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Another Guest Article in the "Arts and Culture of the Prehistoric Hohokam Indians" Series:

Ancient Engineers of the Southern Arizona Deserts

by Jerry B. Howard
Mesa Southwest Museum

When the first explorers and pioneers entered the desert valleys of southern Arizona they were startled to discover evidence of massive irrigation systems winding through this arid land. The abandoned channels of ancient canals could be seen stretching out as much as 12 miles from the Salt and Gila rivers in systematic patterns that followed the contours and terraces of the rivers. Smaller canal systems were also discovered, situated along smaller streams and drainages throughout the river valleys of the southern desert.

The archaeological evidence told the story of people who applied advanced engineering principles to harvest the precious water resources and to bring life to their crops. It also provided a model for the development of a new agricultural society in the river valleys of Arizona. Anglo-American farmers often cleaned out, repaired, and brought back to life the old canal channels.

Despite its contribution to the development of historical agriculture very little has been known about prehistoric irrigation systems. Recent archaeological research has only now begun to tell this fascinating story.

Prehistoric Hohokam canal channel. In only rare cases have the eroded channels of the prehistoric canals of the Phoenix area survived. This channel survived into the late 1990s when it was destroyed by modern construction. Photo courtesy of Jerry B. Howard.

Origins and Growth of Irrigation. Until recently most researchers believed that Arizona's ancient irrigation techniques were first developed in Mesoamerica as early as 1200 B.C. and only used by the Hohokam beginning around A.D. 600. Exciting new discoveries have continued to push back the beginnings of irrigation in Arizona. A small ditch found along the margins of the Salt River by Northland Research, Inc., has been dated to around A.D. 50. It appears to be first step in the development of irrigation in the Salt River Valley.

Even more startling is the recent discovery of very early ditches and canals on the floodplain of the Santa Cruz River by Desert Archaeology, Inc. These early canals appear to date back as early as 900 or even 1200 B.C., to a time before the Hohokam. At a time traditionally called the "Late Archaic period" researchers are documenting permanent villages and people who relied on agriculture.

INSIDE:
Upcoming archaeology activities for volunteers!
See page 6

Continued on page 2

Ancient Engineers of the Southern Arizona Deserts (continued from page 1)

These new discoveries are quickly rewriting the prehistory of the Southwest.

Around A.D. 600 the Hohokam began to construct large canals that could bring water to the upper terraces of the Salt and Gila rivers. The amount of land under irrigation increased as new irrigation systems were added to the major river valleys. Archaeologists' reconstructions of agricultural expansion suggest that by A.D. 1000 the farmers were reaching the limits of the available water.

Prehistoric Irrigation: How Did It Work? The forms and techniques of prehistoric irrigation vary widely, depending on the water source, the amount of water available, the configuration of floodplains and fields, and local topography. Prehistoric canals occur not only on the large floodplains of the major rivers but often along intermittent drainages and in steep bajada settings. In Arizona, researchers can study a wide variety of irrigation techniques and settings, from the simple to the complex.

Many of the systems are small in scale and supported only small groups of people. One irrigation system in the Safford Valley begins high in the foothills, taking water from a small spring. To avoid steep gradients, rushing water and erosion, the small canal winds

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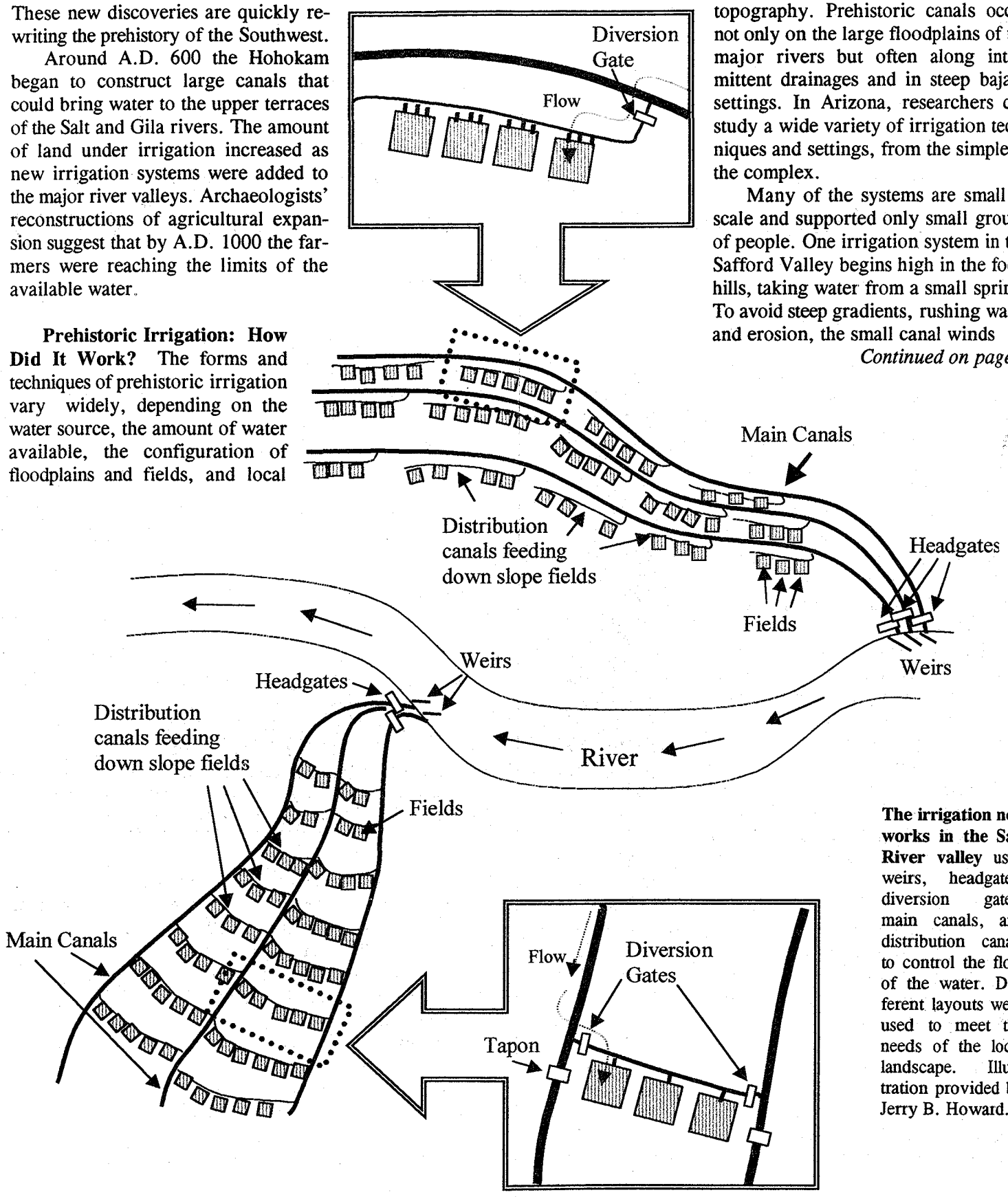

The irrigation networks in the Salt River valley used weirs, headgates, diversion gates, main canals, and distribution canals to control the flow of the water. Different layouts were used to meet the needs of the local landscape. Illustration provided by Jerry B. Howard.

Ancient Engineers of the Southern Arizona Deserts (continued from page 2)

down the mountain in a series of switchbacks reminiscent of a mountain trail. As it winds its way toward the valley floor it irrigates the few flat terraces of land that could serve as field areas.

In the foothills of both the Tonto Basin and Safford Valley small aqueducts have been found that carried water across intermittent drainages. The aqueducts were constructed by building large ridges of soil across the drainages. The canal was then dug into the top of the ridge of soil. The aqueducts would have to be rebuilt each time storm waters rushed down the drainage. In some cases, dams were constructed across drainages to channel flash floods into ditches that diverted the water onto nearby fields.

Small and moderate sized irrigation systems, consisting of one or more irrigation canals, have been discovered along most of Arizona's major streams and valleys. Larger systems have been found along the Verde River, Queen Creek, and the Agua Fria River. Although they lay undiscovered for many decades, irrigation systems are now being recorded in the Tucson area, too, along the Santa Cruz River.

The canal systems along the Salt and Gila rivers were the largest and most complex found in the New World. By the Hohokam Classic period (by A.D. 1100) hundreds of miles of prehistoric canals had been constructed along Salt River, encompassing an area of over 110,000 acres and carrying enough water to irrigate 50,000 acres. The canal systems were organized into irrigation communities, each comprised of a series of main canals that pulled water from the same place on the river. The largest villages, like Pueblo Grande and Mesa Grande, were located near the head of a system where they could control the water in the canal system.

The large canal systems were comprised of several different parts that controlled the water flow. On the river, a *weir* would be constructed. A weir is small dam that reaches into, but not completely across, the river. It raises the level of the water in the river and directs it into the canal. A large water control gate, or *headgate*, would be constructed inside of the canal to control the amount of water entering the canal.

The *main canal* transported the water away from the river and toward the fields. The main canals often followed the contour of the land to keep just the right downslope drop or gradient. The ancient engineers also reduced the size of the main canal as it went from its head on the river to its end. As the amount of water in the canal decreased through discharge onto fields, evaporation and seepage, it was necessary to

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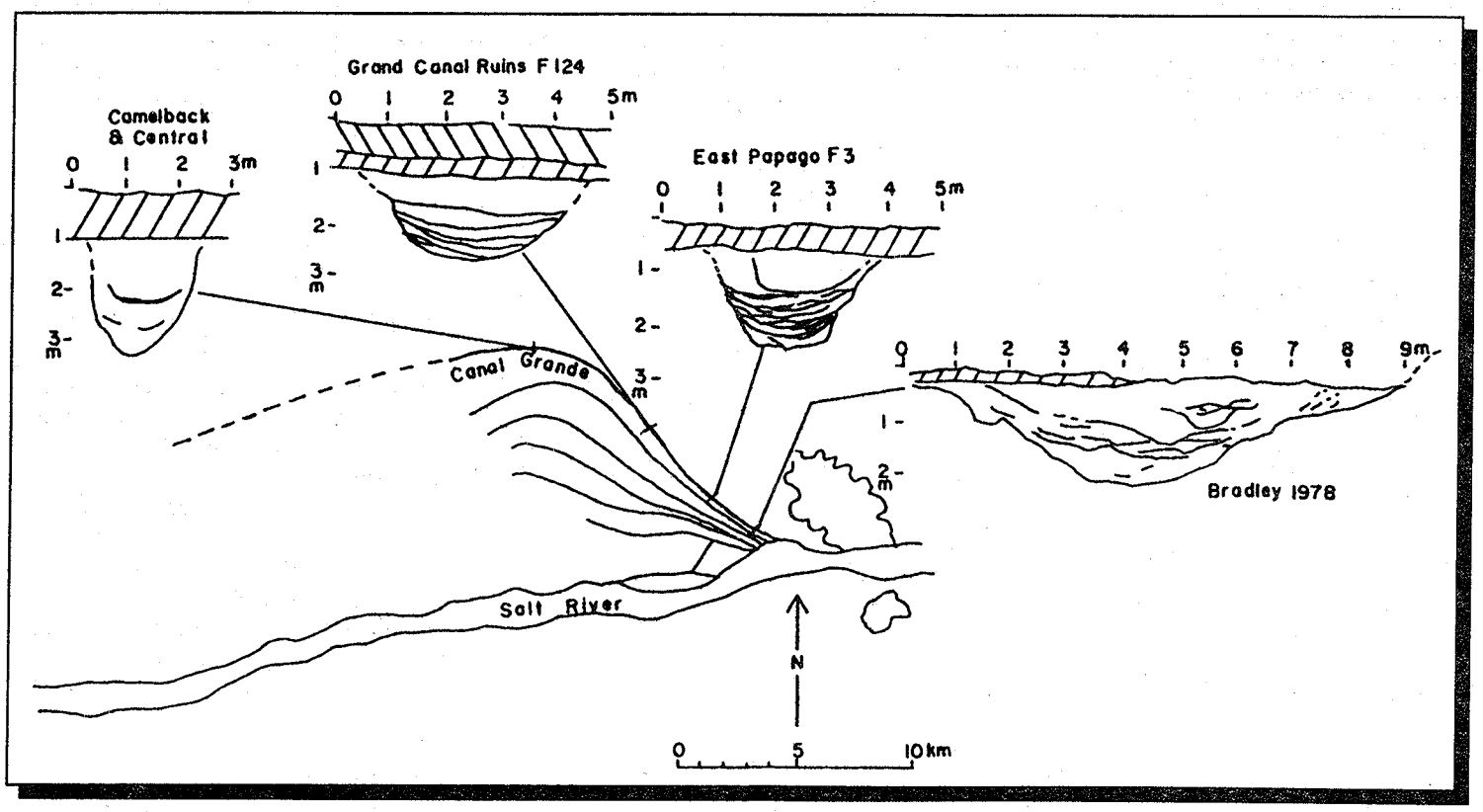
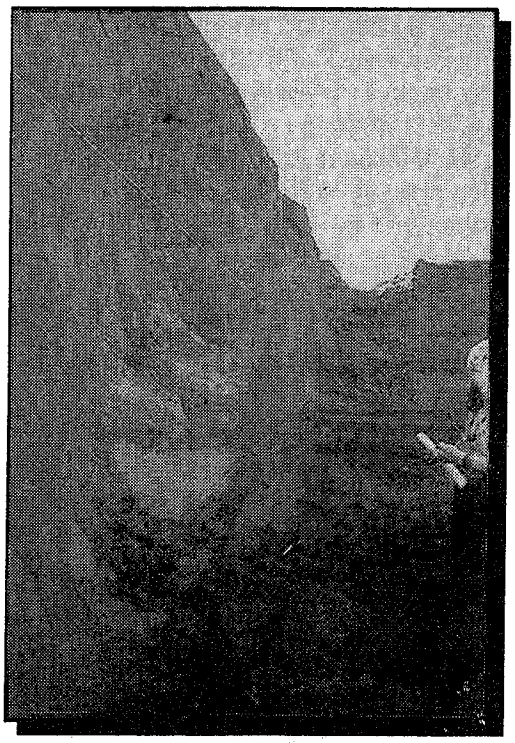


Hohokam canal cross-sectional variations. As it progressed from its head on the river to its end, or "terminus," the Hohokam canal reduced in size to maintain a constant rate of water flow. Illustration provided by Jerry B. Howard, based on excavation projects at four separate locations. Cross-section scales are in meters, overall map scale is in kilometers.

Ancient Engineers of the Southern Arizona Deserts (continued from page 3)



An archaeologist's perspective. Prehistoric canals are usually found lying below modern streets and agricultural fields. They are often filled with silts, sands, and clays, sediments that accumulated during the use of the canal. Photo provided by Jerry B. Howard.

reduce the size of the canal to keep the speed or velocity of the water constant and between two thresholds. If the water moved too fast, it would erode the canal. If it moved too slow the particles of soil carried by the water would settle out of the water, causing the canal to "silt up."

Distribution canals, often arrayed in patterns across the landscape, transported water from the main canals to the fields. Distribution systems had to be carefully designed to meet the needs of the local landscape, whether they traversed flat plains or steep slopes. *Diversion gates* have been found at the junctions of main and distribution canals to regulate water flow. *Tapons*, small dams constructed within the canals, were also used to control the water flow and water level within the canal.

Who Controlled the Water? Irrigation was clearly a pervasive part of the lives of the Hohokam. Construction of the canals, using digging sticks and stone hoes to loosen the earth and baskets to remove it, required a great amount of labor.

Hohokam stone hoes are large, flat fragments of rock with sharp edges. Omar Turney, a Phoenix engineer and early avocational archaeologist, suggested in the 1920s that these tools were held in the hand and used for digging canals. A recent archaeological survey along the Salt River appears to support Turney's ideas concerning the use of stone hoes, at least in part, as agricultural tools. The survey found that stone hoes did occur along the banks of the canals, but the surveyors discovered hoes in the areas of the ancient fields as well. As the archaeological survey teams moved away from the canals and fields the numbers of stone hoes dwindled and then disappeared.

The construction of the larger main canals probably required years to complete. One estimate suggests that the construction of main canals in just *one* of the largest canal systems, during the Classic period alone, required the excavation of almost one million cubic

Concluded on page 5

The Old Pueblo Archaeology Center Membership Program

Archaeology Opportunities is a membership program for persons who wish to support Old Pueblo Archaeology Center's education programs, and perhaps even experience for themselves the thrill of discovery by participating in our research.

Members get to participate in archaeological excavation and survey projects and can help study and reconstruct artifacts in the archaeology laboratory. Benefits include:

- Opportunities to participate in Old Pueblo Archaeology Center's Sabino Canyon Ruin excavations up to 10 days per year, and in Old Pueblo's other archaeological digs, surveys, and research programs.
- Invitations and discounts for field trips and other archaeology events.
- A 20% discount on Old Pueblo Archaeology Center's publications, other sales items, and courses.
- A 1-year subscription to ***Old Pueblo Archaeology***. Each issue contains archaeology news and ample illustrations.

Membership fees support Old Pueblo Archaeology Center's programs.

Annual membership rates

Corporation	$1,000*
Sponsoring	$1,000*
Supporting	$500*
Contributing	$200*
General Household	$120*
2-person Household	$80*
Individual	$40*
Friend of Old Pueblo Archaeology*	$25*

Annual subscription (4 issues)s

Old Pueblo Archaeology	$10*

* Every membership category includes a 1-year subscription to *Old Pueblo Archaeology*. Each "Friend" membership receives *Old Pueblo Archaeology* & 20% discounts but does not allow participation in the Sabino Canyon Ruin excavations.

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Now you can support Old Pueblo Archaeology Center every time you surf the Internet, through onGiving.com's "Surf-to-Give" concept that pays us for the time you spend online. Our new partnership with onGiving.com gives you a brand new way to raise money for our organization.

The plan is simple. All you have to do is visit onGiving.com and download their software program, called the GiveBar™. Once installed, the GiveBar™ displays quality advertisements at the bottom of your computer screen, and 85% of the money generated from the advertising is sent to us. It's a great, no-cost way to support Old Pueblo Archaeology Center's education programs just by engaging in a normal, everyday activity! Sign up now at

Ancient Engineers of the Southern Arizona Deserts (continued from page 4)

meters of soil and over 300,000 person days of labor.

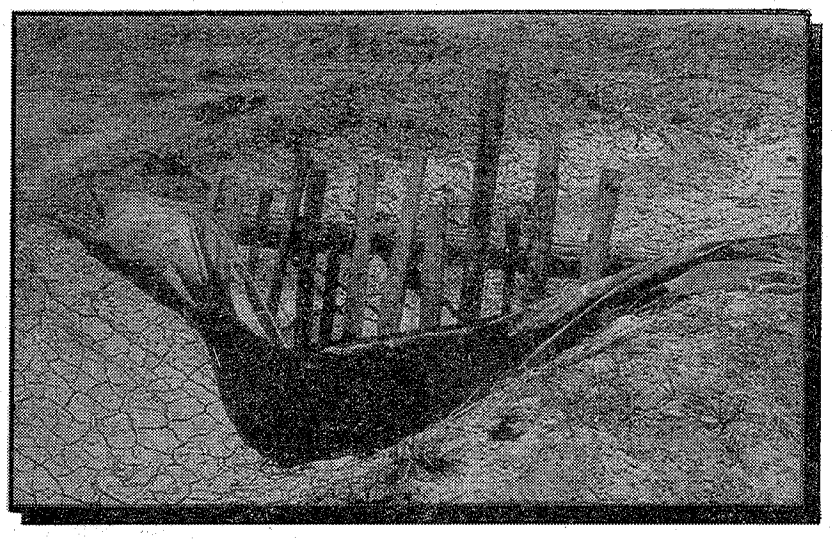
Each year substantial effort was also needed to maintain the canals. Headgates and weirs, often damaged by spring floods, needed to be repaired or replaced. Silt and sand had to be cleaned out, weedy growth had to be removed. Schedules also had to be established to determine who would get water, how much, and when.

One of the most interesting questions confronting Hohokam archaeology concerns the level of leadership needed to control irrigation systems. This is a classic question in anthropology. Does the presence of an irrigation system require strong political leadership to organize the people needed for the construction and maintenance of the canals? Is there a need for leaders to decide how water is to be distributed and to resolve the inevitable conflicts among different farmers? Or can farmers organize themselves and operate without any centralized leadership?

In Arizona there is a unique opportunity to address these questions in the archaeological record. We can see that many of the smaller irrigation systems can be built, maintained and operated by a few farmers with no real need for leaders.

The monumental canal systems along the Salt and Gila rivers may be a very different story. Organizing the construction, maintenance and operation of these enormous canal systems may have required strong leadership and a complex social and political organization.

We need to learn more about how these systems worked, how big they were, how much water they could carry, and the labor required to build them and keep them running. This will help us not only to understand the Hohokam and their society but to also understand how the early use of irrigation technology affected societies around the world.



Long-lived irrigation technology. A modern water control feature on the Salt River Pima-Maricopa Community uses modern materials but an age-old design. Photo provided by Jerry B. Howard.

Supporters of Old Pueblo Archaeology Center, February 22-May 31

Volunteers: Our thanks again to Carol Richardson, Bess Puryear, & Ceil McPherson for mailing the December bulletin; and to Gail Roper, Jim Trimbell, Steve Stacey, Janet Chumbley, Eric Kaldahl, Darla Pettit, and Robin Rutherfoord for organizing and managing Old Pueblo's volunteer appreciation event in April. In addition to the unlogged hours those folks spent, another 206.5 recorded volunteer hours were donated to Old Pueblo during the period listed above by Peggy Bommersbach, Rebecca Bommersbach, José Camacho, Bridget Cashdollar, Donna Cosulich, Ivan Curnutte, Allen Dart, Jane Delaney, Susan Harwood, Jason Kordosky, Mary Lu Moore, Margaret Nagore, Linda Marie Small, and Steve Stacey.

Cash Donors/Grantors in this period included Arcos Architecture and Planning , the Arizona Archaeological and Historical Society, the Arizona Humanities Council, Nancy S. Bernard, Canyon Ranch Management, L.L.C., Carol Condie, Allen Dart, Carolyn Davis, Nancy Hough, John & Helen Schaefer, Barbara Snyder, Jim Trimbell, Elisabeth Zall, and several people who made donations during Sabino Canyon Ruin tours.

Noncash Donors: The Southwestern Mission Research Center donated a three-day, two-night guided tour of Spanish missions in Arizona and Sonora for a future Old Pueblo Archaeology Center fundraiser. Jane Elins donated four shares of General Electric stock, and John Guerin donated 17 of his handmade pottery artifacts to benefit Old Pueblo's OPEN1 and other children's education programs. Steve Stacey donated another batch of new computer equipment for the office, and Allen Denoyer donated a hand-made atlatl and fletched dart for display or fundraising.

New & Renewing Members: Raymond Asp, Veronica Baker, Kathleen Carr, Ralph & Nancy Copp, Diane De Milt, Marcia Donovan, Kathi Greenaway, John Guerin, Quinn Harlow, David Hays, Susan Harwood, Kim Hogan-Krist, Kaleigh Humbarger, Norlene Langston, Austin & Leslie Lenhart, Jeanne Neal, Lynn Neal, Liselotte Punzmann, Forrest and Doris Rickard, Mrs. E. M. Rose, Susan Smith, Barbara Snyder, Ken Snyder, Sheri Thompson, Diane Tyink, Lee Vellom, Marta Wallace, Lori Wieters, and Werner Zimmt.

Old Pueblo Archaeology Center sincerely thanks all of these faithful volunteers and contributors, and offers our apology to anyone we may have failed to acknowledge.

Old Pueblo Archaeology Center's June-September Activities for Volunteers

ARCHAEOLOGY DIGS

Sabino Canyon Ruin Field Schools & Volunteer Sessions

Do you think archaeology is fun? Would you like to know more about it, or maybe even be an archaeologist some day? Then come get to know more about it without leaving Tucson!

Old Pueblo Archaeology Center is offering a 4-day workshop for persons who want to experience real archaeology -- digging, sifting, and discovering! You will work with a real archaeologist excavating at an important ancient Hohokam village, the Sabino Canyon Ruin, to learn about excavation and discovery for yourself.

Adults and kids ages 12 and older are welcome to enroll. Just as real archaeologists don't collect ancient artifacts for themselves, Sabino Canyon Ruin excavation participants do not get to keep any of the artifacts they dig up. Instead, all items recovered will be curated at the Arizona State Museum, University of Arizona, upon completion of Old Pueblo's studies.

Cash, checks, Visa, and Mastercard are accepted for all Old Pueblo Archaeology Center programs.

The Sabino Canyon Ruin summer program will be held from 7:30-11:30 a.m. each day Tuesday through Friday, June 27-30. The $128 fee per person includes an Old Pueblo Archaeology Center membership, allowing an enrollee to continue volunteering in Old Pueblo's excavations on 10 Saturdays within the coming year. Pre-registration by 5 p.m. June 16 is required.

Old Pueblo Archaeology Center also offers archaeological field school and volunteer sessions at the Sabino Canyon Ruin on two Saturdays every month. The Saturday sessions are set up as a two-day program but single-day reservations are okay. On the first Saturday of each month the session begins with an orientation to show participants how to recognize artifacts and to provide information about the site's ancient residents and about archaeological methods. Most of the day is then spent excavating under the supervision of an archaeologist. During the final two hours registrants get to clean and label recovered artifacts. The second Saturday skips the orientation, allowing more time for digging.

Persons who sign up for two field school days may continue volunteering in the excavations for one year.

The next scheduled Saturday Sabino Canyon Ruin field school sessions open to the public -- and to *Archaeology Opportunities* member volunteers -- will be on June 3 & 17, July 8 & 22, August 5 & 19, and September 16 & 30, from 7 a.m. to 3:30 p.m. each day. Cost for a single Saturday session is $35 per person; the two-day program that includes the one-year membership costs $50.

The Sabino Canyon Ruin is on private property in northeastern Tucson about a mile away from the Sabino Canyon Visitor Center. Directions are provided upon pre-registration. For more information call Dr. Eric Kaldahl at Old Pueblo Archaeology Center, 798-1201. For Saturday dig reservations call at least a day ahead of the field school date.

Archaeology Digs at Fort Huachuca

Volunteers can assist Old Pueblo Archaeology in test excavations at historical archaeological sites on Fort Huachuca on two Saturdays per month through September. As detailed in the article on page 8, this activity is resulting in great finds of bottles and other glass artifacts, metal objects, ceramics, animal bone, and other food remains discarded in two dump sites on the post, one near the Officers' Quarters, the other near the enlisted men's and Apache Scouts' homes.

The digs are sponsored by the U.S. Army/Fort Huachuca under a contract issued to Old Pueblo through Tucson's Engineering and Environmental Consultants, Inc.

Volunteers are needed to assist in the excavations beginning at 8:00 a.m. and continuing to 2 p.m. on Saturdays, June 10 & 24, July 15 & 29, August 12 & 26, and September 9 & 23. Meet at the Fort Huachuca Archeological Laboratory and Curation Facility. To get there from Sierra Vista, enter Fort Huachuca through the main gate, turn right on Brainard Road, then turn right again onto Machol Avenue and follow the signs to the lab. The activity is free and open to the public. For information and reservations call Old Pueblo Archaeology Center at (520) 798-1201 and ask for Eric Kaldahl.

ARTIFACT OPPORTUNITIES

Fort Huachuca Archaeology Lab

Old Pueblo Archaeology Center seeks volunteers to help clean, label, and catalog artifacts from a prehistoric archaeological site on Fort Huachuca, near Sierra Vista, Arizona. The artifacts are from the Garden Canyon site, an ancient Indian village occupied from about A.D. 600 to 1300. The activity is sponsored by the U.S. Army/Fort Huachuca under a contract issued to Old Pueblo through Engineering and Environmental Consultants, Inc.

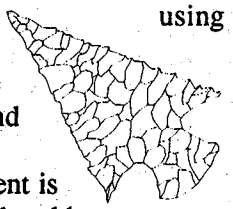
This free activity is being done at the Fort Huachuca Archeological Laboratory and Curation Facility (see directions above) from 2 to 4 p.m. and 6 to 9 p.m. every Thursday, and from 9 a.m. to 2:30 p.m. every Friday, through July 7. For information and reservations call Darla Pettit at (520) 798-1201 Mondays-Wednesdays, or at (520) 533-4451 on Thursdays and Fridays.

Program dates & times are subject to change. Call Old Pueblo Archaeology Center at (520) 798-1201 for latest information & for reservations.

Old Pueblo Archaeology Center's Ancient Technology Workshops

Arrowhead-Making and Flintknapping Workshops

Archaeologist Allen Denoyer will offer his popular "Arrowhead-Making and Flintknapping" workshop on June 24 and again on July 22. As he teaches you how to make an arrowhead out of obsidian and other stone just like prehistoric Arizonans did, Allen helps you understand more about prehistoric people by studying how they made and used their artifacts.



For each session all equipment is provided, participation is limited to 11 persons ages 9 and older, including adults. Cost for the class is $25 per person, and pre-registration is required.

Atlatl & Spearmaking Workshop

Allen Denoyer also will offer a June "Making & Using Atlatls (Spear-throwers) & Spears" workshop. In this Native American technology workshop, he teaches how to fashion traditional atlatls and wooden spears like those utilized by ancient peoples worldwide, using natural Sonoran Desert woods and leather materials. He will show how to straighten the spear by heat-curing over an open fire, and talk about how prehistoric lifeways are better understood through experience of ancient people's artifacts and technologies.

You need to bring your own pocketknife to carve the wood, all other equipment is provided. Participation is limited to 11 persons ages 9 and older.

The atlatl workshop will be offered on Sunday, June 25, from 9 a.m. to noon. Cost is $40 per person, and pre-registration is required.

Both the Arrowhead-Making & Flintknapping Workshop and the Atlatl & Spearmaking Workshop are held at Old Pueblo Archaeology Center, 1000 E. Fort Lowell Rd., from 9 a.m. to noon on the dates listed. For more information or reservations on either one call Old Pueblo Archaeology Center at 798-1201.

Recent Archaeological Work at the Continental Site

Jeffrey Jones and Allen Dart

The Continental archaeological site, AZ EE:1:32 (ASM), was a large Hohokam village ruin alongside the Santa Cruz River in Green Valley, Arizona. In 1995 Old Pueblo Archaeology Center conducted excavations there, exposing nine ancient Hohokam structures and other features occupied year-round between A.D. 1225 and 1290.

This past May, Old Pueblo's archaeologists returned to the northwesternmost portion of the Continental site, owned by Mr. Burwell Newton, and excavated three Hohokam pithouses and several roasting pits.

One of the pithouses excavated during this project was an irregular structure with a prepared mud floor, a slightly ramped entryway that faced south, and 38 postholes both inside and outside, including a concentration of postholes inside the eastern half of the structure suggestive of some sort of raised floor or shelf. No interior firepit was found but four whole ceramic storage vessels were discovered resting in shallow pits along the edges of the floor. Above this floor assemblage was an intentionally deposited layer of Hohokam trash. The lack of a hearth, the raised floor or shelf, and the whole vessels, at least some of which contained charred corn kernels, suggest this structure was a storehouse. Five pits in the area immediately around it may indicate an outdoor communal food processing and storage area.

A second pithouse still contained a remnant of a large center post, an outer ring of standing, burned posts, and a plastered mud floor with a clay-lined hearth. A large assemblage of burned ground stone artifacts including metates, manos, pestles, a mortar, agave knives, and portions of at least three pottery vessels were found on its floor.

The third pithouse provided more of a surprise. It was semirectangular, with a mud-plastered floor and a rock-lined fire ring. The surprising part was that after it had been destroyed, a young man's body was cremated in the same location as the house, then was left in place after burning. This burial was accompanied by several broken pottery vessels, some chipped stone flakes, small pieces of ochre, and a modeled ceramic spindle whorl. It was also found to have a section of a rattlesnake skeleton and bones of a roadrunner-sized bird, a dog or coyote, a rabbit, and possibly a rodent of some kind apparently intentionally buried along one edge of the burial pit. Some of these creatures may have been funerary accompaniments. All of the human remains, animal bones, and burial artifacts were transferred to the Tohono O'odham Nation for reburial in a tribal cemetery after excavation.

Pottery recovered during this project suggests the northwestern periphery of the Continental site was occupied during the Tanque Verde phase, between 1150 and 1300. The recovered artifacts and data will be used to investigate ancient Hohokam subsistence, settlement, adaptation to the environment, trade and exchange patterns, and social networks for an upcoming final report.

An Update on the Fort Huachuca Volunteer-Assisted Historical Sites Testing Program

Eric Kaldahl and Allen Dart
Old Pueblo Archaeology Center

Last year Old Pueblo Archaeology Center was subcontracted by Tucson's Engineering and Environmental Consultants, Inc., to conduct public-assisted artifact management and excavation programs under EEC's general consulting contract with the U.S. Army at Fort Huachuca. Both kinds of public programs allow Sierra Vista-area and other volunteers to participate in archaeological research and collections management without fee.

The two artifact management work orders currently being fulfilled by Old Pueblo include developing a cataloging and data retrieval/management system for the existing artifact collections from the Garden Canyon archaeological site on Fort Huachuca, and processing those collections for curation in the Fort Huachuca Archeological Laboratory and Repository (see "Artifact Opportunities" on page 6).

This article summarizes Old Pueblo's fieldwork project. The sites selected for field study by the post archaeologist include two Historic period refuse dumps: the Heritage Park site, AZ EE:7:148 (ASM); and the Game Management site, AZ EE:7:264 (ASM).

Research Questions. The test excavations at the two archaeological sites are being done to address the following questions:

1) How old are the artifacts contained in the sites?

2) How disturbed are the deposits?

3) Is it possible to identify social and possibly ethnic groups or activities that contributed to the trash deposits?

4) What groups of people deposited the trash?

5) What activities are represented?

6) What differences exist between the artifacts recovered at the two sites?

For background information to address these questions archival records of Fort Huachuca and historical photographs at the Fort's Museum and at other local museums and area historical societies are being consulted. These records will be used to assess what structures were located near the two trash dumps, who might have been using those dumps, and what activities were conducted in their proximity.

Fieldwork Methods. After Fort Huachuca personnel cleared overgrown vegetation from both sites, fieldwork began with establishment of a meridian and baseline through each and staking these lines at 10 m intervals. All measurements taken in the course of the program are in metric as there are no known historical structures that might make English measurements preferable.

While the baselines were being laid out and recorded a careful surface inspection was conducted to locate and sketch trash mounds, sheet trash, and probable site perimeters. Excavation units have been placed in all three of these areas to assess each site's perimeter, the depth of trash mounds, and the degree of disturbance in the mounds. Excavation has proceeded in 20 cm arbitrary levels within 2 m by 1 m test units, and recovered fill is being

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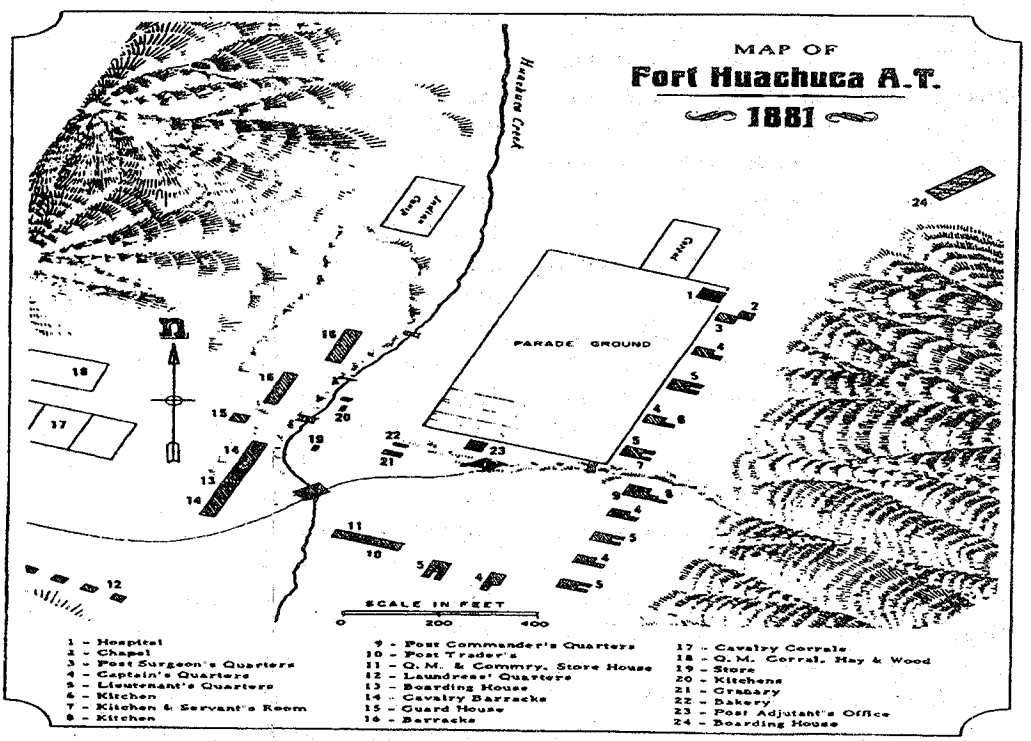

J. C. Kelton's 1881 map of Fort Huachuca. The Heritage Park archaeological site is alongside Huachuca Creek, 1 mile north of the fort's parade ground. The Game Management site is ½-mile east of the parade ground (across the ridge on this map), along Soldier Creek. Reproduced from *The Forgotten Soldiers: Historical and Archaeological Investigations of the Apache Scouts at Fort Huachuca, Arizona*, by Rein Vanderpot and Teresita Majewski (Statistical Research, Inc., Tucson, 1998).

An Update on the Fort Huachuca Volunteer-Assisted Historical Sites Testing Program (Continued from page 8)

screened through ¼" hardware cloth to recover artifacts and ecofacts.

After a brief fieldwork period in which artifacts found in excavation units were mostly analyzed and described in the field, then reburied, all artifacts are now being brought back to the Fort Huachuca Archeological Laboratory and Repository except for window glass and nails, which are being recorded on artifact tally sheets then left in the field.

Old Pueblo anticipates that 10 field days will be spent in test excavations at each of the sites, continuing two Saturdays per month through September.

The Heritage Park Site: A Heritage of Soldiers and Apache Scouts. The Heritage Park site is a very large historical dump. The central portion of the site, as defined by its large trash mounds, measures 150 m by 40 m. Five of the 10 originally proposed field days at this site are now complete, and eight 2 m x 1 m test units have been excavated or started.

One unit was placed on a ridgetop east of the site to assess sheet trash depth in that area and facilitate training of volunteers in an area of relatively shallow cultural deposits. The shallow depth of the deposit there and the proximity of bedrock to the current modern ground surface suggest that the ridgetop was scraped clean of trash deposits at some time past and the deposits were moved downslope to the west over the top of the site's central deposits.

Feature 1 is the site's most obvious trash mound, occupying the central-north portion of the site and measuring roughly 95 m by 20 m. Four excavation units have been placed in the central and southern portions of this feature. Two of them are still recovering cultural materials at depths greater than 1 m and seem to confirm that trash was bulldozed from the eastern ridgetop toward the center of the site, as the upper 40 cm of trash in each is disturbed, suggesting redeposition.

Below 40 cm the strata do not indicate any profound disturbance and the trash deposits appear to be undisturbed by land-modifying activities. The deposits in the lower levels of these two deeper units contain abundant ash, artifacts, charred earth, and debris suggesting former burning of the dump's materials. Local informants who used to collect bottles at the site as teenagers in the 1960s suggest that sterile deposits should be reached in these two Feature 1 units at about 140 cm below surface.

The other two units actually excavated within Feature 1 were placed adjacent to the first two to reduce the likelihood of collapsed unit sides and probably will not be excavated to the bottom of the trash deposit.

Along the western edge of Feature 1, on the western edge of the site next to Huachuca Creek, a unit was dug to assess depth to sterile deposits in sheet trash. In the 40-60 cm level of this unit large smoothed cobbles similar to those found exposed in the banks of Huachuca Creek were encountered. This unit's deposits were relatively intact and gave no indication of redeposited materials from earth-moving activities.

One other test unit has been established to assess the depth of Feature 1 at its extreme southern terminus but the first excavation level there has not yet been completed.

Feature 2 is a 35 m by 20 m trash mound at the south end of the site. One excavation unit was established in its center to assess the depth of the deposits and their age relative to Feature 1. Sediments in the Feature 2 test unit have less ash and burned earth than those in Feature 1, and no indication of any bulldozing disturbance in the upper strata.

Artifacts at the Heritage Park site have included a broad array of materials. Official Army serving ware bearing the stamp of the Quarter Master Department (QMD) and the Quarter Master Corps (QMC) have been recovered. This change in nomenclature occurred in the second decade of the twentieth century, indicating the presence of serving wares from both before and after that time.

Abundant food waste has been encountered including large animal bones with saw marks. Doll parts, ceramic bottles for home-made beer, oyster shells, abundant amounts of ammunition, and numerous parts of wagons and tack for horses and mules have been unearthed. Heritage Park is in the vicinity of the stables and the soldiers' barracks, and the site is also in proximity to the Fort's Apache Scout villages. More recent trash includes painted glass artifacts of 1920-1930s vintage designed to "simulate" porcelain vessels and transfer-printed plates, and beer bottles bearing Mexican maker's marks. The latter may reflect the trade and smuggling of alcoholic beverages across the international border during the Prohibition era.

Abundant "sun-colored amethyst" (purple) glass indicates artifacts much of the deposit dates between 1880 and World War I, and some materials are from the 1920s and 1930s, but further analysis will be needed to determine the earliest use of the Heritage Park dump site. Given what has been accomplished in five field days at this site it may be possible to conclude field work there in another five field days unless attendance by volunteers continues to drop through the summer months as volunteers take vacations or return to their summer homes. *Continued on page 10*

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An Update on the Fort Huachuca Volunteer-Assisted Historical Sites Testing Program (Continued from page 9)

The relatively intact nature of the Heritage Park site central dump deposit beneath the upper 40 cm of disturbed trash, and the wealth of unbroken artifacts, the substantial bone assemblage, and material of everyday soldiers in the lower deposits make this site a treasure-trove of information potentially important to studying the early history of the Fort, including the diet and economic access of late nineteenth and early twentieth century soldiers and perhaps Apache scouts at Fort Huachuca.

The Game Management Site: Insights into the Lives of Officers (and Others)? The Game Management site is also a historical dump with surface artifacts from the nineteenth and twentieth centuries. Measuring roughly 60 m by 40 m, it contains several trash mounds. Five 2 m by 1 m test units have been opened and four of Old Pueblo's 10 proposed field days at this site have been completed.

Feature 1 at the Game Management site is a trash mound just west of the site center, Feature 2 is a far more amorphous trash mound upslope at the southeastern site boundary, and Feature 3 is a very well defined trash pile at the extreme western edge of the site.

The Feature 1 trash mound was investigated with one excavation unit that revealed intact and relatively concentrated trash deposits. Excavation in this unit was ended when large angular fragments of bedrock were encountered at the base of Level 4.

In Feature 2 the first test unit excavated encountered bedrock after excavation of three 20 cm levels. Obvious bottle-hunter's spoil pits in this unit's fill suggest more looting activity occurred in this area of the site but by and large the deposit remains undisturbed. Another test unit recently opened just north of the first in Feature 2 contains much more industrial debris such as sewage tiles and bricks.

Feature 3 is being investigated with one test unit so far. In the first and second 20 cm levels that have been excavated to date we have seen little disturbance but a very rich array of artifacts, particularly glass.

Another excavation unit was placed in sheet trash outside of the mounds in the north-central portion of the site to assess deposit depth beyond the trash mounds. Only two levels were excavated before this unit reached bedrock. By the second 20 cm level hardly any artifacts remained indicating very shallow trash deposits in the nonmound areas of the site, but no disturbance due to looting is indicated.

Artifactwise, the Game Management site clearly has more porcelain and fine-quality whiteware and creamware serving plates that the Heritage Park site. Blue and brown transferprints are common but no Army-issued serving vessels have been observed. Sun-colored amethyst glass is abundant, once again indicating deposits after 1880 and before 1917. Recovered ammunition has been more diverse than the cartridges and bullets recovered at the Heritage Park site, and some of the ammunition apparently is not Army issue. An insignia featuring crossed empty saber scabbards and a piece of a lyre used by marching bands to affix music to instruments have been recovered, and buttons, doll parts, and oyster shells are common. Food bones are also common and bear evidence of being sawed in a butcher's shop.

The Game Management site is in the vicinity of the historic Officer's Row and later in time was in proximity to the Officer's Club. The presence of the more expensive and unusual artifacts in the site is consistent with the differential economic access of officers and their families as compared to enlisted men and Apache scouts whose trash seems to comprise the Heritage Park dump site. Interestingly, though, two test units at the Game Management site have unearthed flaked stone tools including a projectile point, and flaked glass artifacts.

The flaked glass is likely part of an Apache toolkit, because given the very thin walls of bottle glass only fairly skilled flintknappers could create long, narrow, complete glass flakes like some that have been recovered. Another bottle base has so many flake scars it can be defined as a core. As the Game Management Game Management site is at some distance from the location of the Apache Scout encampments these are very surprising finds.

Until the analysis stage of the project is complete, a beginning date cannot be assigned to the Game Management dump ground, but artifacts clearly from the turn of the last century are indicated. The expensive ceramics and foodstuffs being recovered from the Game Management site indicate the site has the potential to provide information about the lives of Fort Huachuca's officers, their families, and their access to markets and foodstuffs during the late nineteenth and early twentieth centuries. Also, the unexpected presence of potentially Apache-made artifacts could provide new insights into the use of Fort Huachuca by Apache families during the late nineteenth and early twentieth centuries.

The Educational Component of the Excavation Program. Part of Old Pueblo's job for the Fort Huachuca testing program was to educate the public about archaeology through hands-on participation. The paperwork that the volunteers have been expected to complete has been a major vehicle of education, as many volunteers previously had not been asked to provide as much detail in field records as Old Pueblo's paperwork demands of them. Moreover, volunteers have learned a great deal more about historical artifacts, proper recordation procedures for text on artifacts, and classification of historical materials.

The Educators' Page

Old Pueblo Archaeology Center's Classroom Programs and Teacher Workshops

Old Pueblo Archaeology Center is southern Arizona's **premier** provider of classroom enrichment programs about the ancient cultures of Arizona and about the science of archaeology. We serve over **1,000 students per year** from school districts throughout southern Arizona. If you haven't sampled our program offerings yet, read more about them here then give us call. Or talk to some of the teachers in your school who have already taken advantage of these innovative learning opportunities. Chances are that we have a program that will complement your classroom's curriculum.

MOCK ARCHAEOLOGICAL EXCAVATION FOR GRADES 3-6 (but OK for 3-12). The "Old Pueblo Educational Neighborhood" (OPEN) program allows children and adults to learn what archaeology is all about by excavating in "OPEN1," a full-scale model of an archaeological site, located at Fort Lowell Road and Park Avenue. The OPEN1 site is a mock dig that archaeologists have constructed to resemble a southern Arizona Hohokam Indian village ruin. Students learn about the science of doing archaeology, the culture of ancient Arizona desert farmers, and the means of studying ancient cultures through artifacts and ruins. Old Pueblo offers both a 2 -hour and 5-hour program. **The *Arizona Humanities Council* and *Old Pueblo Archaeology Center* have made $13,000 of classroom scholarship support available for the 2000-2001 academic year** to help economically disadvantaged schools attend OPEN1 programs.

CLASSROOM OUTREACH TALKS FOR GRADES K-12. Old Pueblo's OPEN-OUT (Old Pueblo Educational Neighborhood Outreach) programs offer 45- to 60-minute presentations by a professional archaeologist for elementary through high schools. The presentations are designed to give students an idea of what archaeologists do, how they do it, and what their work has revealed about ancient peoples. Depending on the age of the children, a hands-on activity or a story may be included.

TOURS OF THE SABINO CANYON RUIN FOR GRADES 4-12. The Sabino Canyon Ruin is a Tucson archaeological site where ancient Hohokam Indians lived between AD 1000 and 1350. Still present today are the ruins of above-ground structures and semi-subterranean abodes called pithouses. There is an enigmatic enclosure with walls up to 4 feet thick, and ancient irrigation canals once flowed nearby. Old Pueblo's ongoing research program has excavated at the site since 1995. Our 2-hour archaeologist-guided tours of the Sabino Canyon Ruin excavations emphasize the life of the ancient villagers and show highlights of our ongoing archaeological investigations.

SABINO CANYON RUIN EXCAVATION FOR GRADES 7-12. Classes that come to the Sabino Canyon Ruin for hands-on learning programs receive an orientation in archaeological methods and the way of life of the Hohokam, then actually get to excavate at the ruin and follow up by washing and processing artifacts they recover. Program length may be 5 hours to several days.

CLASSROOM SCHOLARSHIP PROGRAM. Old Pueblo recently raised $7,000 to help economically disadvantaged schools attend both our OPEN1 and Sabino Canyon Ruin youth programs at reduced program rates. In addition, Old Pueblo has been awarded a $6,000 grant from the Arizona Humanities Council for helping classes attend our OPEN1 programs in the coming academic year. Old Pueblo can award a scholarship of up to $250 per program, with amounts based on the percentage of students in the school who qualify for free or reduced meal support according to the Arizona Department of Education's records.

PROJECT ARCHAEOLOGY WORKSHOP FOR TEACHERS is a college accredited, interdisciplinary archaeology unit for teaching grades 4 through 7. The teaching guide contains 28 classroom tested lessons featuring specific subjects, essential skills, strategies, and cross-reference lists by skills and strategies. In the *Project Archaeology* workshops educators have the opportunity to become the students and experience the lessons hands-on. Participants get to tour an archaeological site, they receive an Arizona cultural history guide containing a series of essays written at the fifth grade reading level, and they receive lesson plans covering 12,000 years of Arizona's cultural history. The workshop lasts 16 hours and teachers can receive 1 hour of Pima Community College credit. Old Pueblo's Educational Project Director Dr. Eric Kaldahl will teach two *Project Archaeology* sessions, one in Tucson from June 13-16 and one in Sierra Vista on July 11, 12, 25, and 26.

ARCHAEOLOGY IN THE SCHOOLS, also a college-accredited workshop, is a hands-on experience at a real archaeological site in Tucson. Educators learn about the discovery process and methods of southwestern archaeology by excavating, interpreting finds, and processing the artifacts they unearth. Emphasis is placed on the relation between research questions, scientific methods, and cultural interpretation. This workshop lasts 16 hours and is offered on two Saturdays per month throughout the year. Like the *Project Archaeology* workshop, teachers can also receive 1 credit hour through Pima Community College.

Teachers: Check out the on-line publication *Archaeology & Public Education* at www.saa.org/Education/PubEd/a&pe/index.html for ideas on teaching archaeology to your classes!

Call Old Pueblo Archaeology Center today in Tucson at 798-1201! We'll schedule programs for this school year or the next! For field trips or classroom talks, Old Pueblo has an enrichment program that will suit your needs!

An oak leaves and acorns design adorns these historical ceramics recovered during Old Pueblo's testing at the Game Management archaeological site on Fort Huachuca (see pages 8-10). Photo by Eric Kaldahl.

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IN THIS ISSUE:

Ancient Engineers of the Southern Arizona Deserts, by Jerry B. Howard --
Part of *Old Pueblo Archaeology's* "Arts and Culture of the Prehistoric Hohokam Indians" series . 1
Old Pueblo Archaeology Center's June-September Activities for Volunteers 6
Old Pueblo Archaeology Center's Ancient Technology Workshops 7
Recent Archaeological Work at the Continental Site, by Jeffrey Jones and Allen Dart 7
An Update on the Fort Huachuca Volunteer-Assisted Historical Sites Testing Program,
by Eric Kaldahl and Allen Dart 8
The Educators' Page: Old Pueblo Archaeology Center's Classroom Programs & Teacher Workshops 11

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