPTIONS AND LITHIC INDICES

Lithic Material Descriptions

The following descriptions represent initial sorting categories for material types recovered during the TJ Ruin mapping project. The descriptions are primarily concerned with simple visual characteristics and not microscopic and chemical compositions; a reevaluation in later studies will be needed. Descriptions for similar materials in the region may be found in Nelson et al. (1978:200-201) and should be consulted for comparison and more complete description. The separation between welded tuff and the finer varieties of rhyolite is especially difficult as these rocks are actually a minerological continuum differing in depositional history (e.g. "rhyolitic tuff"; see Dana 1956:408-410; Ross and Smith 1961:8-9). Any meaningful split between the two materials in terms of Mimbreno functional requirements is probably moot, but, in terms of flaking qualities, the rhyolite-welded tuff continuum can probably best be ordered from excellent-to-moderate as follows: chert-like welded tuff, fine-grained rhyolite, fine-grained mottled welded tuff, coarse rhyolite.

Rhyolite: a light to medium gray, occasionally reddish igneous material with clear cystobolite and/or hornblende spars. A dense, fine-grained rock occasionally showing some flow structure. At least partially vitreous.

> *Variety A* - extremely fine-grained, vitreous, good fracture qualities, possibly comparable with Nelson et al. (1978:200) "glassy rhyolite." Termed "fine rhyolite" in this report.
>
> *Variety B* - coarser minerological structure, irregular in flow lines, coarser texture, poorer flaking qualities. Termed "coarse rhyolite."

Welded Tuff: a very fine-grained grayish to brown, gray-white mottled material maintaining some flow and individual structures. Original structures may be taken as indurated pyroclastics of grain generally finer than 4 mm (dust or ash).

Variety A - a smooth, waxy appearing material with small, infrequent inclusions of hornblende. Uniform grayish color. Flowage and original structure have been totally obscured into a homogenous mass lacking internal flaws. Termed "chert-like welded tuff."

Variety B - a fine-grained mottled gray to brownish material maintaining some flow lines and original ash structure. Very good flaking quality. Termed "fine welded tuff" or "fine-mottled welded tuff" in this report.

Basalt: black to medium gray, fine-grained igneous material.

Vitreous Basalt - a black fine-grained material of homogenous texture. Very glassy mass exhibiting good, even flaking qualities.

Vesicular Basalt - a fine, medium gray slightly vesicular material. Some inclusions and vesicular quality make for a moderate to poorly flakable material.

Siltstone: a very fine-grained to silt-quality sedimentary stone. Some sediment layering lines are visible.

Variety A - red or green silt quality stone without irregularities. Excellent quality flaking material. Termed "fine siltstone."

Variety B - a multicolored, siltstone with textures slightly coarser and less homogenous than *Variety A*. Excellent to very good flaking quality. Termed "coarse siltstone."

Chert: a form of cryptocrystalline silica associated with marine deposits. Lusters are usually subvitreous.

Fossiliferous Chert - material containing evidence of oolites. Variable textures from fine to very fine. Occurs in white, off-white, yellow, and purple-brown colors. The rare inclusions allow excellent to good flaking qualities.

Variety A - a purple-mottled chert; speckled purple-gray material without inclusions. Very fine, homogenous texture. Excellent flaking quality. Termed "purple chert."

Variety B - smooth homogenous textures. Colors resemble butterscotch to "paleopink"/orangish of Washington Pass Chert. Apparently occurs in small nodules about the size of "Apache Tears." Excellent flaking quality. Termed "waxy chert." This may be Nelson et al. (1982:200) "jasper."

Chalcedony: a form of cryptocrystalline silica associated with ground water deposits. Chalcedony is normally transparent clear to white but includes black inpurities. Luster is vitreous.

Variety A - agate. A very fine grained banded chalcedony. Pink, oranges, whites. Excellent flaking quality.

Variety B - white chalcedony. A variable quality material from translucent opaline to opaque. Slightly granular in appearance. Some irregularities in mass make for a variable but generally good quality flaking material.

Variety C - mutlicolored general chalcedony with inclusions as above.

Quartz: white-banded quartz of poor flaking quality.

Obsidian: black volcanic glass. Translucent or opaque. Excellent flaking qualities.

Indeterminate: unknown chert-like group, similar to welded tuffs and purple cherts in characteristics. Very good flaking quality

Lithic Indices

Carl Phagan and T. Hrelby (1985) developed the rational and comparative indices used in this report for examining flake morphology and possible differences in use by material and should be consulted for a complete discussion.

Mean Flake Length (L/W) - used as a functional assessment of general flake lengths within each material. Values >2.0 tend to be blades, between 1.0-2.0 may be characterized as long flakes, and <1.0 are flakes with widths greater than lengths. The TJ Ruin sample falls into the 1.0-2.0 range.

Relative Flake Width (W/Th) - values are relative, but higher scores indicate a wider, thinner group of flakes such as may be expected in later stages of biface production.

Flake Index (LxW/Thx10) - gives a general indication of technological control in the flaking process. High values represent large thin flakes with better fracture control.

Flake Size Index (LxW) - approximates relative flake sizes; high values (>5.0) indicate generally larger flakes.

The *Flake Index* and the *Flake Size Index* are normally divided by 100 if measures are to the nearest 0.1 millimeters but measurements in this report were rounded to the nearest millimeter so that 10 was used instead. A summary of these indices as used in the TJ Ruin sample suggest material types were not selected for different technologies.

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