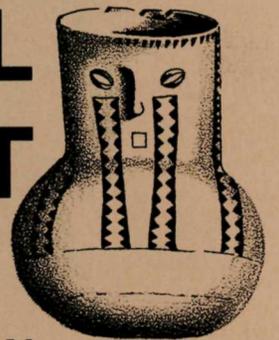


**SAGUARO
NATIONAL
MONUMENT**



An Archeological Overview

Saguaro National Monument An Archeological Overview



by
V. K. Pheriba Stacy
and
Julian Hayden
June 1975

**The Arizona Archeological Center
National Park Service**

Tucson, Arizona

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ACKNOWLEDGEMENTS

This overview could not have been written without the help of several people in Tucson, Arizona, whose assistance the author wishes to acknowledge. Richard Boyer, superintendent at Saguaro National Monument, encouraged the work in every way possible. Hal Coss, naturalist at the Monument's Headquarters Section, read and commented on the manuscript. Jim Martin, district ranger at the Tucson Mountains Section, read the manuscript, offered information for inclusion and guided the author on a tour of some archeological and historical resources in that section of the Monument.

Julian Hayden co-authored the overview, adding the valuable sections about the earliest prehistory of the Tucson Basin. His knowledge in this regard has made the report more accurate and more complete than it otherwise would have been. Sharon Urban, assistant archeologist at the Arizona State Museum, contributed the supplementary bibliography on Hohokam archeology and suggested sources of background information on the Tucson Basin's prehistory.

John Bancroft, editor at the Arizona Archeological Center, readied the manuscript for publication, with the typing load carried capably by Cris Bramley. Scott Clemens prepared the figures and table which illustrate the text.

ABSTRACT

A number of archeological surveys and excavations have been carried out within Saguaro National Monument near Tucson, Arizona, over the years, but the field work generally has been neither problem-oriented nor carried out in accordance with a suitable research design. Much of it, therefore, must be considered incomplete in terms of modern archeological theory and methods. Archeological activity both inside and outside the monument, however, has resulted in delineation of the cultural history for this area of southeastern Arizona. More research has been conducted outside the monument than within its boundaries. Research in both areas and the data generated are described and discussed in this overview.

Although archeological resources in the monument are of secondary importance in relation to a Saguaro cactus forest in park interpretation, preservation of its cultural resources is essential to further interpretation of Tucson Basin prehistory and ethnohistory. This is especially pressing in view of the destruction by land development, in the foothills and other areas surrounding the monument, of archeological resources which could help interpret the history of Piman speaking peoples and the prehistory of the area they occupy today.

Taking into consideration the natural and social forces now at work in the monument and in the surrounding area, it is recommended that primary importance be assigned to preservation of archeological resources within the monument, with research projects which would disturb these resources being approved only when the research will answer questions that cannot be answered by projects outside the monument. Specifically recommended for the monument are secure fencing or sealing off of dry cave sites, performance of an inventory archeological survey and expansion of the monument by purchase of land along Rincon Creek, thus enclosing the entire settlement system represented by the creek. It is further recommended that a settlement pattern approach, relating sites to topography and to localized natural resources, be utilized in conducting the inventory survey.

ENVIRONMENTAL SETTING

Saguaro National Monument is divided into two units: the Headquarters Section east of Tucson, Arizona, and the Tucson Mountains Section west of the city. Although separated by 35 miles, the sections possess similar topography, with a Saguaro cactus forest providing the unique orienting feature for park interpretation. Archeological sites constitute a secondary resource.

THE HEADQUARTERS SECTION. This portion includes the northern, southern and western slopes of the Tanque Verde Mountains, as well as the eastern and western slopes of the Rincon Mountains. Land elevations range from 2,980 feet to 8,666 feet above mean sea level. Approximately 98 square miles are incorporated within this section, including valley flats, bajadas, canyons and mountain slopes. Primary drainages are Rincon Creek, which lies within a half mile of the monument's southwestern corner, and Tanque Verde Creek, which lies within a quarter mile of the northwestern boundary. Only the headwaters of Rincon Creek are within the monument itself. The dominant vegetation is a Saguaro forest (*Carnegiea gigantea*), with associations of ocotillo, palo verde and cholla.

Archeological sites in this section are situated on the valley flats at the southwestern corner of the area and in the lower reaches of canyons on the slopes of the Tanque Verde and Rincon Mountains (see Fig. 1). Archeological surveys have not yet been performed on the higher mountain slopes to determine whether sites exist at higher elevations.

Historic land use has been dominated by mining on mountain slopes and foothills. All but one mine now are abandoned.

THE TUCSON MOUNTAINS SECTION. The western section of the monument occupies 30 square miles on the northwestern slopes of the Tucson Mountains. Land elevations range from 2,220 feet on the valley floor to 4,687 feet on Wasson Peak. The average upper range of elevation is 3,600 feet or below. The area includes valley flats, bajadas, canyons and mountain slopes, as does the eastern section of the monument.

There are no primary drainages within this section, although many arroyos, which drain into Brawley Wash west of the monument or into the Santa Cruz River east of the monument, originate in the mountains. The vegetation association is the same as that in the Headquarters Section.

Sites occupy the valley floor and the shallower parts of mountain canyons, but occur infrequently on the mountain slopes, according to Zahniser.

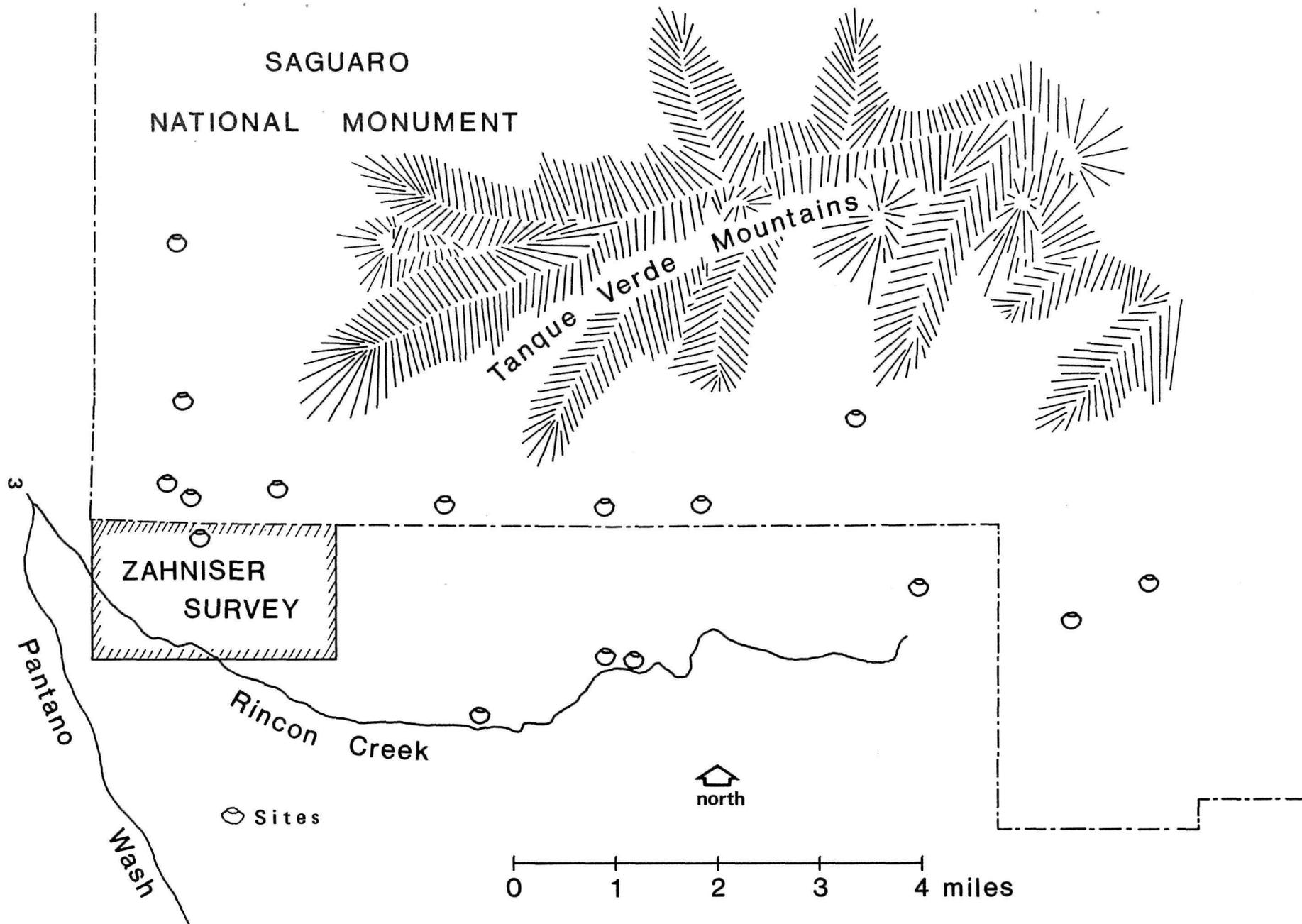


Fig. 1. Headquarters Section of Saguaro National Monument, showing selected sites and area included in Zahniser's survey

ETHNOGRAPHIC BACKGROUND

The earliest recorded use of the monument area in historic time was by Papago Indians from San Xavier del Bac. Hackenberg (1964: IV-134-142) notes that although the residents practiced irrigation agriculture, they continued seasonal gathering of supplementary wild vegetal foods. He documents mid-19th century Papago from San Xavier del Bac gathering cactus fruit from the lower slopes in the Tucson Mountains. He speculates (Hackenberg 1964: IV-157) that the San Xavier Papago may also have used the Santa Catalina and Rincon Mountains for cactus and agave gathering. If so, 19th century Papago use of the monument area would have come from a single settlement during the spring and summer months, when these food supplies matured. The ability to trace land use to a specific settlement increases the possibility of ethno-archeological interpretations for the use of monument lands.

That two Papago families now pick Saguaro fruit in July in the Tucson Mountains demonstrates continuity in a land use pattern from the mid-19th century to the late 20th century. Campsite locations for Saguaro harvesting are evidenced by the presence of temporary shelters, Papago pottery and modern trash. Papago harvesting rights to this area probably have their roots in prehistoric patterns of land use.

Historical use of the monument by non-Indian groups has been confined to mining and grazing. There are numerous mining prospects and test shafts in both monument sections.

Three historic sites within the monument have been nominated for inclusion in the National Register of Historic Places. These are the Manning Cabin, the Freeman Homestead and two lime kilns. No published references to these sites exist.

ARCHEOLOGICAL RESEARCH OUTSIDE THE MONUMENT

Archeological resources within Saguaro National Monument can be evaluated for significance only within a framework of prehistory in southern Arizona, specifically in the area immediately surrounding the monument.

THE HOHOKAM CULTURE IN THE GILA BASIN. Archeological studies in southern Arizona have utilized survey and excavation to provide the chronological and cultural framework for analysis of individual sites. The earliest studies, accomplished in the 1920s and 1930s, were oriented toward building a chronological sequence for the cultural development of the area's prehistoric inhabitants. The first sequence (see Table 1) was defined for the Gila Basin by excavation at Snaketown (see Figure 2), an archeological site on the Gila River (Gladwin et. al., 1965). This was an intensive excavation, sampling all phases of occupation at the site. Snaketown provided the first definition of the Hohokam culture as a subsistence adaptation to sedentary riverine farming in the Gila and Salt river valleys, with the use of canals as a water control device.

More recent excavation at Snaketown (Haury, in press) provided the knowledge that the riverine Hohokam development began about 300 B.C., with canal irrigation already fully developed as an agricultural technique. This excavation confirmed the results of the first project regarding modifications through time in pottery, architecture and other items of material culture. These resulted from localized stylistic change, as well as from increasingly intensive contacts with Mesoamerican cultures. The orientation of the Snaketown studies was cultural-historical, emphasizing cultural development and change through time as reflected in artifacts.

An intensive archeological survey, sponsored by Model Cities and the National Park Service, has recorded about 40 sites on the Gila River Indian Reservation. Some 92,000 acres have been surveyed, including the Gila River flood plain and the mountain foothills. This approach will allow observation of settlement locations through time in relation to the landscape. It also will allow formation of problems to be solved by future research.

As research in southern Arizona expanded to areas beyond the Gila Basin, it became apparent that Hohokam occupation extended beyond the major river valleys. Workers in the Tucson Basin and in the Sonoran Desert area west of Tucson, an area known as the Papagueria (see Figure 2), found regional differences in the Hohokam culture

| TUCSON SEQUENCE | | | GILA BASIN SEQUENCE | | PERIOD | | |
|-----------------|-----------------------------|----------------------|-------------------------|---------------------|-------------|-----------|---------|
| PHASE | POTTERY STYLES | | POTTERY STYLES | | | PHASE | |
| Tucson | Pantano Red on brown | Tucson Polychrome | Tonto Polychrome | Tonto Polychrome | Civano | Classic | 1400 AD |
| Tanque Verde | Tanque Verde Red on brown | | Casa Grande Red on buff | | Soho | | 1300 AD |
| Rincon | Rincon Red on brown | | Sacaton Red on buff | | Sacaton | Sedentary | 1200 AD |
| Rillito | Rillito Red on brown | | Santa Cruz Red on buff | | Santa Cruz | Colonial | 900 AD |
| Canada del Oro | Canada del Oro Red on brown | | Gila Butte Red on buff | | Gila Butte | | 500 AD |
| Snake-town | Snaketown Red on buff | | | | Snake-town | Pioneer | |
| Sweet-water | Sweetwater Red on gray | | Sweetwater Grooved | | Sweet-water | | |
| Estrella | Estrella Red on gray | Estrella Grooved | Vahki Plain | | Estrella | | |
| Vahki | Vahki Plain | | | | Vahki | | |

Table 1. Hohokam Pottery Sequence (after Fontana et. al. 1962:86)

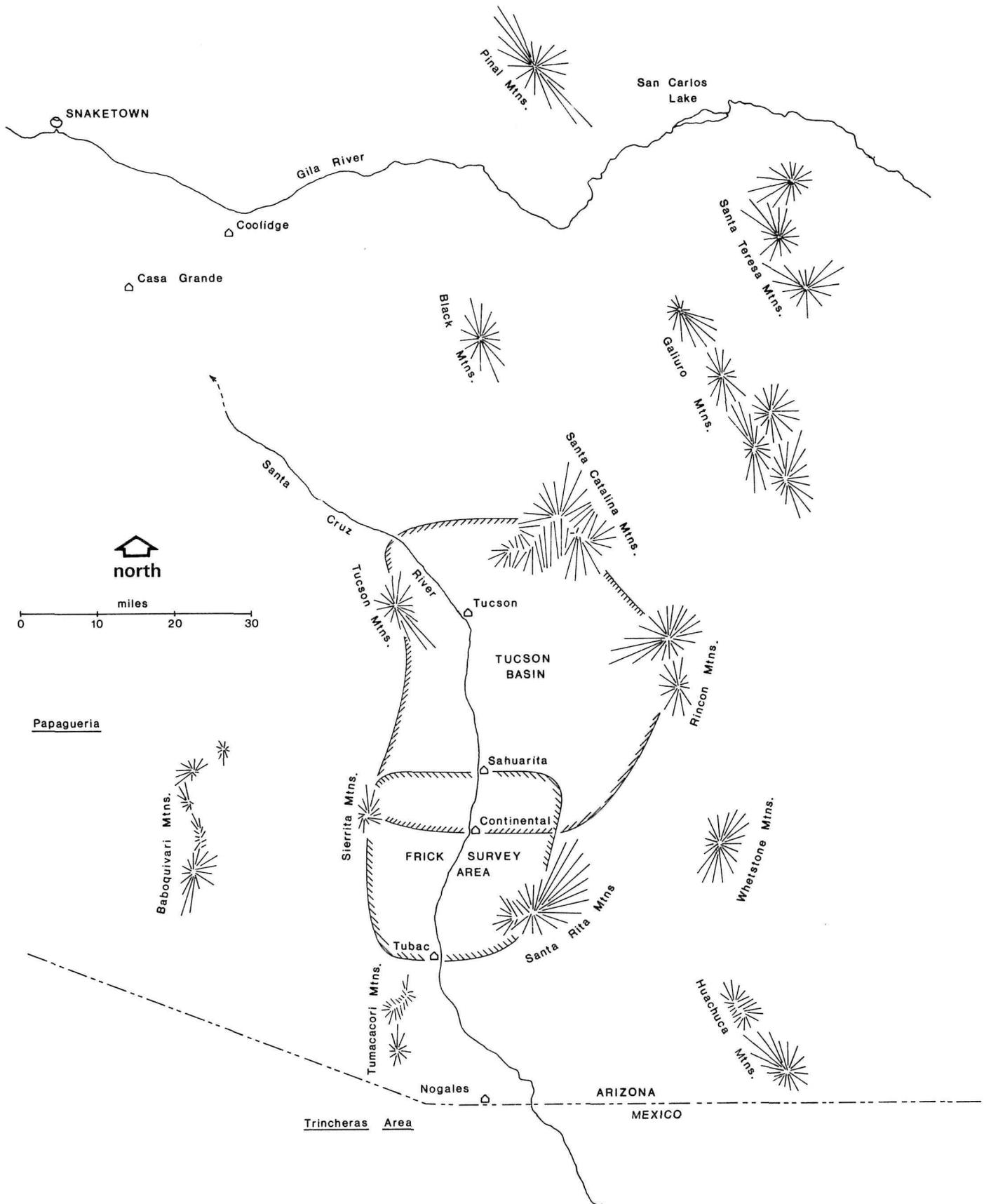


Fig. 2. Southern Arizona, showing the Gila River and Snaketown; the Tucson Basin; Frick's Survey Area, and the Papageria

based on the tenuous availability there of groundwater resources. This contrasted with the perennially available supplies in the Gila and Salt River valleys. The differences are reflected in settlement size and location and in stylistic differences in the pottery and architecture of the people who occupied the settlements.

THE HOHOKAM CULTURE IN THE DESERT PAPAGUERIA. The lack of constantly available water at any one site prompted prehistoric subsistence and settlement adaptations here which differed radically from those found in the river valleys. The Papageria, which stretches from Tucson to Ajo (Arizona), contains no perennial streams or rivers and very few perennial springs. Water is available seasonally at various locations, however, and the historic Papago Indian inhabitants adopted a method of shifting settlement location semi-annually to take advantage of ephemeral water supplies and of seasonally maturing wild plant foods.

No site has provided a detailed chronological and cultural sequence for the Papageria. However, excavation at Ventana Cave (Haury 1950) produced stratified information that an earlier preceramic occupation was followed by later ceramic phases and that these were followed by a historic occupation. Additional prehistoric ceramic phases were defined by excavation at Talshni Village (Withers 1941) and at Jackrabbit Ruin (Scantling 1939, 1940).

The three excavations cited above were planned with an emphasis on delineating the chronological development of Papagerian culture history. More recent projects on the Papago Indian Reservation have provided a chance to view settlement patterning in relation to the landscape and to emphasize in-depth analysis of single sites to reveal activity centers within them. An archeological survey of BIA road construction projects on the Papago Reservation has provided an opportunity to observe a series of archeological transects across the Papageria. Results of the survey included a better understanding of settlement-to-landscape relationships through time, a more complete inventory of the kinds of archeological remains in the Papageria and the opportunity to observe variation in past activities at single sites, provided by test excavation in the project right-of-way.

A four-year project at Santa Rosa Wash, a proposed dam location on the northern periphery of the Papageria, is sponsored by the Arizona State Museum. The study has progressed from archeological survey, which located prehistoric and historic settlements, through a stage of problem formulation for future research and into interpretation of inter-site and intra-site activities from data gathered by survey and excavation. As research progresses, evidence is emerging which indicates that the red-on-brown painted ceramics in the Papageria may indicate a stronger cultural connection with the area immediately to the south, rather than with the riverine Hohokam.

THE HOHOKAM CULTURE IN THE TUCSON BASIN. Saguaro National Monument archeologically is part of the Tucson Basin (see Figure 2). The Tucson Basin includes the central and lower Santa Cruz River Valley. It is bisected by the Santa Cruz River and bounded by the Santa Catalina Mountains on the north, the Tucson Mountains on the west, the Sierrita Mountains on the southwest, the Santa Rita Mountains on the south, the Empire Mountains on the southeast, and the Rincon Mountains on the east (see Figures 2 and 3).

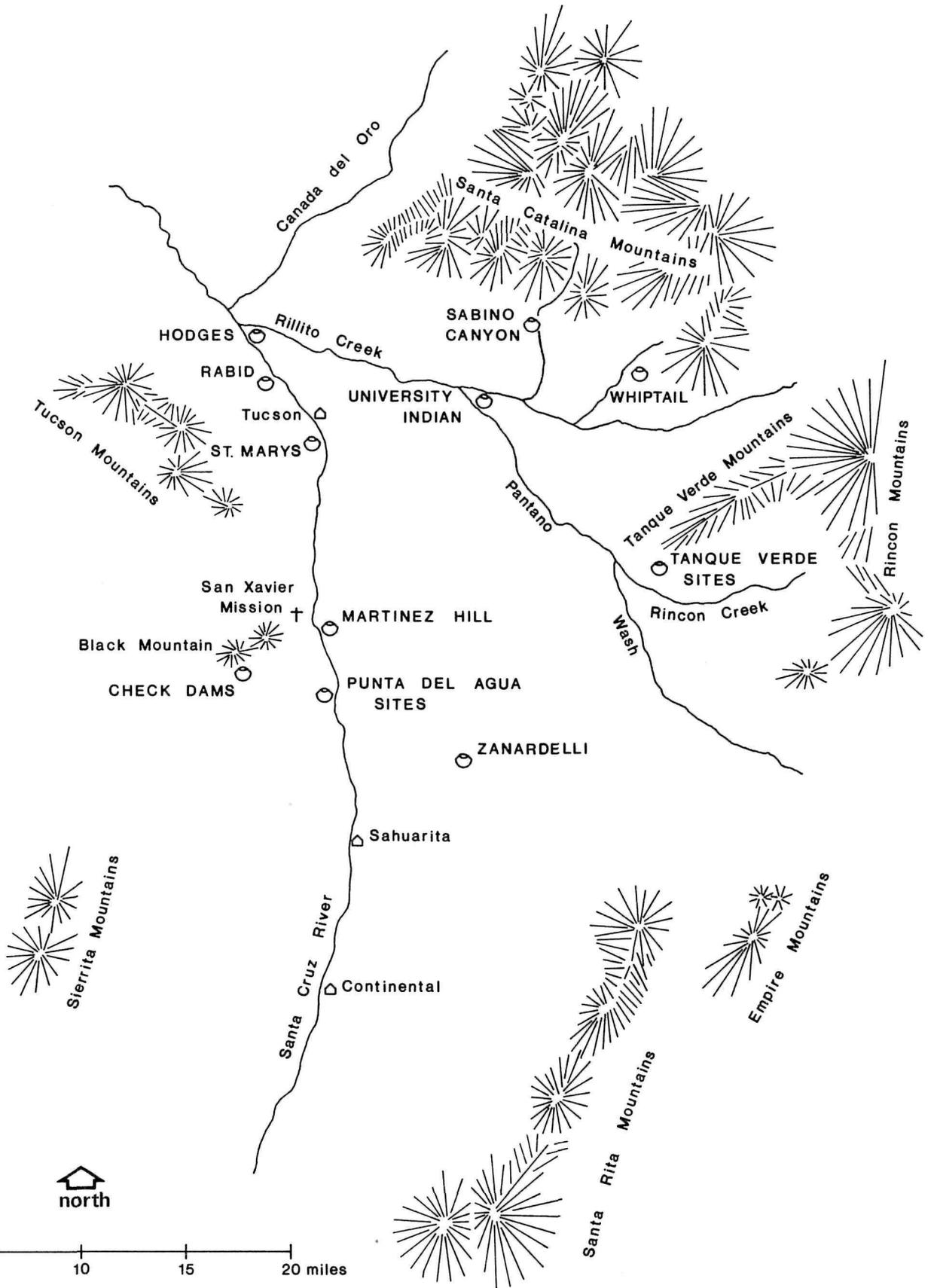


Fig. 3. The Tucson Basin, showing important sites

Archeological sites in the Tucson Basin basically are riverine, oriented around the Santa Cruz River and its tributaries. Additional sites occupy lower reaches of mountain canyons and foothills of mountain ranges. Tucson Basin culture history shows a sequence of development partially related to the Gila Basin and partially related to northern Mexico and the Papaguera. This area represents a Hohokam adaptation in a tributary of the Gila-Salt drainage. Interpretation of Tucson Basin archeology is based both on survey and on excavation. The chronological and cultural framework for the Santa Cruz and Rincon valleys, crucial for interpretation of monument prehistory, was established by four surveys and four excavations, none of them intensive.

SUMMARY OF TUCSON BASIN PREHISTORY. Ceramics oriented archeologists have paid little attention to the preceramic remains of the Tucson Basin, but lithic remains from this period are found throughout the area. The remains are from both the Pluvial Period occupation of the San Dieguito complex, Phase I (prior to 800-900 B.P.), and the Amargosan occupation, which began at the end of the Altithermal Period (5000 B.P.) and has lasted into historic times in the form of the Pima and Papago.

M.J. Rogers surveyed the San Dieguito remains of the Pantano and Rillito drainages in 1958 and found trails, sleeping circles, shrines and tools along the stream terraces (Rogers 1958). Sites in some cases were being destroyed by recession of the terraces. While sites generally belonged to Phase I, Rogers found that incipient Phase II tools occurred at the mouths of canyons, as was the case at Box Canyon. This led him to believe that the San Dieguito folk had retreated to the higher canyon entrances with the increasing drought of the Altithermal Period.

Rogers suggested that there was no Altithermal hiatus between the San Dieguito and Amargosan occupations here, but newer evidence argues a difference in oxidation, or surface alteration, between the tools of the two complexes. The hiatus, however, may have been shorter here than in Organ Pipe Cactus National Monument, for example, due to the higher elevation of the Tucson Basin.

Preceramic remains are plentiful along the terraces flanking the Santa Cruz River south to the Mexican border. These include extensive evidence for San Dieguito Phase I occupation, as well as for both ceramic and preceramic Amargosan occupation. In the Tanque Verde drainage, burials covered by caliche encrusted metates were found on a low spur of the lower terrace. The burials probably are of Chiricahua phase. Basin metates of the same phase, also encrusted with caliche, were found in a similar location in the Pantano drainage. These Amargosa I tools were mentioned by Harden (1958: 168), who found similar caliche covered tools at the University Indian Ruin. The west terrace of the Santa Cruz from below Tucson to Point of Rocks also bear Amargosa Phase I tools and flakes.

In short, during Pluvial and preceramic Medithermal times the Tucson Basin was exploited thoroughly by hunters and gatherers of both the San Dieguito and the Amargosa complexes.

Occupation from A.D. 300 to 500 is represented by the presence of ceramics and pithouses of the Snaketown phase at the Hodges site. This earlier evidence has not been repeated at other sites, with the exception of some Snaketown Red-on-buff sherds at the Punta de Agua sites.

By A.D. 500, the Canada del Oro phase is represented at the Hodges site and at the Punta de Agua sites, largely by the presence of sherds. Sedentary village sites first become the norm during the Rillito and Rincon phases (A.D. 700-900 and A.D. 900-1200, respectively). This time period saw a significant number of small villages placed along primary and secondary drainages in the Tucson Basin. During the Rillito phase, there were more small villages located in secondary drainages than in the primary drainage of the Santa Cruz River. The Rincon phase is characterized by settlements throughout the valley, in both primary and secondary drainages. All had shallow, rectangular pithouses and a red-on-brown pottery style. The villages also contained numerous grinding implements for processing plant foods, probably both wild and domesticated.

The Classic Period in the Tucson Basin is represented by two phases: the Tanque Verde (A.D. 1200 to 1300) and the Tucson (A.D. 1300 to 1500). These phases represented times of change in architecture and in ceramics and most archeological survey and excavation in the Tucson Basin has concentrated on them.

During the Tanque Verde phase, pottery decoration became quite different from that of the earlier phases, emphasizing rectilinear design elements rather than the earlier curvilinear and repetitive motifs.

In the Tucson phase, other styles of ceramic decoration appeared, including Tucson Polychrome and Tonto Polychrome. This change was accompanied by introduction of a new architectural style consisting of rectangular, multi-roomed adobe structures standing entirely above the ground surface. This contrasts with the single-room pithouses of earlier phases. Burial of the dead shifted from cremation to inhumation. The sites most characteristic of this late period are the Martinez Hill Site and University Indian Ruin (see Figure 3). The abrupt changes often are attributed to an alien population, for which the terms "Salado occupation" or "Salado influence" have been used.

No sites representative of the period from A.D. 1400 to the Spanish entrada into the Santa Cruz Valley have been located. The large Tucson phase villages appear to have been abandoned, but the archeological record does not indicate how the prehistoric inhabitants of the Tucson Basin became the 16th century Indian groups contacted by Father Kino.

ARCHEOLOGICAL SURVEYS. Archeological survey provides a framework for analysis and interpretation of individual sites. Surveys give an overview of the kinds of archeological resources in a region, thereby providing a data base for formulation of future research problems. The site descriptions and locations provided in a survey report give a range of choices where further work, either survey or excavation, may be accomplished.

In 1937, E. B. Danson surveyed the upper Santa Cruz River Valley from its origin in southern Arizona into the State of Sonora, Mexico, and north to Tubac, Arizona. The purpose of that survey (Danson 1937: iii) was ". . . to present the archeology of the region in general and to define its relations with contiguous regions." The primary orientation was chronological and culture historical, but some attention was given to placement of the various kinds of sites on the landscape and to changes

in topographic features used for settlement through time. In addition, Danson mentioned the possibility of local variation between sites in the San Rafael Valley and those in the Santa Cruz Valley, but he did not address himself further to that question. He attempted functional differentiation of sites by size and artifact content, but no attention was given to variation between areas where different activities occurred within sites. In the absence of painted ceramics, plainware sites were assumed to be early, an invalid assumption. He dated occupation of this portion of the valley from A.D. 800 to 1400.

The survey area included both sides of the Santa Cruz River for a distance of 30 miles, between its headwaters and Tubac. The survey was accomplished "... on foot, on horseback, and by car, and the land surveyed, although for the most part lying directly on either side of the river, ran back in some places into the mountains, and followed a few tributary streams for some distance."

There is no statement about intensity of the survey or extent of the area covered and there is no map plotting sites or showing areas surveyed. Danson (1937) stated that two types of sites were omitted from the survey. These were Trincheras sites like those reported by Sauer and Brand (1931) and Early Man sites. He does not state whether the omission meant that he did not record those sites on mesas associated with polychrome pottery or the walled sites on hills associated with plainwares. The term Trincheras has been applied to both (Sauer and Brand 1931).

Danson gave cursory treatment to historic sites indicative of Spanish and Anglo-American occupation in the survey area, although a fuller treatment describing sites and site locations would have been desirable.

With Danson as project advisor, Paul Frick surveyed the central Santa Cruz Valley from Tubac to Sahuarita, a distance of 26.6 miles (see Figure 2). The purpose of that survey, as stated by Frick (1954:7), was to obtain data to assess "...the nature of archeological remains in an unknown area, the chronology of the sites, and the correlation of the sites with the known archeology of the surrounding areas." Frick also hoped that his survey would provide a guide for more comprehensive research.

The survey included only areas accessible by vehicle roads. This allowed access to the flood plains and river terraces on both sides of the river, but excluded most of the mountain foothills. Sites were reported on Arizona State Museum survey cards and a representative sample of the artifact types was collected from each site and deposited in the Arizona State Museum. Excavation was not part of the project.

To complete the survey, Frick devoted "... weekends and holidays during the spring and fall terms of 1952 and the spring term of 1953" to his work, completing the survey in July 1953. He located 216 sites, which he classified as sherd areas, compounds and mesa-top rock enclosures. These sites fell within the Rillito, Rincon, Tanque Verde and Tucson phases of the Tucson Basin Hohokam chronology (Frick 1954). Most of the sites were located on the lower terrace above the river, most were Rillito phase and most were sherd areas. Fewer sites were located in the mountain foothills than on the flood plain and most were Rillito or Rincon phase. The recording of fewer sites in the foothills may have been due to the limited access mentioned above.

Frick did not include a map of the exact area surveyed, nor did he make any statement about the area covered or the intensity of coverage. He provided neither a list nor a description of sites in the survey report. Frick's survey is reported as a masters thesis at the University of Arizona.

The third area survey was performed by Jack L. Zahniser in 1964 in the Rincon Valley southeast of Tucson. The survey accompanied excavation of a single site, Arizona BB:14:24, adjacent to the Tanque Verde Ruin, the type site for the Tanque Verde phase in the Tucson Basin. Goals for the project were stated by Zahniser (1966:14) as follows, in order of diminishing importance: to provide a site report for Arizona BB:14:24, which was located on land for sale, and to incorporate the information about excavation of the Tanque Verde Ruin; to accomplish a survey which would provide a statement about prehistoric occupation of the area surrounding the two sites, and to offer a comprehensive statement about the Tanque Verde phase.

Zahniser wanted to determine how many known sites existed within a few miles of his excavation. All sites previously recorded in the vicinity of the excavation were within a 10-mile radius of Arizona BB:14:24, but Zahniser's survey was more restricted in area. He limited his survey to the kinds of ridges on which his site and the Tanque Verde Ruin were located, later stating that "this survey can be considered complete for sections 8 and 9 of township 15 south, range 16 east" (see Figure 1). This would indicate that the survey area comprised 2 square miles adjacent to Arizona BB:14:24. This survey area takes in the southwestern corner of the Headquarters Section of the monument, but he provides no map. He stated (personal communication, 1974) that the survey required about eight months for completion.

Survey procedures were modified to accommodate "the unusual terrain and the area to be covered in the time available" (Zahniser 1966:170). He stated that sherds could not be collected on the basis of terrain because a single occupational unit often extended across several ridges. Collections, therefore, were made ". . . from places where they seemed most abundant (usually, but not always, from only one ridge)." Artifact clusters, each plotted on a USGS topographic map, later were grouped as sites on the basis of pottery analysis.

Zahniser demonstrated a research bias by concentrating on Tanque Verde material, but his report represented the phase affinity of the majority of the sites. In addition to Tanque Verde phase sites, he noted seven ceramic concentrations where Rincon or Rillito phase ceramics were present, the presence of Colonial Hohokam ceramics at the Freeman Site (Arizona BB:14:3) and one site indicating preceramic occupation of the Rincon Valley. Zahniser notes (1966:172) that "the Tanque Verde occupation is the only one about which there is sufficient information based on survey and excavation."

Zahniser expressed an interest in intra-site continuity and development in a chronological sense (1966:173), but attempted no intra-site studies, such as definitions of activity areas within single sites.

Zahniser presents a further bias in giving attention only to ceramics. Lithics and other artifacts are not well discussed in the survey report, nor are intra-site features mentioned.

A settlement pattern approach to the Tanque Verde phase would have been a more fruitful research emphasis. This approach would have necessitated detailed recording of every site, with listing of attributes including artifacts, features, measurements and location relative to the landscape and to other sites. A report of the survey and site excavation exists in published form and as a masters thesis at the University of Arizona.

In 1973, a 3-mile survey of a proposed sewage interceptor route in and around Tucson was done by Gordon Fritz under contract with the Arizona State Museum (see Figure 4). Fritz reported 18 new sites in the proposed right-of-way, for which mitigation involved a combination of project realignment and archeological field research.

The survey was designed to evaluate the research potential of archeological resources in the project area using the organizational framework of cultural ecology. The survey was in progress from October 22, 1973, through November 16, 1973, and from February 21, 1974, through February 28, 1974. A total of 231 man-hours was spent in the field, walking the project right-of-way. Each site located was recorded on an Arizona State Museum survey form. Artifacts were not collected, except for typological identification. Areas not surveyed along the right-of-way were those "which showed no evidence of natural soil" (Fritz 1974:3). The report recommended \$16,730 be allotted for mitigation of impact on archeological resources, but the report includes no justification for the recommended mitigative procedures. Also omitted was a summary of survey results.

The survey confirmed the existence of Rillito, Rincon, Tanque Verde and Tucson phase sites in the project area and pointed out unique research potential at several sites in the vicinity of the Hodges site, where canals and agricultural terraces were located.

All of these surveys have been designed with a chronological orientation to data collection and thus have not fulfilled the research potential offered by the techniques of archeological survey. A settlement pattern approach would have allowed for pulling the survey data together into a meaningful unit by dealing with the variables of environment, subsistence and settlement through time in a single region.

Ideally, an archeological survey should provide an overview of human use of an area through time. This overview then becomes useful as a predictive device for forming future research plans to answer questions generated from the survey results. Fritz attempted this approach, but was unable to use it fully because the project area was linear.

To produce such an overview, several things are required of the archeologist. First is a detailed record of each site encountered, noting artifacts of all kinds, features, site size, vegetation cover and situation with reference to topography. Third is a listing of sites with phase designations so that chronological differences in settlement location and configuration can be keyed into the map. The archeologist must record with the same attention to detail every site, regardless of size, content, chronological period or cultural affiliation. Specific research interests in a particular phase or in a particular kind of site later can be extracted from survey data.

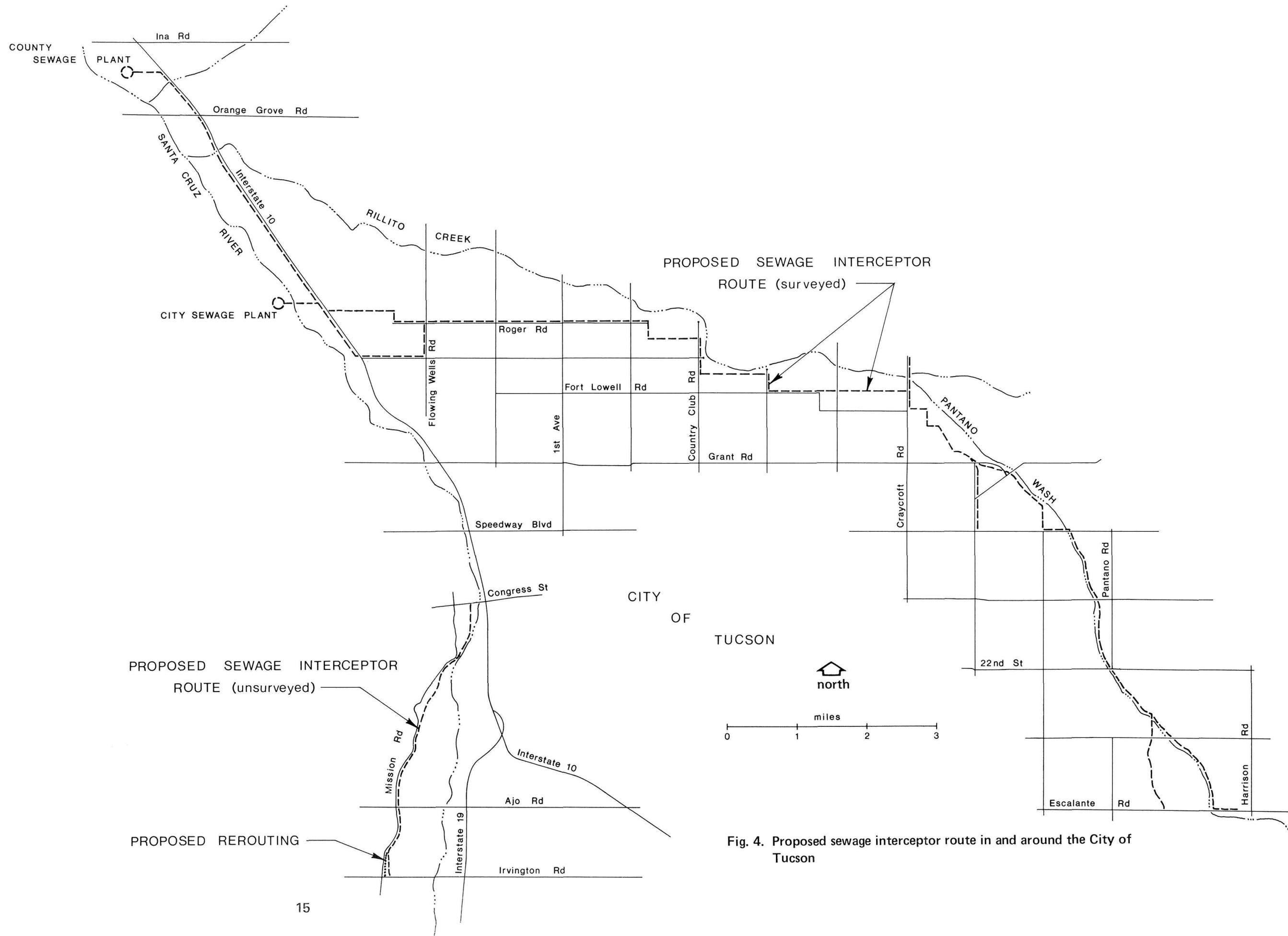


Fig. 4. Proposed sewage interceptor route in and around the City of Tucson

Three of the four surveys discussed above share inadequacies. First, each had a chronological bias in data collection, emphasizing decorated ceramics as the only attribute worth recording at each site. Second, maps of areas surveyed and site locations either were absent from the survey report or were not sufficiently detailed to inform the reader of the project's accomplishments. Third, none of the reports presents a series of site descriptions adequate for use by other researchers, nor are the series of site cards and collections deposited in curatorial institutions sufficiently complete for use by others. Fourth, each surveyor recorded only a portion of the archeological data present in his survey area, in each case being biased either by ease of access to certain topographic features or by allegiance to a research problem at a fixed point in space and time. No author approached his study area with a research design for stratifying and sampling the environmental and cultural universe represented by his study area. In no case is the survey report usable by another researcher with a different problem orientation. Each could have been made more useful through creation of a sampling design for data recovery and by more intensive and more consistent recording.

ARCHEOLOGICAL EXCAVATIONS. Excavation of individual sites has provided definitions for the chronological and cultural phases of the Tucson Basin sequence. The sites which provided phase definitions are called type sites. In the Tucson Basin (see Figure 3), the Hodges site is the type site for the earliest phases. The Tanque Verde Ruin provided the type description for the Tanque Verde phase and the University Indian Ruin became the type site for the Tucson phase. Other site excavations provided additional data for one or more of the phases in the Tucson Basin sequence.

The early phases of the Tucson Basin sequence, from the Pioneer Hohokam Period through the Rincon phase, were established after excavation of the Hodges site (Arizona AA:12:18) on the Santa Cruz River northwest of Tucson. However, phases earlier than Sweetwater phase are not securely established at the Hodges site. Excavation was begun by Carl Miller in 1936 and continued in 1937 and 1938, sponsored by Gila Pueblo and field directed by Isabel Kelly. The report for that site never was completed, but James Officer compiled and revised Kelly's field notes (Kelly 1961). In his introduction he stated (Kelly 1961:6) that excavation of the site provided a good cross section of Tanque Verde phase material culture, as well as dates for that phase. Gila Basin ceramics, from Vahki through Snaketown phases (see Table 1), were found in stratified context validating the existence of all phases of the Pioneer Period of the Gila Basin sequence in the Tucson Basin. Kelly also defined Canada del Oro, Rillito and Rincon phases at the Hodges site on the basis of ceramics connected with pithouse architecture.

An earlier excavation at the Tanque Verde Ruin (Arizona BB:14:1) had established the existence of a Tanque Verde phase in the Tucson Basin. The site is located on the southwestern slopes of the Tanque Verde Mountains east of Tucson. Fraps (1935) reports that about half the site was excavated by graduate students supervised by Byron Cummings in a few week's work. The project excavated 12 rooms of a pithouse village. Emphasis was on ceramics and architecture as chronological indices.

Like the Hodges site, data about Tanque Verde Ruin exists in the form of unpublished field notes (Haury 1927), in a manuscript (Haury 1928) and in a short published report (Fraps 1935).

Since the sites are recorded only as field notes or as brief summaries of data gathered from excavation, it is impossible to make a statement about time allotted for excavation or actual portions of work done on the sites.

For excavation, the Hodges site was gridded at 25m intervals and test pits were placed within this system. Work was concentrated on clearing houses after tests produced no evidence of chronologically significant stratigraphy at the site. Ceramics associated with architectural units provided the major contribution of the project, the phase definitions for the early part of the Tucson Basin sequence. Occupation of the site did not extend into the Tucson phase, as evidenced by the absence of Salado Polychromes. Officer's revision of Kelly's notes exists in manuscript form at the Arizona State Museum Library, dated 1938.

Excavations at University Indian Ruin (Arizona BB:9:33) provided the type description for the Tucson phase, the final prehistoric time period in the Tucson Basin sequence. The site, which served many years as a field training area for archeology students at the University of Arizona, is 8 miles northeast of Tucson on Pantano Wash.

In 1940, the National Park Service sponsored field work directed and reported by Julian Hayden. Work was accomplished in two areas of the site. In the village area, nine rooms and five courts were excavated. In the large mound, 13 rooms, four enclosures and several other kinds of features were excavated. The village area represented only a portion of the time span encompassed within the mound. The mound's excavation provided a sequence of architectural changes from pithouses to contiguous room pueblos. In addition, the mound's strata provided the ceramics and architecture used for defining the Tucson phase, including the polychrome ceramics indicative of the phase.

Hayden stated (1957:47) that "somewhat more than the south one-third of the mound was opened completely, or opened sufficiently to secure details of stratigraphy and wall relationships." Time spent on the excavation itself was three months and two weeks, while report writing occupied four months. The project was completed in 1942. Excavation techniques included trenching across the village area and the mound to locate structures, after which rooms were excavated as units. The northwestern and western limits of the site were not excavated. The site was compared with Casa Grande Ruin and with the archeological resources of the Salt River Valley for chronological and cultural equivalence.

William H. Kelly (1936) reports that by 1936, 17 rooms, comprising Group One at the site, had been excavated over a three-year period by students in archeology at the University of Arizona. This work was limited to the south side of the site. At the time of Kelly's article, excavation was in progress on the site's east side.

In 1965 and 1966, James Sciscenti and J. Cameron Greenleaf excavated portions

of four sites in the construction right-of-way or in borrow pit areas for Interstate 19 south of Tucson. The excavated sites and four that were not in the right-of-way appear to form a settlement unit. The sites are composed of a series of low trash mounds adjacent to pithouses. The unexcavated sites are Arizona BB:13:42, Arizona BB:13:44, Arizona BB:13:45, and Arizona BB:13:48. The sites excavated were Arizona BB:13:16, Arizona BB:13:41, Arizona BB:13:43, and Arizona BB:13:50. The entire complex is named Punta del Agua, taking the name of the ranch which operated near the sites from the late 19th century to the early 20th. The complex lies 2.5 miles south of San Xavier Mission along Interstate 19 on the terraces above the Santa Cruz River.

Excavation at the sites revealed that each represents occupation from the Canada del Oro phase through the Tanque Verde phase, with ceramics indicating that the main occupation was during the Rincon phase at each site. Excavation exposed groupings of 5 to 10 pithouses, believed to represent settlement units within sites. The excavation also produced two new ceramic types, which may be transitional between Rincon and Tanque Verde phases. These are a late Rincon Red-on-Brown and a Rincon Polychrome.

Since the series of excavations was a project in archeological salvage, only those portions of the sites in the construction right-of-way could be excavated. The excavation was accomplished in two seasons of work. The first, from June to September 1965, was directed by Sciscenti. The second, from December 1965 through March 1966, was directed by Greenleaf. Total excavation time was seven months. Further information was unavailable at the time of writing this overview, but a publication is in preparation.

Zahniser (1966) excavated Arizona BB:14:24 in conjunction with his survey of Tanque Verde phase sites in the Rincon Valley. The site is adjacent to Tanque Verde Ruin (Arizona BB:14:10) and belonged to the same phase.

The purpose of the excavation was to extend knowledge about Tanque Verde Ruin and adjacent sites and, therefore, about the Tanque Verde phase. A site map shows three exploratory trenches and pithouses located by each trenching operation. The majority of the time was devoted to excavation of five pithouses. Zahniser states (1965:124) that the fill of three houses was not completely removed and that no fill was screened. The excavation produced Tanque Verde phase ceramics, manos, hammer stones and marine shells. Zahniser provides no statement about time spent on the excavation.

Thomas Hemmings (1969) reported salvage excavation in a site 5 miles south of Tucson on the Santa Cruz River. The site (Arizona BB:13:4) dated from the Rincon and Tanque Verde phases (A.D. 900 to 1300), as evidenced by ceramics.

The site was eroding out of the river bank and construction of a highway bridge and borrow pit road already had destroyed much of it. Hemmings provides no statement about intensity or area of coverage. The excavation was concerned only with removal from the site of four burials and cremations. Rock-filled hearths were observed at the site, but were not excavated. No house floors were located.

The Zanardelli site (Arizona BB:13:12), 14 miles south of Tucson, is in the flood plain of the Santa Cruz River. The site was excavated by archeology students at the University of Arizona under the supervision of Barton Wright and Rex Gerald (1950). The research orientation was chronological, with a stated goal of finding the occupation date for the structure contained in the mound. The site was approached by a stratitest in the mound, which produced a pithouse and ceramics dating from the Tanque Verde and Tucson phases. The only excavation attempted was salvage of the pithouse, which produced Tanque Verde phase ceramics.

Excavation at Whiptail Ruin (Arizona BB:10:3) was accomplished by members of the Arizona Archeological and Historical Society, under the direction of Paul F. Grebinger. The site is located on a bajada at the foot of the Agua Caliente Hills, 20 miles from the Hodges site. Excavation of the 60-acre site was planned so that most parts were sampled. The site has only Tanque Verde phase occupation, with no underlying Sedentary Period nor overlying Classic Period. The site appears to predate the appearance of Gila Polychrome and includes many Tanque Verde phase pithouses. Since there is no report on the site, statements cannot be made about the amount of the site excavated nor about the time spent in the excavation and write-up.

There is no report for Rabid Ruin (Arizona AA:12:46). It was excavated as a highway salvage project in a proposed borrow area, under the direction of Laurens Hammack of the Arizona State Museum. Rabid Ruin is 2 miles south of the Hodges site on an upper terrace above the Santa Cruz River.

Excavation proceeded on weekends for a period of two or three months in 1968. Principle results of the work were 50 primary cremations with beads and projectile points. Two pithouses were located and one has been archeo-magnetic dated, but that date is not readily available. The site primarily is Tanque Verde phase. There were Gila Polychrome ceramics on the site, but they were not associated with the area excavated.

There are no site reports for St. Mary's Ruin at the base of Tumamoc Hill, nor for the Sabino Canyon Ruin in the foothills of the Santa Catalina Mountains (see Figure 3).

Excavation in Tucson phase sites or sites having a Tucson component are minimal. University Indian Ruin provided the phase description and the Zanardelli site provided some additional information about the phase.

A third excavation is that performed by Norman Gabel (1931) at Martinez Hill (Arizona BB:13:3). This site is 17 miles south of the Hodges site. Although the excavation was done earlier than that at University Indian Ruin, Gabel did not describe a new phase as the result of his excavation. The site is near San Xavier del Bac Mission south of Tucson, a half mile east of the Santa Cruz River.

The excavation was performed with a chronological and cultural orientation to

provide information about a hitherto unknown area. Emphasis throughout excavation and analysis was on ceramics and architectural styles. Excavation was confined to three of seven adobe room blocks, which represented only the occupation during which contiguous room surface structures were built. Once structures were located, excavation proceeded by room units within each structure. Techniques employed in excavation, analysis and interpretation were not discussed in the site report. The ceramics in the excavated area were Tucson Polychromes and Red-on-Brown.

All prehistoric site excavations in the Tucson Basin have involved sites late in the chronological sequence of the area. These appear to represent the majority site in the Santa Cruz drainage. No excavation to date has considered settlement location or intra-site activity areas. The earlier phases of the Tucson Sequence are derived from the Hodges site. The type site for the Tanque Verde phase is the Tanque Verde site, while the type site for the Tucson phase is the University Indian Ruin.

Another type of site in the Tucson Basin is represented by the walled and terraced hillsides discussed by Gabel (1931), Fontana et. al. (1959) and Larson (1973). These *cerros de trincheras*, or "entrenched hills," bear long enclosing walls, sometimes circling a hilltop; shorter terraces on the hillsides, and circular structures. All features are built of volcanic boulders piled without mortar. Associated with the features are very few artifacts, although lithic flakes and plain brownware sherds occasionally occur on the hills. Occurrence of an occasional Tanque Verde Red on-brown sherd places the hills late in time (A.D. 1200 to 1300).

No site of this type has been excavated. Gabel (1931) briefly described the long walls and shorter terraces on Martinez Hill, adjacent to the valley floor site. He thought that the hill might have served as an occasional refuge from the Santa Cruz River floodwaters for the inhabitants of the village below the hill.

Fontana, Greenleaf and Cassidy (1959) described the rockwork on Black Mountain and assigned a defensive function to the walls, while the circular features were regarded as sleeping circles. In addition, they set up a four-part typology hypothesizing four functions for different kinds of hill sites: defensive, ceremonial, habitational and agricultural. They did not consider the possibility of multiple use areas on any one hill, which seems to be the case more often than not.

A grant from the Department of Housing and Urban Development funded three years of historical and archeological field research in the 80-acre urban renewal section of Tucson. This provided an opportunity to use problem-oriented research in a documented historical context. The Arizona State Museum provided approximately \$60,000 toward salary of the project director, vehicles and office and laboratory space.

Field work for the project began in November 1967, and continued until the spring of 1973. The project was under the direction of James Ayres of the Arizona State Museum. Both historical and archeological information were recorded in the urban renewal area. Other participants in the program were the

Arizona Pioneers Historical Society and the Department of Geography at the University of Arizona.

The project was divided into two phases. Phase I was concerned with recording existing architecture before its removal and with excavation in trash deposits connected with businesses and homes. The emphasis during this phase was on the historic time period. Phase II was devoted to archeological excavation after all existing structures had been removed from their sites.

By August 1968, the project had taken over 800 photographs and spent 5,000 man-hours moving over 300 cubic yards of earth. It also had produced more than 500 pages of notes and drawings.

The stated problem orientation for the project was “. . . to answer specific questions and solve certain problems regarding urban sub-cultures and culture change” (Ayres 1970:2). Sub-cultures historically recorded as living in the area were Chinese, Mexican and Anglo-Americans. The majority of the material recovered ranged between 1776 and 1920, thus presenting enough time depth to formulate a number of research questions.

These included: Do architecture and cultural debris reflect economic level, occupation and ethnic origin of the residents?; How did ethnic neighborhoods shift and change through time or space?; What effect did the arrival of the railroad in 1880 have on the development of architecture and material culture in Tucson?; How did architecture change through time or space?; How did architecture change through time in terms of materials utilized, construction techniques and use?

Additional research objectives were to identify trash from Tucson’s early businesses and professions and to study Papago and Anglo contact in the urban area. Tree-ring dating techniques were applied to beams from existing structures to acquire construction dates.

Since the project was, by nature, a “salvage operation,” with the necessity for data retrieval prior to its destruction, all areas could not be recorded and excavated, necessitating a sampling program. Architectural recording and archeological excavation were confined to a selected series of architectural units which had remained unmodified by later construction. Forty architectural studies were recorded, including photographs and drawings of floor plans. More than 225 excavation units were completed, consisting largely of wells and latrines which presented “time capsules” filled with items deposited there by the tenants of the adjacent structures. There was little trenching in backyard trash areas, as these were not felt to offer primary trash deposits indisputably connected with occupation of the adjacent structure.

Work on the project over a three-year period was accomplished on weekends, holidays and during the three summer months of each year when volunteer student labor from the University of Arizona was available. Over 300 volunteers participated in the project.

The extent to which the original series of research questions has been answered is variable and depends upon the amount of laboratory analysis and data synthesis accomplished. All artifacts have been washed and labeled, but no funds have been available for analysis and report writing. Some preliminary studies of artifact classes and architecture have been accomplished by students in the Historical Archeology classes at the University of Arizona.

In spite of the lack of write-up, it is clear that the connection of material culture with the ethnic background of its users has been successful. Less successful was tree-ring dating of beam samples. Not enough samples could be taken to yield more than a generalized picture of structure dates, given the current state of knowledge about techniques for analysis of local tree species. The question of railroad impact on artifacts and construction materials requires more data than the project was able to gather. There is evidence that the nature of Papago and Anglo relationships with reference to the economics of Papago pottery use will be a fruitful line of research. The project produced no evidence of prehistoric archeological phases, other than a few isolated sherds. However, Haury (no publication) excavated a Rillito phase pithouse under the northeastern corner of the old Tucson Presidio.

No published reference exists for the Tucson Urban Renewal Project. Two unpublished papers (Ayres 1968;1970) summarize the project.

OTHER STUDIES. Zahniser (1970b.) wrote a research design for archeological work in the Rincon Valley, but has not to date accomplished the work outlined in the research design. Through further study of late prehistoric settlements in the Rincon Valley, Zahniser hopes to approach questions about late Classic Period (Hohokam) abandonment of the area, probably prior to A.D. 1300. In this connection he has proposed a list of research priorities, the first being to sample a site from each occupational phase to control chronology. Second priority was given to sampling a site from each functional category determined from preliminary survey. Third priority was assigned to sampling a site from each spatially isolated cluster of sites to gain information about settlement patterning.

Research techniques proposed include archeological survey of southern and central areas of the Rincon Valley, sub-surface sampling at the eastern and western ends of the valley, stratigraphic testing at a dry cave site and collection of archeomagnetic samples from house floors.

The research design is inadequately constructed, given the state of knowledge about the Rincon Valley. First priority should be given to the archeological survey, to determine settlement patterning in the valley through time. Without this framework, decisions to excavate would have an inadequate basis. A specific problem orientation, such as that concentrating on late prehistoric sites, cannot be devised adequately without an archeological inventory defining the chronological and spatial limits of that late cultural manifestation.

ARCHEOLOGICAL STUDIES IN THE MONUMENT

Archeological research within monument boundaries has been limited to a single survey and to two partial site excavations, all unpublished. The use of excavation procedures prior to archeological survey in the area dictated that the two sites (Arizona BB:14:33 and BB:14:3) could be interpreted only within the minimal framework of time and space established by excavation in Tucson Valley sites of the Tanque Verde phase.

ARCHEOLOGICAL EXCAVATION. Two sites were excavated partially in the 1920s and 1930s. These were Arizona BB:14:33 and Arizona BB:14:3. The first was excavated under the direction of Byron Cummings, the other under the direction of Emil Haury. No report exists for either site, but survey cards are on file at the Arizona State Museum. Since no reports exist, it is impossible to assess the purpose or orientation of these excavations. A single reference to the Freeman site (Arizona BB:14:3) exists in Zahniser's study of the Tanque Verde phase in the Rincon Valley (1966:113). He locates the site northwest of Tanque Verde Ruin and Arizona BB:14:24. He stated that the excavation consisted of a trench placed through the rubbish mound at the site and that a study of ceramics from the excavation determined that the site had Colonial and Sedentary period occupations. Zahniser adds the statement (Ibid.) that illegal digging has destroyed the remainder of the site.

ARCHEOLOGICAL SURVEY. In 1965, Zahniser performed a survey of both sections of Saguaro National Monument. He stated (1965c:7) that he conducted the survey to find cultural features similar to those known in the surrounding area. In the Tucson Mountains Section, the first to be surveyed, 10 sites were recorded and given Arizona State Museum survey numbers. Almost half of these were petroglyph sites. Zahniser does not mention the amount of land included in the survey, but the distribution of sites on an archeological base map confirms his statement (1965c:8) that the desert flats were surveyed and that canyons were followed when they were near major sites.

In the Headquarters Section, 31 new site numbers were assigned in low elevations along Rincon Creek and at the western end of the section. Again, there is no statement about actual area covered. Zahniser does not identify areas actually surveyed. It appears that in some cases sites cluster close to access roads, which may indicate that the survey was not completed for all the land sections not bisected by a road.

Zahniser notes that the following areas were not surveyed (1965:8): the highest elevations of mountain slopes and peaks, caves and rock shelters and the Canadian Life Zone. Preliminary survey was performed in each kind of area, with no more time devoted to the kinds of areas which produced no archeological remains in the trial periods. In the Rincon Mountains

area there is no evidence that survey proceeded south of Township 15S, Range 17E, Section 14.

Principal investigator for the survey was Zahniser, aided by students from the Fenster Ranch School. The survey was accomplished between February 6, 1965, and May 10, 1965, on three-day weekends. From May 10 to June 25, 1965, work proceeded in the field full time. Zahniser spent a total of 54 field-days doing the survey. He did not estimate number of man-days involved, nor did he give the size of his field crew.

The survey was accomplished in vehicles, on foot and on horseback. Zahniser stated that he surveyed areas where sites should be located (1965c:7). Special attention was given to the desert flats in each section of the monument, which were traversed at minimum intervals of a quarter mile.

Zahniser's survey appears to be minimal in coverage and did not adequately sample each kind of topographic unit within the monument. Future archeological programs within the monument should not proceed without an intensive archeological survey to record and assess archeological remains, as the existing survey is not adequate for management purposes.

OTHER STUDIES. A study of six petroglyph areas in the monument was done by Cheryl White as a Senior Honors Thesis at the University of Arizona. White stated that (1965:1) "the purpose of this paper is to present a discussion, analysis and interpretation" of the petroglyphs at each site, but did not deal with the petroglyph sites as units. The thesis is more artistic than archeological.

Monument personnel in the Tucson Mountains Section continue to record sites as patrols can be planned to include archeological survey. They have spent two years revisiting sites located by Zahniser and visiting landforms that appeared to be potential site locations. These include sheltered knolls and the banks of washes between 2500 and 2800 feet of elevation. It has been determined that Zahniser's survey did not record lithic workshops or any areas having lithic tools other than manos and metates. Neither did he note hearths.

The continuing survey has noted several kinds of sites in the Tucson Mountains Section (see Figure 5). These include: (1) camping areas that do not appear to have been reused, represented by small or sparse sherd or lithic scatters and by an absence of features such as hearths; (2) campsites with hearths and associated sherd and lithic material; (3) complex areas that appear to have been reused through time (these areas exhibit bedrock mortars, rock shelters, hearths, sherd scatters, lithic working areas and grinding surfaces on rocks. They are frequently located near drainages and are associated with a low hill or knoll.) and (4) between 5 to 10 active Papago Saguaro-collecting camps near the monument boundary, west of Sandario Road. Further information about these and about earlier Papago camps within monument boundaries might be obtained from conversation with Mr. Lopez of the Papago tribe, who can be contacted at Box 422, Sells, Arizona.

It is notable that all sites recorded in the Tucson Mountains Section to date have been campsites and that there appear to be no large, permanent villages like those of the Tanque Verde phase recorded by Zahniser in and near the Headquarters Section. The Tucson Mountains Section lacks appropriate landforms, close to the flood plains of major washes, where such villages might be located.

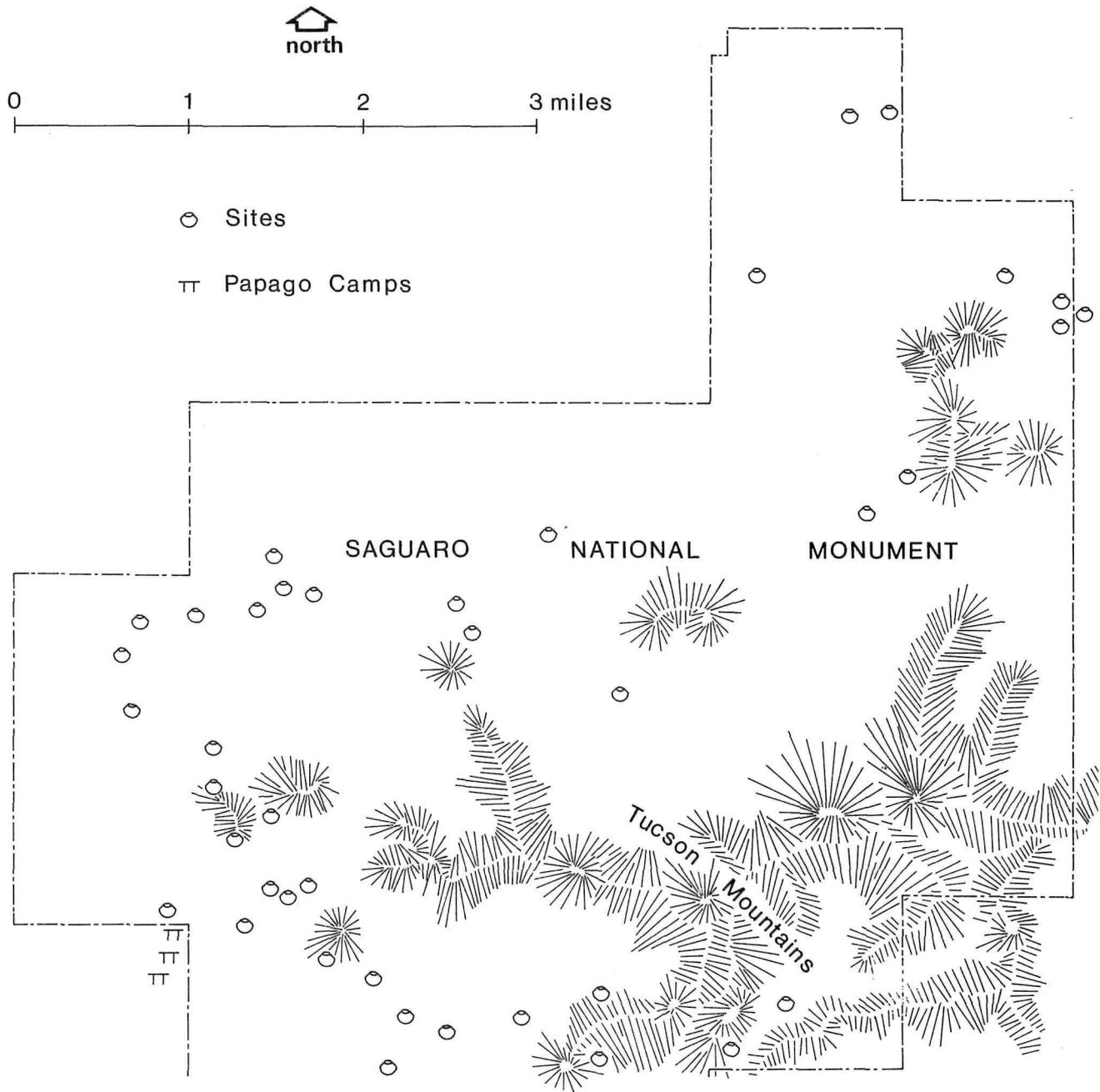


Fig. 5. Tucson Mountains Section of Saguaro National Monument, showing selected sites and historic Papago Saguaro fruit-gathering camps

Monument personnel have noted that the more complex sites in the Tucson Mountains Section, those having hearths, petroglyphs and abundant material culture, are found between 2500 and 2800 feet on both slopes of the mountains. This zone is characterized by well-defined washes and by low, rounded hills with silted flat areas below them. Complex sites do not extend into the higher, more rugged elevations, nor into the lower, flat bajada areas.

No sites have been found in the desert grassland transition zone at about 3500 feet, although sotol and agave grow here and could have constituted a wild plant food resource. One rock shelter has been noted at this elevation on Safford Peak. An early resident of the area noted Papago Indians carrying rock material, possibly hematite, out of this area in the 1920s.

In the flat bajadas, sites are limited to scattered sherds and lithic flakes not associated with other cultural features.

Continuing survey in this section of the monument has demonstrated that significant camp-sites, unaltered through time, exist here, but vandalism of petroglyph sites and of camping areas occurs daily. More survey and recording of archeological resources in this section is necessary if information about sites in the mountain foothills is to be preserved. Stratigraphy in this area is horizontal, rather than vertical, so that removal of archeological resources from the ground surface destroys a fragile pattern of human activity.

CULTURAL HISTORY.In the Tucson Mountains Section, evidence indicates that the bajadas and lower ridges and terraces were occupied both by San Dieguito Phase I people and by Amargosans, the latter from the onset of the Medithermal to the present day, as seen in the Papago fruit gatherers. As elsewhere in the Southwest, trails, shrines, sleeping circles, tools and tool-making debitage are present. Amargosan tools are particularly common on the bajadas, where hunting and Saguaro fruit gathering presumably have taken place for millenia.

In the Headquarters Section, especially in the Rincon area, San Dieguito remains are frequent not only on lower terraces, but also on higher terraces and on ridges at the mouths of canyons. One of these is Box Canyon, which may have held water until well into the onset of the Altithermal. Certain tools from these sites presage the Phase II tool types of western Arizona and the California deserts. Development seems to have ended here with the coming of adverse climatic conditions and subsequent abandonment of the area.

After the Altithermal, Amargosans populated the region, occupying terraces at canyon mouths, mesas and the drainages' lower terraces. Along the trails in the Madrona Canyon area have been found scattered plain brownware sherds which also occurred in a canyon rock shelter where Amargosa II tools were found. It seems probable that these sherds are not Hohokam in origin, but that they are Sonoran brownware traded up from Mexico from a source different from that of the Hohokam and perhaps at an earlier time (Ezell 1954, Hayden 1970).

In both sections of the monument preceramic sites are inconspicuous, scattered and associated with landforms of the proper period.

In surveying preceramic remains, trail maps should be made, lithic scatters or concentrations noted, material analyzed for degree of oxidation, ground patina and technological characteristics and these assigned to appropriate periods. All

remains should be related to landforms, which may not have been altered substantially during man's time in the basin. This work can be done only by fieldworkers with special training and experience in the preceramic lithics of the Southwest deserts.

The remainder of the monument's culture history can be summarized from information Zahniser (1965c:11-12) included in his survey report. Later phases found in the Headquarters Section are Rillito (A.D. 700 to 900); Rincon (A.D. 900 to 1200), with sparse representation, and Tanque Verde (A.D. 1200 to 1300), with an abundant representation. The presence in the Headquarters Section of late prehistoric redware sherds is not firmly established, nor is there any good series of dates assigned to early Papago pottery. The historic Anglo-American use of the monument is documented plainly in the numerous mine shafts and the few habitation sites still visible in both sections of the monument.

Zahniser reported only plainware sherds from the Tucson Mountains Section of the monument. He reported that although the monument's files listed the presence of Estrella Red-on-Gray sherds, an early Hohokam ceramic type, he did not see any in the course of his survey and could not confirm the existence of this early phase in the monument. He reported that intrusive ceramics were rare in both sections, with only five noted in the course of the survey.

Rillito, Rincon and Tanque Verde phases have been defined only for the Tucson Basin, so it currently must be assumed that the culture history of the monument parallels that of the Tucson Basin during these phases. The presence of redwares indicates that a later prehistoric occupation of the area probably provided continuity in occupation of the monument from A.D. 700 into the period of historic records, although Zahniser stated that he recovered no sherds indicative of Tucson phase occupation. He did not explain, but he may have meant that polychrome wares characteristic of the phase did not appear in the monument.

The monument, then, has evidence for very early San Dieguito occupation and Amargosan remains, but lacks remains from the early phases of the Tucson Basin sequence. It also lacks firm evidence for a Tucson phase occupation. It appears that the strongest evidence for monument occupation ranges from A.D. 700 through 1300 and includes the whole historical sequence from Early Papago (no dates assigned) through Anglo-American use and occupation.

Within these phase categories several kinds of sites occurred, forming the known archeological resource base for the monument.

Prehistoric sites on the monument can be classified for the sake of convenient description. The categories suggested are based on the kinds of activities which took place at sites. Furthermore, sites which are classified together have a number of similarities: location, size, stationary cultural features found there, the kinds and quantities of sherds and stone artifacts associated with them, etc.

The categories recommended by Zahniser (1965c:12) are: Category A--sites of a permanent nature (habitation sites where excavation might reveal remains of

dwellings); Category B--temporary shelters (caves and rock shelters); Category C--sites resulting from temporary and intermittent use in the process of food procurement (collection sites, campsites, sites with bedrock mortars, watering spots, occasional petroglyph sites); Category D--sites with which no special activity can be associated (trails, occasional petroglyph sites, places where stray materials were dropped in the course of hunting, collecting or traveling).

Zahniser describes the distribution of these kinds of sites within the monument (1965c: 12-20). The Tucson Mountains Section has no sites of Category A or B. There are 10 sites belonging to Category C, including three camp or collection sites, three sites with bedrock mortars and four petroglyph sites. This grouping indicated to Zahniser that transient activities predominated there in prehistoric times. The petroglyph sites were located on low flanks and usually were associated with a wash. The bedrock mortar sites were on gentle, rocky slopes. Zahniser failed to mention the presence or absence of Category D sites in this section of the monument.

Sites located by Zahniser in the Tucson Mountains Section usually appear to have been situated on the bajadas, rather than on the flat valley floor or on the steeper mountain slopes.

The Headquarters Section has sites representative of all categories. Category A habitation sites are clustered in the upper end of the Rincon Valley and at the southwest corner of the monument. Each of these areas contains a village site of more than 20 acres, with occupation lasting from A.D. 700 to 1300. These large sites appear to be surrounded by related, smaller habitation sites and features representing other site categories. The large villages are near major washes, indicating the importance of water in determining village location.

Four Category B (cave and rock shelter) sites were recorded in this section of the monument. Their unique value lies in the fact that in addition to non-perishable ceramics and lithics, they preserve twine, chewing guides, corncobs and other perishable items of diet and human manufacture not available for interpretation at other kinds of sites.

Category C sites predominate in the Headquarters Section, possibly because it is a "catch-all" category. Zahniser feels that these sites were used for food procurement or processing. He does not provide enough information, either in his text or in site descriptions, to determine the kinds of topographic features occupied by sites of this type. The only pertinent statement is that all of the sites in this category are in immediate proximity to wash beds, which would have provided water for food processing and human maintenance.

In summary, sites in both sections of the monument appear to occupy lower elevations, on the valley floor or on the bajadas, and to be associated with major or tributary washes where water could be obtained readily. Higher mountain slopes may not have been used for settlement location, but this zone has not been examined intensively. The only recorded use of steeper slopes is that of caves and rock shelters for human habitation.

SIGNIFICANCE OF AND RESEARCH POTENTIAL IN THE MONUMENT'S ARCHEOLOGICAL RESOURCES

The documented Papago use of the monument for over a century as a vegetal food collecting area indicates that the extent of use today may be established through oral history studies with San Xavier del Bac residents. If so, the use pattern can be carried back in time within the memory of living informants. Archeological survey to establish prehistoric and historic site locations in the monument may carry this use pattern back into unrecorded time. Preservation of cultural resources eventually could supply a test area for a long-term land use pattern, providing part of the story of man/land relations in an arid environment.

In a culture historical sense, the monument preserves sites representative of several phases of Tucson Basin archeology, as noted by Zahniser (1970:112-113). The majority of the sites located by Zahniser's survey (1965) were Tanque Verde phase sites, occurring late in the Tucson Basin sequence. The existence of late prehistoric sites offers the opportunity to preserve archeological resources which may contribute toward understanding the relationships between patterns of land use by prehistoric populations and those practiced by the historically recorded Pima and Papago Indians.

Another unique research possibility is presented by the preservation in dry caves of both perishable and nonperishable artifacts, possibly in stratigraphic relationships. These caves present the possibility of obtaining information about chronological development of culture in the Tucson Basin. In addition, a more complete material cultural inventory can be obtained from the artifacts preserved in the caves. Preservation of animal and plant food remains in these caves could provide data for analysis of prehistoric subsistence patterns.

Although no archeological resources earlier than the Sedentary Period of the Hohokam sequence have been recorded in the monument, there is a possibility that monument lands may contain a Tucson Basin variant of the desert adaptation known as the Cochise Culture in southeastern Arizona or of another adaptive variant known as San Dieguito, most fully documented in southwestern Arizona, southern California and northwestern Sonora, Mexico.

The monument duplicates the kinds of archeological resources recorded in other areas in the Tucson Basin. From the mid-20th century onward, however, the resources outside the monument have been assaulted by housing developments and by industrial

construction at an alarming rate. In 1954, Paul Frick reported that large scale farming on the flood plain and lower terraces of the Santa Cruz River dated from World War I, but that the upper river terraces usually were undisturbed. It is these upper terraces and the bajadas that have now become the target for residential subdividers. The most recent example is the submission of a development plan for the Rancho Romero area in the northern foothills of the Cataline Mountains. The plan was rejected to preserve a green belt for the city of Tucson (February 1974, various newspaper articles, *Tucson Daily Star* and *Tucson Daily Citizen*), but this sort of preservation is unusual. It is quite possible that by the end of this century, archeological data about the Tucson Basin no longer will be available outside its parks and monuments. The monument's archeological resources should be held in trust, undisturbed until research questions about the Tucson Basin no longer can be answered outside monument boundaries.

THE MONUMENT IN THE CONTEXT OF OTHER PARKS AND MONUMENTS

Saguaro National Monument shares with others in southern Arizona the distinction of preserving archeological resources which are the remains of settlements of a Piman speaking people. Historically, there were three divisions of the Piman speakers noted in the journals of early visitors to the area. These were the Sobaipuri, distributed from the San Pedro to the Santa Cruz rivers; the Pima, distributed along the Gila and Salt river drainages; and the Papago, found west of the Santa Cruz River to the desert east of the Colorado River and south into Sonora, Mexico. While historically known language groups cannot be extended into the unrecorded past, it is evident that the three areas supported significantly different kinds of prehistoric sites, each with different pottery types and each designated as a separate archeological culture area.

Several national monuments having cultural relationships to the archeological resources on Saguaro National Monument exist within 100 miles of the monument. These are Hohokam-Pima National Monument on the Gila River, Casa Grande National Monument near the Gila River, and Organ Pipe Cactus National Monument west of the Ajo Mountains in the country historically occupied by the Sand Papago. The three monuments incorporate archeological remains indicative of two kinds of cultural adaptation to different portions of the Southern Arizona desert.

Hohokam-Pima National Monument, which still is in the planning stage, incorporates the Gila Basin Hohokam site at Snaketown (Gladwin, et. al. 1965 and Haury, in press), which provided the stratigraphic phase relationships to construct the Gila Basin Hohokam sequence. The monument area lends itself to archeological study of a sedentary desert adaptation distinguished by the use of irrigation farming techniques. The area showed a continuity in this adaptive pattern into the 19th and early 20th centuries, as exhibited by the Pima Indians living on the Gila and Salt Rivers.

Casa Grande National Monument, a mile north of Coolidge, preserves a Classic Period riverine Hohokam site occurring late in the Gila Basin sequence. This site, like Snaketown, provides an opportunity for studying a sedentary desert adaptation, which may help in understanding the late Hohokam relationships to early Historic Pima. Studies of Casa Grande have been published by Fewkes (1907, 1908, 1912) and Ambler (1961, 1962).

Organ Pipe Cactus National Monument represents a desert area where irrigation was impossible. Sand Papago adaptation here was oriented toward collection of seasonally

maturing wild plant foods, necessitating a more mobile lifestyle than that practiced by the riverine Pima. The monument preserves archeological resources from San Dieguito through historic Yuma and Sand Papago use of the area. This area preserves cultural resources providing the potential for understanding long term adaptation of human populations to an extremely arid environment. Studies of the monument area have been done by Ezell (unpublished, 1950s; 1954) and Fontana (1965).

RECOMMENDATIONS

Outside the monument, land development rapidly is destroying archeological resources which could help to interpret the history of Piman speaking peoples and the prehistory of the area they occupy today. The data categories preserved in the monument rapidly are being lost in surrounding foothill areas in the Tucson Basin due to expansion of the City of Tucson. The Santa Catalina Mountains foothills rapidly are being subdivided for housing developments and irretrievable archeological resources have been lost everywhere, with the exception of the northern slopes of that range, where a recent housing proposal was rejected. The Tucson Mountains foothills also are being developed, both on the western and eastern slopes. The flood plain and terraces of the Santa Cruz River and its tributaries largely have been destroyed by urban development. Therefore, preservation of cultural resources in the monument is essential to further interpretation of Tucson Basin prehistory and ethnohistory.

Saguaro National Monument possesses another unique importance in that it contains archeological resources characteristic of an environment more arid than that preserved by the national monuments on the Gila River, but less arid than that preserved at Organ Pipe Cactus National Monument. Saguaro National Monument offers the possibility for preservation and interpretation of an adaptive pattern that may lie between the extremes of abundant groundwater and practically no groundwater.

The archeological resources in the monument do not present a good cross section of Tucson Basin prehistory. The land forms included in the two sections of the monument are limited to higher mountain slopes and to bajadas, or outwash plains, cut by erosional canyons. Only a very small sample of the riverine terraces above the Santa Cruz River is included in either section of the monument. If man/land relationships are considered through time, problem-oriented research in the monument must be confined to prehistoric and historic utilization of these land forms for subsistence, settlement and other socially patterned activities.

PRESERVATION. The archeological Overview is designed to present a framework for future interpretation and research of the cultural resources within the monument. However, primary emphasis should be assigned to *preservation* of those resources, with secondary importance assigned to research within monument boundaries, and then only if that research will answer questions that cannot be answered at sites outside the monument. In line with those objectives, two primary recommendations are offered:

FENCING CAVES. Fence securely or seal off the dry caves and rock shelters within the

monument to prevent further vandalism and loss of information. These caves may preserve the only possibility to acquire a stratified sequence of the occupational history of the Tucson Basin foothill areas. Excavation is not recommended at this time for reasons given below.

ARCHEOLOGICAL SURVEY. Perform an inventory archeological survey to assess the number, kinds and locations of all cultural resources within both sections of the monument. It must be emphasized that any future archeological research within monument boundaries cannot proceed without a well-designed and well-executed inventory survey.

Full justification for as complete a survey as possible is presented by Leland Gilson in the archeological overview for Chiricahua National Monument's management plan (Gilson 1974: 18-19): "Within the Monument, the lack of a survey of available cultural resources is a hindrance for design of: (1) archeological resource management plans; (2) guidelines for statements of environment impact on archeological resources. These are strictly archeological problems, but they have ramifications in planning stages for proposed actions that affect the environment inside the park. In order to make rational and intelligent decisions about archeological resources, one must have a comprehensive and extended physical survey of the area to obtain a sample of all the archeological resources."

The crucial factor here is sampling design, or how to walk a sample of the whole monument area that will provide information about the kinds of cultural resources that may be expected in each part of the monument.

The 1965 survey of monument lands was inadequate even as an inventory for determining number, kind and location of archeological resources. Since it was a minimal survey, it was not accompanied by a research design oriented toward asking and answering questions about past occupation and use of monument lands. Future research in the monument, if any, should require an inventory archeological survey accomplished by an archeologist affiliated with a recognized research institution. The researcher should be required to provide, before the survey is accomplished, a research design specifically stating sampling methods for survey and data recovery.

It cannot be stated too strongly that excavation or other work on any site in the monument without the framework provided by the inventory survey would be throwing away money and knowledge. Not enough is now known about monument prehistory to provide a framework for gathering the most useful information for interpretation of individual sites.

This is especially true of the cave site (Arizona BB:14:9) proposed for salvage excavation under 10-238 Package No. 134, submitted April 29, 1972. Caves provide unique possibilities for data recovery and interpretation. They provide dry environments which preserve the remains of cultural activities in stratified sequence, as they occurred through time and in space. Finally, the number of this kind of research capsule available in the southwestern United States is limited, making accurate and planned recovery of all information even more imperative. A salvage operation is not adequate. The researcher selected for such a project, if excavation eventually is accomplished, should submit: a detailed research design stating questions to be asked (and, hopefully, answered) by

the project; exact techniques for excavation and mapping, and provisions to be made for analysis of the materials recovered. Expensive and specialized techniques of analysis will be necessary for the materials recovered from a dry cave site. Pollen samples must be collected and analyzed by experts in the field, at approximately \$20 to \$30 per sample (1974). Vegetal food remains require the services of an ethnobotanist over an extended period of time. A specialist in fecal analysis must be found and funded to study human fecal remains for dietary information. A specialist in textiles and basketry will be needed for description and comparison of those materials. A cave excavation, therefore, is not to be approached without a specific research design and more than adequate funding.

BOUNDARY EXPANSION. Sites plotted on topographic sheets in and near the Headquarters Section indicate that the focus for interpretation of monument prehistory lies outside the present boundaries. The important series of large village sites along the lower reaches of Rincon Creek, near its junction with Pantano Wash, are crucial to interpretation of the smaller sites on the upper reaches of that creek and in its smaller tributary canyons. But the sites just south of the monument are endangered by subdivision construction. It is strongly recommended that the monument consider purchase of lands along Rincon Creek for extension of monument boundaries to enclose the entire settlement system represented by Rincon Creek. This would include Township 15S, Range 16E, Sections 7 through 17, and 23-24; also Township 15S, Range 17E, Sections 7 through 10, and 15 through 18. This action would provide an interpretive system relating human land use to landscape and resources in an entire tributary drainage, which would be more valuable than simply preserving large or unusual sites elsewhere.

OTHER PRIORITIES. Within Saguaro National Monument there are areas of project priority where archeological research must be accomplished prior to construction or modification in connection with park facility improvement. This means that some areas will require archeological assessment and field inspection before the inventory survey can be performed. The danger of doing archeological assessment and mitigation in the face of new projects each fiscal year without the framework provided by archeological survey emphasizes the immediate need for initiation of the survey.

ARCHEOLOGICAL SURVEY DESIGN FOR SAGUARO NATIONAL MONUMENT

To facilitate planning and construction within monument boundaries the inventory archeological survey is of primary importance. The survey will insure knowledge of the type and distribution of cultural resources present before projects are planned. In order to begin planning for the survey, an organizational framework will be suggested here. Previous research within the monument does not meet the current standards and interests of archeological theory and method. It was not accomplished to answer a specific set of questions about monument prehistory and history, nor was an adequate sample of monument lands included.

The most useful framework for organizing archeological sites in a restricted survey area is a settlement pattern approach, relating sites to topography and to localized natural resources, especially wild plant foods. Using the settlement pattern approach involves use of ethnographic analogy, comparing topographic and vegetation associations of historically recorded settlements with those of prehistoric sites in the same area. The historic model would be 19th century Papago land use in the Santa Cruz Valley and foothills (Hackenberg 1964).

The minimal method for utilizing this approach at Saguaro National Monument, step by step, is as follows:

1. Note what kinds of topographic features exist within each section of the monument (i.e., river or wash with sandy flood plain or boulder flood plain; first terrace, second terrace and third terrace above the river; mountain slopes and mountain peaks).
2. Note the kinds of vegetation communities associated with different topographic features, listing dominant plant cover and subdominant species. The Headquarters Section contains Lower Sonoran, Upper Sonoran and Transitional zones, with isolated stands of Arizona Madrone, Rainbow Cactus and Rocky Mountain White Pine. The Tucson Mountains Section contains Lower and Upper Sonoran zones, but lacks the elevation to support Transitional Zone vegetation. (Steps 1 and 2 are steps in stratifying the natural setting of sites into units for archeological survey).
3. Survey on foot. No other method is adequate for recording sites of all types and sizes and all are necessary to understand the nature of cultural resources in the monument. Survey might proceed within the sample selected for only one type of terrain

feature at a time. This would facilitate comparison of site types and locations in association with topography and vegetation within each locational category before being compared across categories.

4. As each site is located, record the information requested on the Arizona State Museum Site Survey Form and the survey manual.

5. Record areas *within* sites where activity centers may be discerned, including hearths, ceramic or lithic concentrations, mounds and surface evidence of structures.

6. Plot all sites on topographic maps of the monument, using a scale adequate for site relocation and usable for monument planning and management. This will present visually the relation of site to landform and of site to other sites. If an overlay of vegetation zones can be made for the topographic maps, the relationships will be visually more meaningful.

7. From the visually presented data, summarize what kinds of sites occur on what kinds of landforms, their habitation dates and their vegetation associations. This will show the patterns of land use in the monument through time.

A beginning toward this inventory survey can be made by accomplishing the following survey requirements, ranked in order of priority:

The first candidate for survey is any area where projects which will modify the ground surface in any way are planned. These are exemplified by such currently proposed projects (FY 74) as removal of overhead power lines and their burial elsewhere, additions to visitor center, ramada and picnic area construction or addition, road improvement or boundary fencing. These are emergency situations at present and survey should not cease once these priority projects are completed.

Second priority should be assigned to surveying an area a quarter mile wide on each side of every road and trail. This should begin as soon as current projects are completed, as these areas receive heavy public use. Any archeological resources located in these areas should be recorded so that information will be available should destruction take place. Roads and trails provide an additional advantage in that they traverse all the vegetation and topographic zones contained within the monument. They also pass by springs that may have provided prehistoric watering sources.

The trail systems in the Headquarters Section traverse Lower Sonoran, Upper Sonoran and Transitional vegetation zones and provide access to localized stands of Arizona Madrone, Rocky Mountain White Pine and Rainbow Cactus. These cross sections provide a convenient way to run archeological survey transects through every topographic and vegetation stratum of this section of the monument without the expense and time usually spent on laying out the transects through rough terrain. Walking all the trails and roads should provide a small sample of all monument lands, broken down as follows: A. Lower Sonoran Zone: total area of approximately 20 square miles; eight transects totalling approximately 12 linear miles. B. Upper Sonoran Zone: total area of approximately 30 square miles; six transects totalling approximately 21 linear miles. C. Transitional Zone: total area of approximately 25 square miles; four transects

totalling approximately 12 linear miles. D. Arizona Madrone: total area of approximately 1.5 square miles; no trail or road transects. E. Rocky Mountain White Pine: total area of approximately 5 square miles; eight short transects totalling approximately 8 linear miles.

The Tucson Mountains Section system of roads and trails also provides a way of transecting the topographic and environmental zones. (More detailed data about vegetation is not available from existing maps.) In addition, the Tucson Mountains Section presents a specialized landform that should be surveyed as a separate type of topographic feature. This is the series of isolated hills bounded by Kinney Road and Ho-Ho-Kam Road. Hills frequently present specialized use areas, both prehistorically and historically, and should be included as a separate environmental stratum in construction of a survey design.

Third in importance are public picnic grounds and ranger stations. These often are placed in areas that have been used over a long period of time, as in the vicinity of springs. Any park service facility should be surveyed within a half mile radius.

Fourth in line are any additional springs and oases having perennial or ephemeral sources of naturally occurring water.

Survey, finally, should follow drainages, primary and secondary, from the mountains to their lower reaches within the monument.

The settlement pattern study emerging from application of this survey design should provide considerable interpretive input for park programs without the need for excavation. This study of the patterned surface distribution of cultural resources will provide a framework for further studies based on surface manifestations of archeological and historical sites.

APPENDIX A

Maps and Collections

Materials already in existence which would aid in planning the survey are the following maps on file at the Arizona Archeological Center:

1. Topographic Maps: USGS 15 minute series; USGS 7½ minute series; Coronado National Forest Aerial Planimetric Quadrangle, and Rincon Valley, Arizona (N 3200-W11030/1 1961).
2. "Vegetation Type Map, Saguaro National Monument," prepared by Branch of Forestry 1939 (Headquarters Section only).
3. "Natural History and Archeological Base Map." Part of the Master Plan for Saguaro National Monument 1958 (Headquarters Section only).
4. "Tucson Mountains District." Part of the Master Plan for Saguaro National Monument 1962 (Base Map only).
5. Maps showing archeological sites in both sections of the monument included with Zahniser's report (1965).

The maps listed above, especially topographic and vegetation maps, will help to stratify the survey area into topographic features and vegetation zones. The sample areas to be walked can be plotted on one or more of these maps. When sites are located, they can be added to the same map series.

Artifact collections from the Headquarters Section are confined to a single small collection on deposit at the Arizona State Museum in Tucson. Zahniser listed that collection in Appendix B of his manuscript (1965) reporting survey in the monument. The list also is included here as Appendix B.

Additional collections exist at the Tucson Mountains section of the monument. The collection there is uncatalogued and ranges from the early mining period of use of monument lands. Much of the material was present before the arrival of the present staff and has no provenience designation other than the Tucson Mountains Section. Of special importance is a collection of lithic material donated to the monument

by a local resident. The material apparently came from the Signal Hill area. A small sherd collection is referenced to specific sites. The collection from the mining period includes parts from carbide lamps, hand-made digging tools and tin cans. These items probably date from the late 19th century through the earlier part of the 20th century.

APPENDIX B

List of Catalogued Artifacts in Arizona State Museum from 1965 Saguaro National Monument Survey

Invoice No. 1131

Accession No. 1637

Catalogue No. A-30, 563-A-30, 571

Collection of archeological material from various sites in monument area surface finds.
These few items are catalogued as examples of representative specimens.

| | |
|------------------------------------|---|
| Arizona BB:14:42A | Handstone A-30-570 |
| Arizona BB:14:42B | Hammerstone A-30-565 |
| Arizona BB:14:48 | Chipped stone tool; scraper? knife? A-30,566x-1 |
| | Bifacial handstone A-30, 566x-2 |
| | Unifacial handstone A-30, 566x-3 |
| Arizona BB:14:2 | Miniature Gila Plain pot A-30, 567 |
| Arizona BB:14:50B | Corrugated sherd spindle whorl A-30, 569 |
| Arizona BB:14:54 | Tiny fragment turquoise A-30, 571x-3 |
| | Turquoise disc bead A-30, 571x-2 |
| | Green stone disc bead A-30, 571x-1 |
| | Chert (jasper) projectile point A-30, 568 |
| Arizona BB:14:3 | Unifacial mano A-30, 564 |
| Unnumbered site (Survey No. 28) | Rubbing stone A-30, 563 |

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